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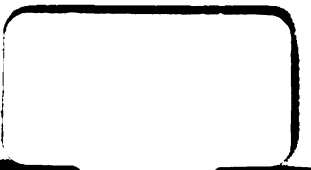

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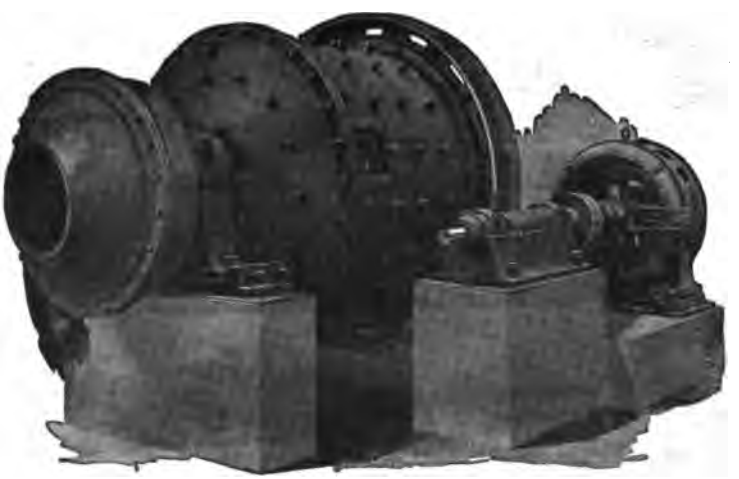

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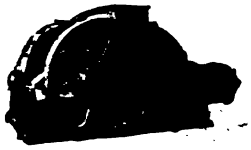

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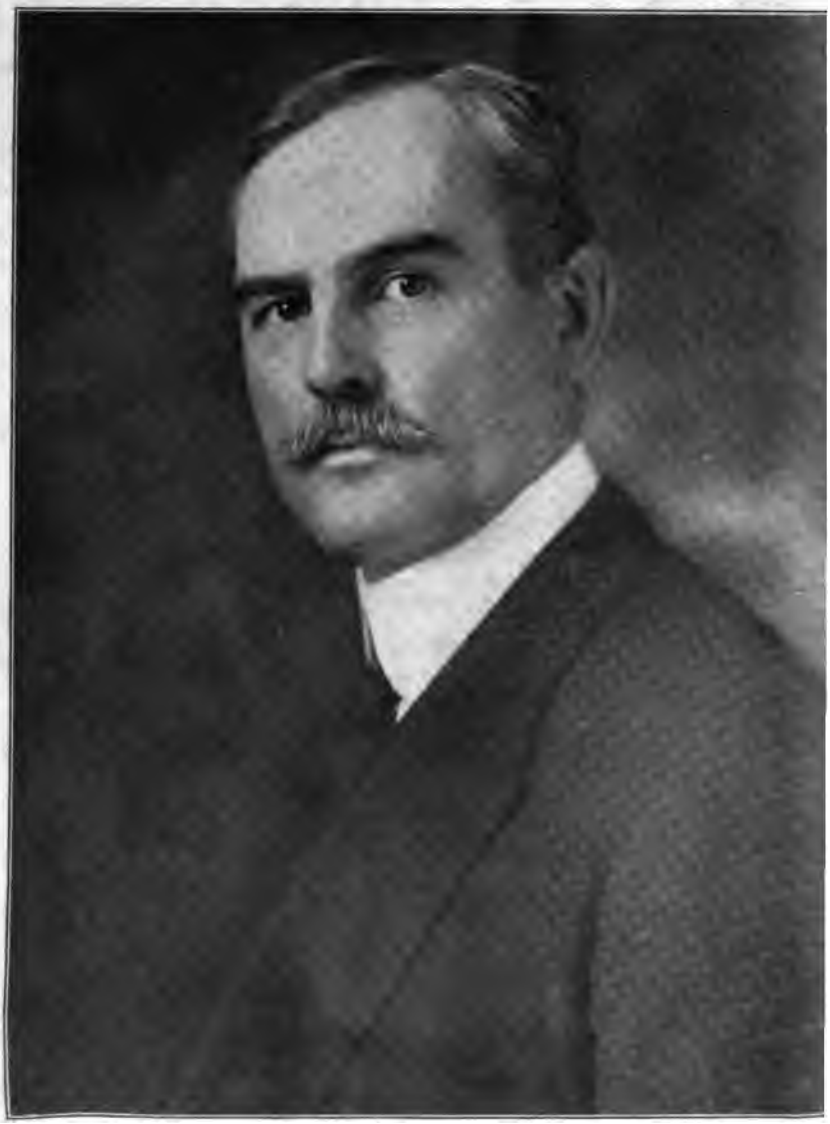

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Former Geologist in the U. S. Geological Survey, 1883-1906; Member Institution of Mining and Metallurgy of America; Fellow Geological Society of America; Author: Copper Mines of the World; Geology of Butte, Montana; Nature of Ore Deposits, etc.

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PREFACE

The present volume, covering the mining industry for 1918, 1919, and first quarter of 1920, has been entirely rewritten and descriptions of newly organized companies added. Statistical chapters covering all the metals are again given, and a glossary and chapter on ore minerals included.

The list of obsolete securities, or so-called "Dead List," has been omitted to make room for the thousand or more new companies added. A complete list of obsolete mining stocks will be published in a separate volume. A full list of the iron mining companies of the Lake Superior district is given, and the many mining corporations of the lead and zinc fields of Missouri, Oklahoma and Kansas are included.

The year 1919 was a very dull one for the base metal mining industry, and the big companies curtailed their production, while the smaller mines were shut down. The present year will see a widespread and active demand for all the metals, and a corresponding expansion of mine work.

The MINES HANDBOOK will hereafter be published annually, the delay in issuing the present volume being due to labor conditions and a shortage of paper.

Mr. M. von Bernewitz and M. Stencel have again been my valued assistants in the preparation of the book.

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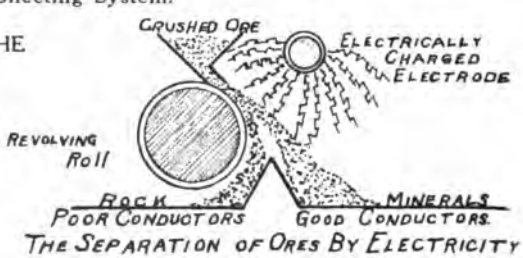

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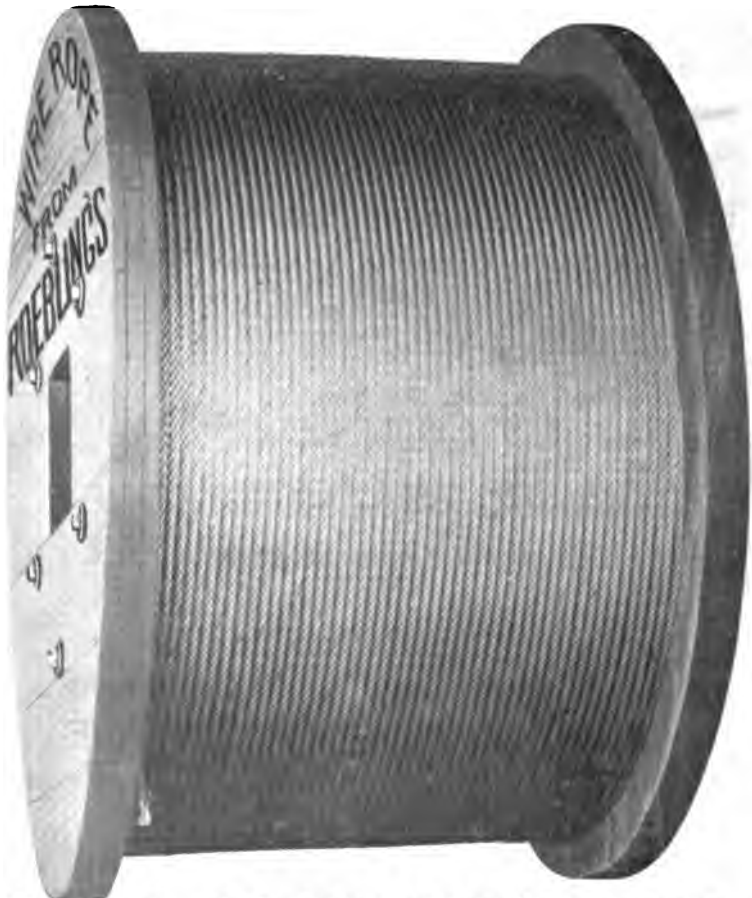

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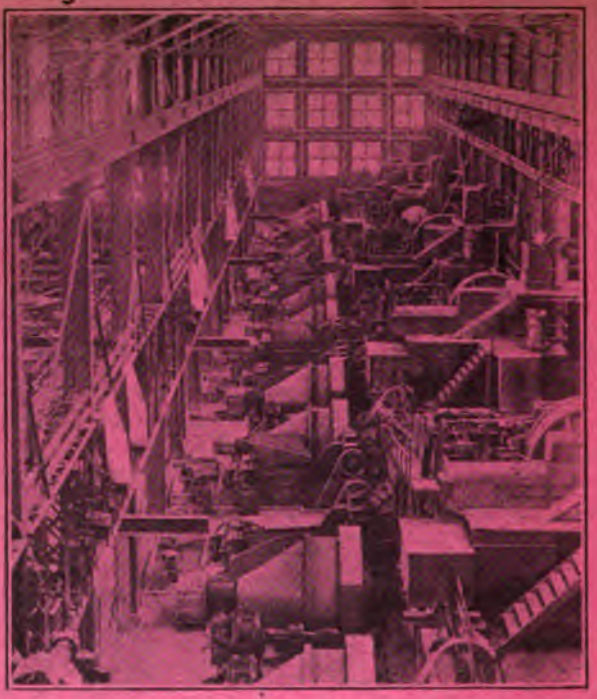

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(Descriptions of Mining Companies begins in Chapter IV)

CHAPTER I

GLOSSARY OF MINING TERMS

The following glossary of mining, milling, and trade terms will be found useful by many readers.

Acicular. Needle-shaped.

Acid. An acid of silicious rock is one in which bases are combined with silica. The antithesis of basic.

Adit. A level mine opening driven into a hill or mountain.

Adobe. Sun-dried brick used in all Latin-American countries.

Air-blast. A violent explosion caused by the escape of air compressed by the settling down of rocks in the upper workings of a mine.

Air-Compressor. A machine for condensing air to a pressure sufficient to actuate machinery. The compressed air is forced through pipes to various parts of the mine, or surface plant, and used in the same way as steam for driving drills, pumps, hoists, etc.

Air-doors. Doors built in mine passageways to stop air currents.

Air-drill. A drill driven by the elastic pressure of compressed air.

Air-shaft. A shaft used to provide ventilation for deep workings. Two shafts, one opening on slightly higher ground than the other, will provide natural ventilation underground, when connected by a drift, the longer shaft becoming a chimney, and the shorter an inverted syphon, down which the air is sucked with great force.

Alkali. Potash and soda are the common alkalis. An alkali is the opposite of an acid; it turns red litmus blue, and forms salts with acids.

Alloy. Two or more metals united mechanically, but not chemically by fusion.

Alluvium. Soil or broken rock deposited by the action of water.

Altered. An altered rock is one that has undergone changes in its chemical and mineralogical structure since its original deposition.

Aluminous. Containing aluminum.

Amalgam. An alloy of mercury with another metal such as gold, silver or copper. Mercury will not amalgamate with iron.

Amalgamation. The process of extracting gold and silver from crushed ores by amalgamation with mercury. The quicksilver is expelled later by heat, and recovered for further use.

[A]morphous. Without form.

[A]mygdaloid. A trap rock, containing vesicles or small rounded cavities filled by mineral matter such as calcite, agate, etc. Rock is spotted in outcrop often pitted as amygdules weather out, leaving cavity. In the Lake Superior district copper-bearing amygdaloids frequently show native copper in the cavities left by the leaching out of the soft minerals originally therein.

[A]nalysis. A determination of the constituents of a chemical substance.

[A]nhydrous. Devoid of water.

Anode Copper. Copper from a converter, cast in molds into plates with ears, and used in cells of electrolytic refineries.

Anticline. An arch or fold of rock-strata bulging upwards, in U shape; is the reverse of syncline.

Antigua. In Mexico, is a mine worked by Spaniards or Mexicans at a time so remote—from 50 to 300 years—that particulars have been forgotten; sometimes valuable, but "every antigua is not a bonanza."

Antimonide. An ore of any metal chemically united with antimony.

Apartado. Aparatado de correos is Spanish for postoffice box; usually abbreviated to Ap.

Apex. The top or uppermost part of a vein. In the United States the ownership of the outcrop or apex carries the right to follow the vein downward beneath another's ground, if within one's end lines extended.

Arastra. A circular rock-lined pit in which broken ore is pulverized by stones attached to horizontal poles fastened in a central pillar and dragged around by mules.

Arenaceous. Sandy; carrying silica as sand.

Argentiferous. Silver-bearing.

Argillaceous. Clayey.

Aroba. A Spanish weight of 25.36 lbs. avoirdupois; Portugese, 32.38 lbs.

Arroya. A gulch.

Arsenide. A mineral composed of arsenic combined with another metal.

Arsenopyrite. A mineral composed of arsenic sulphur and iron; often carries gold or silver also.

Assay. A test or ore or metal to determine the exact amount of any metal or metals contained in it. Usually fire assay; smelting on a small scale.

Assessment Work. The work required annually by the U. S. government, on an unpatented mining claim to keep title.

Attle. Cornish term for waste rock.

Auriferous. Containing gold.

Back. The rock above mine opening like the ceiling of a room. The part or section of a vein between two levels or between a level and the surface.

Bad Air. Air vitiated by powder fumes, noxious gases or insufficient ventilation.

Ball Head or Stamp. A steam stamp, named after its inventor.

Barilla (De Cobre). Spanish term for particles of native copper, cleaned (concentrates). Equivalent to the "mineral" of Lake Superior mines. Used mainly in Bolivia among tin producers.

Barranca. A deep gulch or canyon, with precipitious sides.

Barrel Work. Masses of crude native copper, picked out by hand before ore passes beneath stamp. Was formerly shipped in barrels to the smelter.

Barrow. A wheelbarrow.

Basalt. A dark colored heavy igneous rock, carrying much iron; a trap rock.

Base. Impure; an alkaline element.

Base Bullion. Copper or lead carrying much gold or silver.

Base Metal. Any of the non-precious metals.

Basic. Low in silica; containing more than enough iron and lime to form a good slag.

Basin. A syncline; a trough in the earth's surface.

Battery. A set of stamps, usually five in a stamp mill.

Bearing. The course of direction, as that of a mineral outcrop in degrees, east or west of, north (meridian).

Bed. A seam or layer of stratified rock. Used in some mineral districts for flat veins or lodes.

Bed Rock. The solid rock underlying stream gravel or rock.

Bedded Vein. One parallel with the bedding of the country rock.

Bells. Signals for lowering and hoisting the bucket, skip or cage in a shaft usually are given by bells, the number of strokes indicating the nature of the load, the place for stopping, etc.

Bit. The cutting end of a boring tool. A steel drill; a short hollow cylinder of soft steel, used in diamond-drilling. The diamonds are set around the inner and outer edges of the bottom of the bit, and cut into the most refractory rocks when the bit is rotated.

Black Copper. Impure copper, smelted, but containing impurities requiring refining.

Black Jack. Sphalerite, zinc blende of dark color.

Blanched Copper. Copper containing a large amount of arsenic, practically forming an alloy.

Blast. (N.) Air forced through tuyeres into a blast furnace or Bessemer converter. (V.) to explode gunpowder or dynamite.

Blast-Furnace. A cupola furnace in which ore is smelted, with the aid of air pumped in under pressure.

Blasted. A blasted miner is one who has been injured by the explosion of dynamite or gunpowder.

Blasting. The breaking of rock by means of high explosives, inserted in holes bored in the rock for the purpose.

Blende. Zinc-blende or sphalerite; sulphide of zinc.

Blind Drift. A drift connected with other workings of the mine at one end only; a cul de sac.

Blind Lode. A lode not outcroping at surface.

Blister Copper. Copper of 96 to 99% purity; applied to product of Bessemer converter.

Blocking Out. Exposing the ore in a mine so that it can be extracted by stoping. Properly speaking, ore is not blocked out for stoping until opened on three sides.

Blossom. The oxidized, softened outcrop of an orebody altered by weathering.

Blout. A mass of quartz, often mineralized, that is often isolated and not connected with a vein; an abbreviation of blow-out.

Blower. A fan used to force air into a mine; a blowing engine.

Blowing Engine. An engine for forcing air into blast furnaces under pressure, often about one pound avoirdupois per square inch.

Blowing In. A smelting furnace is blown in, when charge is ignited, fusion begins and the process of reduction by fire is begun.

Blowing Out. A smelting furnace is blown out when the metal and slag are tapped out, and the fires are allowed to die out.

Blowout. An outcrop larger than the orebody beneath; see blout.

Bluestone. Copper sulphate.

Bonanza. Spanish for pay-ore. Usually applied in United States to a body of exceptionally rich ore, especially in silver mines.

Bonnet. The cover or roof of a cage; also a steel casting connecting the piston-rod with the upper end of a stamp-shaft.

Bostonite. A light colored igneous rock composed mainly of potash feldspar.

Bore Hole. A drill hole bored for test purposes.

Bort (Bortz). A form of crystallized carbon between the diamond and the black diamond.

Botryoidal. Resembling a bunch of grapes.

Bottom. A mass of impure copper formed below the matte, in matting copper ores.

Boulders. Loose, rounded masses of rock, larger than cobbles.

Box Canyon. A canyon closed at one end.

Branch. A vein branching off from the main orebody.

Brattice. A screen for the regulation of air currents in a mine.

Breast. The face or innermost end of a mine working.

Breccia. A rock formed of angular fragments cemented together.

Brecciated. Broken into angular fragments partly or wholly cemented together.

Broken. A vein is broken when dislocated by faults.

Broken Ground. Rock strata where the walls are poorly defined and the general formation shattered.

Bucket. An iron or steel bucket used for hoisting men or ore in a mine. In a vertical shaft a bucket swings free, but in an incline shaft the bucket runs on a skidway of plank timbers.

Buddle. A conical table on which ore is dressed; formerly used in Cornwall, etc., and recently applied to a new concentrator.

Bulkhead. A wooden or masonry partition walling off part of a mine or protecting it against soft or creeping ground; also a damming back water

Bullion. Includes any of the base metals containing gold and silver: also mixture of gold and silver.

Bullion Bars. Unrefined gold and silver melted and cast into bars.

Bunch. A small mass or pocket of exceptionally rich ore.

Bunchy. An orebody containing small scattered masses or bunches of ore.

Cable. The steel wire rope used in shafts for hoisting buckets, skips or cages.

Cage. The elevator used in vertical shafts for hoisting ore and rock, and for lowering men, timber, etc.

Calcareous. Limey.

Calcine. To drive off sulphur, carbonic acid gas, or other volatile constituents of an ore by heating.

Calcining Furnace. A furnace for roasting ore to drive off sulphur, previous to smelting; also for heating cement materials.

Calcite. Crystallized calcium carbonate.

Cam. A double-curved tooth, fixed on a shaft, for lifting gravity stamps.

Camp. A mining town.

Canyon. A deep gorge with precipitous walls.

Cap. The top piece of a framed set of mine timbers; copper caps containing fulminate of mercury, used to explode dynamite in blasting rock.

Capping, or Cap-Rock. The rock or other ground above a mineral deposit.

Captain. In most mining fields where Cornishmen are employed the foreman in charge of mining work is termed a captain.

Carbonaceous. Any mineral in which carbon and oxygen are chemically united.

Carbonates. A term commonly applied in the western part of the United States to oxidized lead ores, usually argentiferous.

Carboniferous. Rocks of the coal age of geological eras.

Carga. A Mexican weight of 300 lbs. avoirdupois.

Cartridge. Dynamite put up in cylindrical cases of oiled paper to fit the holes bored by drills.

Casing. The wooden lining of a shaft; an iron pipe put down outside of a diamond drill hole when passing through soft or broken ground, to prevent the hole becoming clogged by matter intruding from outside.

Casting Copper. Impure copper better suited for casting into various forms than for drawing into wires or rolling into sheets.

Cave. A natural opening or vug in a rock formation; the part or complete falling in of a mine.

Caving System. A plan of mining, by which the worked out upper levels and surface are allowed to subside gradually, as the mine workings are deepened.

Cement Copper. Regulus; the loose and usually impure copper deposited on iron by copper-bearing waters.

Cerro. Spanish for a mountain or hill showing rock outcrops.

Chalybeate. Iron-bearing waters.

Chamber. A large stope.

Change House. Building where miners change their clothing before entering a mine.

Change Day. The day when miners are transferred from day shift to night shift, or the reverse.

Chapeau de Fer. French term for an oxidized iron outcrop; gossan or iron hat.

Charge. The amount of ore, flux and fuel fed to a smelting furnace.

Chert. A coarse impure chalcedony or flint.

Chile Bars. Bars of Chilean blister copper, weighing about 200 lbs each.

Chilean Mill. A grinding apparatus with three heavy wheels running around in a circular pan.

Chimney. An orebody or pipe shape in an approximately vertical position.

Chloride. A mineral (or ore) of any metal united chemically with chlorine; usually applied to hornsilver ore.

Chloride. (V.) To work the oxidized part of an ore deposit on a lease or tribute; a term used in the western part of the United States.

Churn Drill. A drill having a churning motion, used for boring oil wells, test-holes, etc.

Chute. A hole, usually lined with planks, used for dropping ore or waste to a lower level of a mine.

Claim. The area of 600′ x 1,500′, or 20 acres of U. S. public land staked off and claimed by a prospector or miner. Size of claims varies in different countries.

Classifier. A machine which separates mineral particles according to their weight.

Clay Gouge. A thin seam of clay separating ore, or ore and rock.

Clay Slate. An argillaceous slate.

Clean-Up. The collection or gathering together of accumulated ore or metal in a mill or smelter.

Cleavage Planes. The more or less regular lines along which slates and other metamorphic rocks break into slabs or leaves.

Coarse Jigs. The jigs used to handle the larger sizes and heavier grades of ore or metal.

Coarse Metal. Matte resulting from the first smelting in old-style smelting of oxidized copper ores.

Cobbing. Breaking masses of ore into lumps by hand hammers and sorting ore out.

Collar. The top of a shaft; surface timbering of a shaft.

Colloids. Non-crystalline materials.

Compartment. Mining shafts usually are divided into two or more compartments or sections, separated by framed timbers and planking.

Concentrate. The ore or metal, after part or complete elmination of gangue rock.

Concentration. The process of separating the metallic part of an ore from the waste rock or mineral in which it has been enclosed. It involves crushing to free the metallic particles. The separation may be by gravity, either dry or in water; by oil or froth flotation, or magnetic separation.

Concentrating Table. A table on which a stream of finely crushed ore and water flows downward and the heavier metallic minerals lag behind and flow off in a separate compartment.

Concentrator. A plant where ores are concentrated; a jig or machine for separating ore or metal from gangue-rock, the process usually employing a rocking or oscillating motion, aided by jets of water, whereby the worthless gangue is carried off and the heavier mineral remains.

Conchoidal. Breaking with a curved or shell-like face, or fracture.

Concretion. A rounded mass or nodule formed of mineral matter gathered about a center.

Conductivity. Electrical conductivity is measured by the resistance offered to the passage of an electrical current.

Conglomerate. A rock formed of pebbles and rounded boulders cemented together. Sedimentary conglomerates are ancient shore deposits whose pebbles and sands are hardened into rock. Volcanic conglomerates are formed of rounded masses ejected from volcanic vents cemented together by volcanic sand or ash (tuff) rock.

Construction Account. Many mining companies summarize their finances so that the cost of operation is divided into two classes, one being for general working expense and the other for construction, sometimes classed as capital account. It includes new buildings and machinery on surface and frequently new mine openings.

Contact. The junction of two dissimilar bodies of rock, as limestone and porphyry.

Contact Deposit. A mineral deposit found between two unlike rocks, usually applied to an orebody at the contact between a sedimentary rock, limestone, shale or sandstone, and an igneous rock.

Contract. In mining applies to an agreement between operator and workman to pay latter so much per foot for excavating drift or stope. These men are known as contract miners and are usually skilled workmen. They work harder than men on wages, due to the incentive of higher earnings.

Copper Ore. Rock carrying copper mineral or minerals. See detailed descriptions of copper-bearing minerals in Chapter III.

Core. A drill core.

Cornish Pump. A form of mine pump actuated by long rods reaching from surface down, mine shafts.

Costeaning. Proving an ore deposit or vein by trenching across its outcrop at approximately right angles.

Counterbalance. Hoisting plants usually are worked in counterbalance for deep shafts. The weight of the descending cage or skip is used to partly offset the weight of the ascending cage or skip.

Counter Vein. A cross vein running at approximately right angles to the main orebody.

Country Rock. The predominant rock about an ore deposit.

Course. The direction or strike of a vein; a stretch of mineralized matter in a vein.

Crab. A hand winch.

Creeping. The slow movement of the rock in mine workings caused by the pressure of super-incumbent and adjacent rock masses.

Cretaceous. A geological age characterized by chalky beds in England. The limestones of Arizona and Mexico are largely of Cretaceous age, and so are the coal-bearing beds of the Rocky Mountain region.

Cribbing. Close-set round timbers supporting an underground roof, or lining a shaft.

Croppings. Outcrops.

Cross-Course. An intersecting vein.

Crosscut. A mine opening, similar to a tunnel, that is driven across the rocks at approximately right angles to the orebody; a drift follows the lode or vein.

Cross Vein. An intersecting vein.

Crucible. A vessel of refractory material in which ores and fluxes are melted.

Crystals. Geometrical forms, with plane faces, of infinite variety, assumed by the majority of minerals.

Cupola. An upright furnace used in smelting.

Cupriferous. Copper-bearing.

Cut. To intersect an orebody; the portion of a working face of mineral removed at one operation.

Cwt. A hundredweight, or 112 lbs avoirdupois.

Cyanide. (V.) To treat crushed rock with a weak solution of cyanide of potash or of soda, dissolving the gold and silver, which is recovered by precipitating it with zinc (or aluminum for certain silver ore).

Datum Level. The level (usually sea-level or mean level of nearest considerable body of water) from which altitudes are measured in surveys.

Dead Roasting. Sulphide ores are dead roasted when all the sulphur possible to drive off by roasting has been eliminated.

Dead Work. Underground work which is not in ore; the opening of new shafts, drifts, and winzes preliminary to the stoping of the mineral bodies.

Debris. Broken down rock material; the fragmental material broken off by frost, etc., from rock exposures; talus.

Decomposed. Rock or ore altered and leached by air and water.

Decrepitate. To break into fragments with violence, under the blowpipe or great heat.

Dendrite. A moss or fern-like mineral stain or film usually of manganese or iron oxides.

Denouncecment. In Mexico, the formal filing of a claim to mineral land.

Denudation. The uncovering of rock or an ore deposit by the weathering of wind and water, or glaciation.

Dessication. Drying out; loss of water from any given substance.

Detritus. Debris; broken down rock, usually applied to gravel, etc., moved and deposited by streams or glaciers.

Denouncement. In Mexico, the formal filing of a claim to mineral ore deposit and to open up new and further amounts of ore.

Diabase. A dark trap rock composed largely of a felt of lathe shaped crystals of plagioclase feldspar, plus ferro-magnesian minerals, etc.

Diamond-Drill. A machine used for boring holes in rocks, with a hollow cylinder for a bit, whose end is set with black diamonds or bort.

Die. The iron block in a mortar, onto which ore is fed for crushing by a stamp.

Dike. A vein of igneous rock; locally a reef or wall of rock projecting above the ground; also applied to the hardened waste material filling fissures.

Diorite. A crystalline granitic rock with predominant plagioclase feldspar.

Dip. The inclination or angle at which a lode or vein pitches downward into the earth.

Dip Compass. A compass having the needle fixed to swing in a vertical plane, so it can be readily deflected by magnetic rocks.

Dirt. Frequently used to designate ore broken underground; for instance, in Joplin district, Missouri.

Disintegration. The breaking down of rock through weathering.

Disseminated Ore. Ore carrying fine particles of metallic minerals, usually sulphides, scattered through rock or gangue matter.

Disturbed. An orebody is disturbed when lacking defined walls and settled character.

Dolomite. Magnesian limestone; carbonate of calcium and magnesium

Donkey. A small auxiliary hoisting engine, usually operated underground and actuated by compressed air, or used for preliminary work at new shafts or exploring pits.

Downcast. A shaft having a downward air current.

Draftage. An arbitrary allowance claimed by some British smelters to cover loss of weight in transport.

Dress. To separate ore from gangue rock by hand or machinery.

Dressing Floor. A floor where ore is sorted by cobbing and picking.

Drift. A horizontal passage in a mine following the lode or vein.

Drift Copper. Native copper found in gravel and clay, far from original orebody, from which it has been carried by glaciers.

Drifting. Opening drifts; driving.

Drill. A steel bar with chisel shaped end used for boring in rock; is struck on the other end by a hammer, or is forcibly driven against rock by air piston.

Drill-Core. Solid, cylindrical cores of rock cut out by a diamond drill. These form a record of the strata through which the drill has passed.

Driving. Extending a drift horizontally.

Drum. The cylinder of a hoisting engine, around which the rope is wound.

Druse. The crystallized crust lining a cavity in rock or ore.

Dry Ore. Argentiferous ores containing insufficient lead for fluxing in a smelter.

Ductile. That which is capable of being extended in length by tension, as into wire.

Ductility. The capacity of a metal to elongate, when under pull from the ends, without cracking or breaking.

Dump. A place for depositing rock taken from a mine; a pile of ore or rock.

Dyke. See dike.

Dynamite. Nitro-glycerine held in wood pulp, infusorial earth, or some similar article, to render it safer in use. Strength varies according to percentage of nitro-glycerine contained.

Eisener Hut. German for iron hat, or gossan, occurring above an ore-body.

Electrolyte. The solution in which electrolytic separation of metals is carried on.

Electrolysis. The separation and redeposition of metals by electroyltic action.

Electrolytic. Applied to copper means copper made from impure metal by electrical decomposition and redeposition. The bar of impure copper is gradually dissolved and the pure metal redeposited at the opposite pole of the battery, while other metals fall as black slime to the bottom of the tank in which the solution (electrolyte) is held.

Elvan. Cornish name for dikes of greenstone, porphyrite and granite.

Erosion. The wearing away of surface masses of rock and soil by the elements, or by glacial action.

Eruptive. Igneous rocks, brought to the earth's surface or outer crust by volcanic activity.

Escarpment. A rock wall, nearly or quite vertical.

Exfoliation. The separation of thin leaf-like layers from a rock mass.

Exploders. A fulminating cap for setting off high explosives.

Exploitation. The productive working of a mine or ore deposit.

Exploration. Prospecting work; looking for ore.

Face. The inner or working end of any mine opening. A face of ore is the ore shown at the extreme end of a drift, stope, or tunnel.

Fahlband. A zone or band of crystalline rock, carrying finely disseminated metallic sulphides.

Fall of Ground. Rock falling from the roof into a mine opening.

False Set. A temporary set of timber.

Fan. A machine for forcing or sucking air into or out of a mine.

Fathom. Six feet. In stoping, a fathom is a cube of six feet.

Fault. Dislocation of a vein or of a rock stratum.

Feeder. A branch or small vein joining a larger one.

Ferruginous. Containing iron.

Filling. The waste material used to fill up old stopes or chambers; allowing a mine to fill with water.

Filter. A machine for removing the solution or moisture from crushed ore, either by forcing it under pressure or sucking it through canvas or cloth, leaving the muddy ore behind.

Fines. The finer particles of ore or metals saved in concentrating processes.

Finisher Jigs. The jigs used to save the smaller particles of ore in a concentrator or stamp mill.

Fire. The miner's warning cry when a blast is to be set off is "fire."

Fissile. Splitting easily into plates.

Fissure Vein. A fissure in the earth's crust filled with mineral matter

Flake Copper. Very thin scales of native copper.

Float. Loose ore or rock, away from its parent mass, on the surface.

Float Copper. Drift Copper.

Float Ore. Loose ore, often water worn ore, found at a distance from its outcrop.

Flocculent. Resembling tufts; cloudy masses of slightly cohorent material floating in a liquid.

Floor. The floor of a drift or other horizontal mine opening; the rock bed beneath an orebody.

Flour Copper. Very fine scaly native copper that floats on water and is difficult to save in milling.

Flotation. A process of concentrating or separating out the valuable metallic sulphide minerals of an ore, by mixing the pulverized ore with acid and oil and agitating it by air or paddles to make a scum or froth that takes up the metallic minerals and floats them off, leaving the waste behind.

Flume. A launder or conduit for carrying water.

Flux. Substances used in furnaces to form a fusible compound with the waste matter and make slag. In assaying, borax, soda, salt, etc., are used; in smelting, limestone, ironstone, etc.

Fluxing Ore. An ore containing appreciable metallic minerals, but smelted mainly because containing fluxing agents required in the reduction of richer ores.

Foliated. Having a laminated structure.

Foot. The foot-wall.

Foot-wall. The rock wall under a vein or underlying inclined mineral deposit.

Fork. The branching of a vein.

Formation. A term used by miners for any particular body of rock, as a granite formation, a sandstone formation. Geologists limit term to groups or rock beds of similar age.

Founders Shares. The few shares issued to the individuals organizing a stock company. In companies owned outright by other companies, founders shares are issued to as many individuals as are required to incorporate and hold the offices required for corporate management, as the laws do not permit a corporation, which is an artificial person, to form another corporation, or to serve as a director of another corporation.

Free. A metal is free when virgin or native, and not combined chemically with any other element.

Free Milling. An ore that readily yields metallic contents by simple means, such as amalgamation or cyanidation.

Freeze. A furnace freezes when the molten charge solidifies.

Friable. That which may be pulverized or broken up easily.

Froth. Foam; a mass of bubbles.

Furnace. A structure for the smelting or roasting of ore.

Fuse. A cotton cord with a gunpowder core, so made as to carry fire to an explosive.

Fusible. That which may be melted.

Fusion. Melting; alloying metals while liquid, through heat.

Gabbro. A rock composed mainly of plagioclase feldspar and iron magnesia minerals.

Gad. A small steel wedge or chisel.

Galena. Lead sulphide; see Mineralogy.

Gallery. A drift or level.

Gallows Frame. The timber or steel framework over the mouth of a

shaft, carrying a sheave-wheel, over which the hoisting rope passes to the engine; now commonly called head frame.

Gangue. The waste rock or mineral in which ore or metallic particles are held.

Gash Vein. A gash-shaped fissure vein, rapidly pinching downward.

Geode. A hollow crystal-lined cavity, or the rounded mass containing such a cavity.

Geological Horizon. Rocks of one geological age.

Geology. The science of the formation of the earth and the rocks of which it is made.

Giant Powder. Dynamite.

Girt (or Girth). A horizontal brace in direction of a drift in mine timbering.

Glaciation. The erosive effect produced by glaciers.

Glance. A metallic sulphide showing a bright shining surface. Copper glance is chalcocite; silver glance is argentite.

Glory Hole. A large open pit from which ore is or has been extracted.

G. M. B. Good Merchantable Brands, an English grade of refined copper. Term replaced by "Standard."

Gneiss (pronounced nice). A banded coarse-grained rock often formed of the same minerals as granite, often in patchy and irregular arrangement. May be a diorite gneiss, granite gneiss, etc.

Gob. Waste used to fill worked-out openings.

Gophering. Prospecting work confined to digging shallow pits or starting adits. Term used from similarity of this work to the crooked little holes dug in the soil by gophers.

Gossan. Iron hat; is the leached capping, usually quartzose, showing yellow to reddish brown iron stains found overlying veins.

Grade. The percentage, or value of ore and partly refined metals; the percentage of rise in roads or mine openings driven on an approximately horizontal plane.

Gram. A metric weight of 15.4 grains or 1-500 of a pound avoirdupois.

Granite. A dense, granular rock of igneous origin, composed of varying proportions of quartz, feldspar and mica.

Granulated. In the form of grains.

Gravity Stamp. A stamp, usually set in batteries of five, in which the piston is raised by a cam, the stamp crushing the charge in the mortar by its weight, when allowed to fall.

Greenstone. An altered basic porphyry; usually andesite or diorite.

Grizzly. A screen or grating of heavy iron rails or steel bars, through which the smaller pieces of rock or ore fall through.

Groundsill. The bed-piece of a set of mine timbers.

Guides. Perpendicular square wooden strips or stringers for guiding cages in vertical shafts. Cables or steel rails are used instead in some mines.

Gut. To rob, or extract, only the rich ore of a mine.

Hade (American). Inclination or dip of a vein, measured from the vertical, while dip is measured from the horizontal. Becoming obsolete, and should not be confounded with rake of an ore-shoot.

Hanging. The hanging wall; the rock on the upper side of a mineral vein or deposit.

Hardinge Mill. A cone-shaped cylinder, resting horizontally and half filled with pebbles, which fall and crush ore when mill is revolved.

Haulage Plant. A mechanical installation for the underground tramming of rock, operated by ropes, compressed air, or electricity.

Head or Heading. An underground level or airway in a mine; also water pressure.

Head Frame or Gallows Frame. A framework of 2 or 4 legs, made of wood or steel, fitted with sheaves, over the mouth of a shaft.

Heap-Roasting. Burning the sulphur out of ores piled in heaps, with a small amount of wood or other fuel.

Heave. A horizontal dislocation of a vein or bed caused by a fault. Also applied to the rolling out of line of a lode in making depth.

Hectare. An area 100 meters on each side; called pertenencias in Mexico; equals 2.471 acres.

Hoist. An engine for raising ore from a mine and for lowering men and material.

Holing Through. A drift or other mine opening is holed through when a connection is made between two separate sections working toward each other.

Horizon. The sky-line, commonly used in the sense of absolutely flat, as shown by a spirit level. Geologically, all rock strata of the same geological period.

Horse. A mass of country rock enclosed in a mineral vein or deposit.

Horsepower. A measure of power of an engine. One horsepower is rated as equivalent to raising 33,000 lbs. avoirdupois to a height of one foot in one minute.

Horse-Whim. A windlass operated by horses.

Hot Blast. Heated air supplied to a blast-furnace.

Hungry. Nearly or quite barren.

Hunt & Douglass Process. A leaching process, using chloride of iron and salt, to dissolve oxide ores of copper.

Huntington Mill. Somewhat similar to a Chilean mill.

Hutch. See Jig.

Hydrated, Hydrous. Containing water combined chemically.

Hydro-Metallurgy. The reduction of ores by wet processes.

Igneous. Rocks consolidated from a molten state; includes not only volcanic rocks but those deep-seated rocks, hardened under cover, which have been exposed to view by erosion, or artificial openings.

Impregnated. Containing metallic minerals, scattered or diffused through the mass; properly used in referring to country rock carrying mineral similar to that in the vein.

Incrustation. A solidified coating, usually crystallized.

Infiltration. The deposition of mineral matter from percolating waters.

Ingot. A mass of metal cast in a peculiarly formed mold; applied only to gold, silver, or copper. Iron and lead are cast in pigs.

In Place, In Situ. Rock or ore that is in the position where deposited by nature.

Intrusive. Igneous rock masses pushed up through other and older rock formations.

Iridescent. Showing the colors of the rainbow.

Iron Hat. Gossan; outcrop of iron-stained material over an ore deposit or vein.

Jack. A miner's term for sphalerite; is called black jack, ruby jack, or rosin jack, according to color.

Jig. A machine for concentrating ore; i. e., separating the metallic mineral from the waste, by means of oscillatory or vibratory motion, aided by jets of water. The heavier minerals sink, and the lighter rock or gangue is carried off by the current.

Jump. To locate and take possession of mineral lands held or claimed by another party.

Kaolin. China clay.

Keweenawan. Pertaining to or of the Keweenaw formation or rocks in which the Lake Superior copper veins occur.

Kibble. A bucket used for hoisting material in a shaft.

Kilo or Kilogram. A metric weight of 2.2046 lb.

Kilometer. 0.621376 miles. For rough computations may be figured as ⅝ of a mile.

Kin. A Japanese weight of 1.31 lbs. avoirdupois.

Kindly. The appearance of rock carrying or promising to carry good mineral value.

Ladderway. The series of ladders giving ingress and egress to a mine; the compartment in which the ladders are located.

Lagging. Timber, usually of small diameter, placed over the cap-timbers of incline shafts and drifts, to prevent damage from falling rock.

Lamina. A thin plate; plural is laminae.

Lamellar. In thin sheets of laminae.

Lander. The top man at the mouth of the shaft who receives signals from below, and attends to the unloading of rock sent up in buckets, skips or cages.

Launder. A wooden flume or sluice, used to convey water, or tailings held in suspension in water.

Lava. Rock from volcanoes.

Leach. To dissolve metals out of ore by water or acid, or both.

Leaching. The process of extracting a metal from its ores or salts by treatment with a solvent, such as weak acid.

Lead. (pronounced leed). A mineral body.

Leader. A small vein running into a larger one.

Ledge. The solid vein or lode.

Leg. An upright timber supporting the cap of a set of timber.

Lens. An orebody of lenticular form.

Lenticular. Having the shape of a double convex lens.

Level. A horizontal opening in a mine, usually connected with a shaft. Levels are commonly opened at stated intervals as depth is gained—usually at 100 feet in modern mining practice. The word "level" frequently is used interchangeably with the word drift, but is more comprehensive. Both drifts and crosscuts may be opened on a level, though a crosscut is not a level.

Limestone. A rock composed of lime carbonate.

Lixiviation. The process of leaching out the metallic contents of ores.

Locate. To locate a mining claim is to file a notice claiming ownership, at the point where mineral is discovered, and to put up stakes or monuments at the corners of the rectangular area claimed.

Location Work. Labor required by law to be done on mining claims within 60 days of location, in order to establish ownership.

Lode. A metalliferous vein. In Lake Superior region refers to the mineralized beds; is used generally as synonymous with vein; used by geologists as meaning an aggregation or congerie of mineralized veins.

Long Ton. An English ton of 2,240 lbs. avoirdupois.

Low Grade. Ore whose recoverable value yields but slight profit per ton. Carrying mineral value but sparingly.

Magma. An originally molten mass of rock coming to the earth's crust from depth.

Magmatic Segregation. The process by which the different constituents of molten rock masses crystallize at varying temperatures with a tendency to separate themselves, so far as circumstances allow, from the other compounds.

Malacate. A horse whim with vertical drum used for hoisting in Mexico. Sometimes is called a Zacatecas malacate.

Mass. Copper; a solid chunk of native metal.

Massive. Rock without defined lines of cleavage; ore occurring without appreciable gangue, as contra-distinguished from ore disseminated throughout a gangue.

Matrix. The rock between imbedded objects, such as a particle or mass of ore or native metal. More rarely a metallic mineral is the matrix cementing together rock particles.

Matte. A furnace product composed of copper and iron sulphides, produced by shaft or reverberatory fusion. Usually contains 30-40% copper, but varies from 20-60%. Is blown to blister copper 98-99% fine in bessemer converters.

Matting. The process of smelting sulphide ores into matte.

Mesa. Spanish for tableland or plateau.

Mesh. The size of openings in a screen.

Metalliferous. Carrying metal.

Metallurgy. The science and practice of reducing metals from ores and minerals.

Metamorphic. Rock that has been changed from its original condition by pressure, chemical action, heat, or other causes.

Metamorphosis. The process by which changes in structure are affected in a rock form by heat or percolating waters.

Metasomatic. Replacement, particle by particle, so that original structure is often preserved.

Meter or **Metre.** 39.37 inches.

Metric Ton. A weight of 2.204.6 lb. avoirdupois.

Mica. A scaly transparent mineral. Biotite is brown or black mica; muscovite or isinglass is the clear mica used in stoves, lanterns, electric apparatus, etc.

Mill. Works for treating ores without smelting.

Milling. Dressing ore in a mill; also dumping ore in a winze to be drawn off into cars or wheelbarrows on a lower level.

Mill Run. The treatment of a definite quantity of ore in a mill; also the result or yield thereof.

Mill Test. The determination of the metallic contents and recoverable values in any given ore by the milling of a sufficient quantity to afford average milling conditions.

Miner. In strict construction, the man that does the drilling and blasting in a mine. In a broader sense, all men working underground.

Mineral. Ore or rock containing metal. In the Lake Superior district the term mineral has a special use, being employed to designate the concentrate of native copper, with its small amount of admixed amygdaloid or conglomerate, as it comes from the mill, before going to the smelter.

Mineral Belt. The strip or zone of mineralized territory in a given formation or district.

Mineral Right. The ownership of mining rights under the surface of land owned by another holder. Mineral rights sometimes are reserved in selling land in some districts.

Mineralized. Carry metalliferous minerals.

Miner's Inch. The amount of water that will flow through an opening one inch square under a six-inch head, which is 2,274 cubic feet in 24 hours, or 94¾ cubic feet per hour, equal to 655 wine gallons or 593 imperial gallons hourly.

Mining Engineer. Graduates of technical mining schools are given the degree of engineer of mines and sign the letters M. E. after their names. The letters M. E. stand for mechanical engineer, when given by a school, but are often used by men engaged in mining, who lack scholastic degrees, as an abbreviation for mining engineer, or mining expert.

Missed Hole. A drill hole, charged with explosives, which fails to be set off by the fulminating cap.

Moil. A steel bar, like a drill, except that it is sharpened to a point instead of having a cutting face.

Molybdenite. A graphite-like, flaky lead-colored mineral found in some ores; composed of molybdenum and sulphur.

Momme. A Japanese weight equal to 3.75 grams or 2.4113 pennyweights.

Monocline. Upturned beds of rock that have a practically uniform dip.

Monzonite. A granitic rock intermediate between diorite and granite.

Morgen. A South African land measure—2.1165 acres, or 1.44 claims.

Mortar. An assayer's mortar in which rock or ore is crushed with a pestle. A mortar is the box, about the stamp of a mill, in which the ore is stamped and crushed.

Mother Lode. The main lode of the district. In America applies to the mineralized belt of the principal California gold region.

Mouth. The surface entrance or opening of an adit, tunnel or shaft.

Mucker. Ore shoveller, who loads the mine cars and in most mines is also a trammer, pushing the cars to the shaft or tunnel mouth.

Mullock. Australian for waste rock broken underground

Mundic. Pyrrhotite, magnetic pyrite; iron sulphide.

Mynpacht (South Africa). A part (10%) of a farm, which the owner has the first right to locate or peg out, when the farm is proclaimed a public goldfield.

Nickeliferous. Carrying nickel.

Nodule. A small concretionary, rounded mass of mineral matter.

Non-Conformable. Rock strata not associated originally in the position now occupied.

Nugget. A lump of native metal; usually applied to gold.

Open-Cast, Open-Cut. A mine worked as a quarry, or pit open to the sky.

Ore. Metallic minerals; mineralized material or rock, holding metallic minerals. Called pay ore when it can be profitably worked; low-grade ore when it yields but slight profit.

Ore-Car. A mine car for carrying ore or waste rock.

Ore-Chute. An opening in ore or rock through which ore is dropped downward. Also used for ore bins and pockets.

Ore Dump. A heap or pile of ore at the tunnel mouth or top of shaft.

Ore-Shoot. An orebody or portion of a vein carrying high-grade, or payable ore. Usually has a vertical or diagonal dip on the plane of the dip of the vein.

Orthoclase. A white, or pale-colored feldspar composed of silicate of potassium and aluminum. Occurs as white crystals or spots in porphyry.

Outcrop. The apex, or part of a vein or mineral deposit that is exposed at the surface of the earth.

Outlier. An isolated mass of rock or group of rocks lying at a distance from the main body, and separated therefrom, on the surface by a different rock formation.

Output. Production.

Overburden. Waste material, usually drift or alluvium above the solid rock, or orebody.

Overhand Stoping. Removing ore in ascending steps.

Oxide. An ore of any metal or metals chemically united with oxygen.

Oxidize. To unite with oxygen. Many minerals and most metals oxidize with greater or less rapidity when exposed to air or water.

Panning. To wash gravel, etc., in a pan, so that the sand and gravel is loosened and thrown out and the gold or heavy metallic minerals left in the pan.

Patent. A deed given by the Government, to mineral lands.

Patio. A walled yard with paved floor in houses and mine plants, in Mexico and other Spanish countries.

Paystreak. The rich band, part, or zone in a vein or ore deposit which carries the profitable, or pay ore.

Pegmatite. Very coarsely grained granite; a giant granite.

Penthouse or **Pentice.** A shed-roof erected in the bottom of a shaft, when sinking, to protect miners from accidental fall of rock, timber or tools from above.

Peroxide. The oxide of any metal containing the greatest proportion of oxygen.

Pertenencia. The unit of a mineral claim in Mexico; 100 meters square, or one hectare, 2.471 acres.

Peter Out. To pinch out, or feather out and end.

Petrology. The study of rocks by thin sections and microscope.

Phosphate. An ore of any metal or metals with which phosphorous and oxygen are chemically united.

Picul. A Chinese weight of 133⅓ lb.; commonly used in the Orient.

Pillar. A section, or block or ore left in place to support shafts or roofs.

Pinching. The narrowing of a vein.

Pinching Out. The narrowing of a vein to extinction.

Pipe Vein. An orebody of chimney form.

Pitch. The angle and direction of dip or take of an ore-shoot in a vein. If a vein dips east, an ore-shoot may pitch at a flatter angle than the vein, to the N. E. or S. E.

Plain. A flat or nearly level country.

Placer. A deposit of metal-bearing gravel or alluvium.

Plant. The machinery equipment of a mine or reduction works. In general use the term includes buildings, housing, machinery.

Plat. To draw to scale. In Lake Superior and Australian usuage it is the station or enlargement of a level, to give extra space for loading and unloading the cage, skip, or bucket.

Plumbiferous. Carrying lead.

Plutonic. Rocks of deep-seated, igneous origin.

Pocket. An orebody of small extent; a natural underground reservoir of water; a cavity cut in the rock underground to hold ore; a bin at shaft house or mill, in which ore, flux, or fuel is stored.

Pockety. Carrying only occasional bunches of good ore.

Poling. The process of deoxidizing molten copper and tin in a reverberatory furnace by stirring with long poles of green timber.

Poll-Pick. A tool having a pick on one end, and a poll, or hammer head, on the other.

Pood. A Russian weight of 36.112 lb. avoirdupois.

Poppet-Head. Framework or gallows frame over a shaft, for sheave-wheel and hoist rope.

Porphyritic. Carrying isolated crystals in a ground mass, like plums in a pudding.

Porphyry. Properly, is any igneous rock showing phenocrysts, i. e., distinctly isolated crystals in a dense or crystalline matrix. Porphyry may be granite, quartz, or one of several other rocks.

Pound. The troy pound alone is used for gold, silver, and platinum only. It is 0.82286 of an avoirdupois pound. A pound of gold weighs 12 troy ozs. or 5,760 grains and the avoirdupois pound 7,000 grains.

Primary. The first; primary ores are those first or originally formed in an ore deposit, before alteration began. Also applies to the oldest rock formations.

Prop. A heavy timber placed with its foot against the floor of a mine opening, and its top against the roof, to support the rock above.

Prospect. To seek for mineral; a new mining property that has not yet been developed enough to be called a mine.

Prospector. A searcher for mineral deposits.

Protoxide. The oxide of any metal containing the least proportion of oxygen.

Puddingstone. A coarse conglomerate showing rounded pebbles.

Pulp. Pulverized ore or concentrate.

Pulverize. To crush to powder.

Pulverulent. That which may easily be reduced to powder.

Pyrrhotite. Iron sulphide, often called mundic or magnetic pyrite.

Pyrite. Iron disulphide; fool's gold.

Pyrites. A local term for pyrite and for sulphide ores; more properly, iron disulphide.

Pyrolusite. A black manganese ore containing 63% manganese.

Quarry. An open pit, of varying size, sometimes several acres, from which stone or ore is mined.

Quarter-Section. In the United States a quarter of a square mile; 160 acres, laid out in a parallelogram, each side of which is one-half mile in length.

Quartz. Crystalline silica; any hard silicious ore, in miners' usage.

Quartz Claim. In the United States mining claims are of two classes:

placer claims, carrying mineral, usually gold, in alluvium; and quartz lode claims, any prospect carrying metalliferous bodies in place.

Quartzite. An altered (metamorphosed) crystalline sandstone.

Quartzose. Rock having much quartz in its composition.

Quicksand. Fine sand, which flows easily when wet.

Ragging. Cornish for rough cobbing; broken lumps of ore of medium size.

Raise or **Rise.** A shaft or winze that is being opened from below. Sometimes called upraise or uprise.

Rake. The pitch of an ore-shoot on the plane of the vein. Also applied to cross veins, which are sometimes called rake, or counter veins.

Range. A mineral belt; also in many American states a surveyor's term for describing and locating lands. The state is surveyed in sections, towns, and ranges. A township comprises 36 sections and is a square of six miles. Each township receives a double number, one for the town and one for the range. The towns are numbered consecutively from south to north, and the ranges are similarly numbered from east to west. Thus T. 2 N., R. 5 W. means Township 2 north or 12 miles north and Range 5, or 30 miles west of the State meridian.

Reamer. A tool like a bit, used to enlarge a hole previously drilled.

Reduction. The separation of metals from their ores.

Reef. A quartz vein or lode; a projecting ledge or inclined wall like an outcrop. The gold deposits on the Rand are termed reefs.

Refining. The elimination of impurities from crude metals, or separation of metallic alloys obtained in the reduction of ores.

Refractory. A refractory ore is one that cannot be smelted or otherwise treated by ordinary metallurgical processes. A refractory stamp-rock is one that is pulverized with unusual difficulty.

Regulus. The metallic material that separates and settles in the bottom of a pot of molten matte, or slag.

Reniform. Kidney-shaped.

Reserves. The amount of payable ore, developed and ready for extraction, or blocked out ahead of immediate requirements.

Reverberatory Furnace. A smelting furnace in which the flame from the grate below is reflected back by the roof on the charge of ore.

Rise. A raise or opening driven upward.

Roasting. Driving off sulphur and other volatile elements from ore, by heat. When done in a furnace, under great heat, the process is called calcining.

Rob. To remove pillars and other supports from a mine for their mineral content, regardless of the future of the property.

Rock. Lake Superior; applied to ore mined and ready for the stamp mill. In English practice ore is called "Stone." More properly applied to the stony matter surrounding ore, or constituting the earth's crust; is a synonym for stone.

Rock-Crusher. A machine for reducing rock or ore to smaller sizes. Crushers are of two types, the jaw and the gyratory. The jaw-crusher works by means of swinging jaws; the gyratory operates on the plan of a coffee-grinder, only that the motion is somewhat eccentric.

Rock-Drill. A power drill.

Rock Filling. Waste rock, used to fill up worked-out stopes to support the roof.

Rock-House. Lake Superior; the building (usually the one over the shaft) where copper-bearing ore from the mine is dumped from the ore skip (or bucket), is screened, crushed and stored in a bin, ready for shipment to the mill.

Rolls. Heavy steel rolls, worked in pairs, like a clothes wringer, for crushing rock and ore.

Roof. The rock overhead in a mine opening.

Room. Similar to a stope; term usually applied to mines working mineral bodies lying nearly horizontally.

Royalty. A percentage of the ore or value thereof paid to the land owner by the lessee of the mine; often a fixed sum for each ton of ore extracted.

Run. See mill run. A bar or course of ground better or worse than the average value of the mine.

Running Ground. Superincumbent material that breaks off readily and falls into the mine openings.

Saddle. Depression or U-shaped fold; the reverse of an arch or anticline.

Safety Cage. A cage furnished with automatic appliances to stop its descent in case the cable breaks.

Salting. Placing rich foreign ore, minerals or substances in a mine to deceive intending purchasers or other interested parties.

Sample. A specimen of ore from a mineral deposit. A selected sample is misleading because containing far above average value, and splendid samples frequently come from the poorest mines. An average sample is what its name purports—if it be an average sample.

Sampling. Cutting a representative part of an ore deposit, which should truly represent its average value. Most usually a trench-like cut 4 inches wide and 2 inches deep, cut into the clean face of ore and across its course. Honest sampling requires good judgment and practical experience.

Sand Pump. A pump, usually centrifugal, designed to lift water carrying large quantities of coarse tailings or sand in suspension.

Sand. Tailings from the stamp mills of Lake Superior copper mines: contract, from any mills.

Sand (or Tailings) Wheel. A large wheel, having buckets on its inner perimeter, for elevating water carrying stamp-sand.

Scale Copper. Copper in very thin flakes.

Schist. A crystalline, usually micaceous rock of foliated structure, made up of superimposed flattened particles.

Scoria. Slags from copper smelters; volcanic ash.

Scoriaceous. Of the nature of scoria.

Scram. To search for ore in a mine that is apparently worked out and to extract it.

Screen. A grating of perforated metal or woven wire.

Seam. A thin layer of rock or ore.

Secondary Enrichment. An enrichment of a vein or an orebody by material of later origin, often derived from the oxidation of decomposed overlying ore masses. Nature's process of making high-grade out of low-grade ores. First discovered by Weed and announced by publication in Geol. Soc. of America program, Dec. 8, 1899. Confirmed by Emmons and W. Van Hise, Feb., 1900.

Sectile. Easily cut.

Section. A field or district; also, in the U. S. a square mile of land.

Sedimentary. Rocks formed by deposition from water, as contra-distinguished from rocks formed by igneous action.

Selvage. A clay seam along which parting occurs; also called fluccan.

Set. A framed form of timber, used for supporting ground in a mine.

Shaft. A pit or deep mine opening.

Shaft-House. A building at the mouth of a shaft, where ore or rock is received from the mine.

Shale. A hardened clay with fissile structure.

Shear-Zone. A belt in which the rocks are crushed by many parallel fissures.

Sheave. A grooved wheel, notched to carry rope; an open pulley.

Shift. A miner's work period of 8 to 10 hours' time; a force of men employed on one turn.

Shift Boss. A mine boss, or under-captain, in charge of a gang or shift of miners.

Shoot. See ore-shoot. To fire or explode dynamite in holes drilled for that purpose. An erroneous spelling for chute.

Short Ton. A weight of 2,000 lb. avoirdupois.

Shot. A blast of some explosive.

Shot Copper. Small rounded particles of native copper, somewl resembling small shot in size and shape.

Shrinkage Stoping. Taking out ore by blasting it down on a heap broken ore. Working space for drilling is kept open by drawing out p of the ore from an opening beneath. Is a method of overhead stoping

Silica. Quartz, a compound of oxygen and silicon. Ordinarily sand composed largely, if not wholly, of silica.

Silicate. A mineral composed of any metal or element chemica united with silica.

Silicious. Containing much silica or quartz.

Sill. The floor-piece of a set of mine timbers.

Sinking. The process of deepening a shaft or winze.

Sinking-Pump. A movable pump, usually vertical, hung in a shaft, a lowered, as the shaft is deepened.

Skip. An iron box, open at the top, running on guides, on four whee and hauled by a cable; used for hoisting ore and rock, and for loweri timber.

Skip-Road (or Way). A track of T-rails, spiked to wooden sleepe on which a skip runs.

Slag. The melted rock or waste separated from the metal in a smel ing furnace.

Slice. To remove ore in mine in pillars, or by successive slices.

Slickenside. A polished rock surface, showing striations produced l the opposing walls of a fracture rubbing and grinding against each oth in the movement produced by earth stresses.

Slide. A bedding fault, or slipping caused by the subsidence of tl overlying rock formation; also applied to masses of loose rock, or ore on mountain slope.

Slime. Exceedingly small particles of rock and mineral held in su pension in water. This mud is called slum.

Slime Table. A circular revolving table, on which slim flows an minute particles of mineral are saved.

Slip. A fault.

Sludge. The mixture of rock and water, or slime, formed by a dia mond-drill.

Sluice. A wooden trough, box, flume, or launder.

Smelter. Works where ores or crude metals are reduced by fusion.

Soapstone. Steatite; a soft unctuous rock.

Soft Ground. Heavy ground; rock about underground openings tha does not stand well and requires heavy timbering.

Sollar. A platform or ladder landing in a shaft.

Spathic. Containing carbon dioxide; a carbonate.

Specimen. A sample of mineral selected because typical, unusual o exceptionally rich.

Speiss. Impure metallic arsenides produced in copper smelting; or particles finely disseminated through a rock, usually occurring as impregnations

Spelter. The common term for metallic zinc.

Sphalerite. Zinc blende; zinc sulphide; the most common zinc or mineral; is often found associated with galena and chalcopyrite.

Spile. Lagging driven ahead of the regular timbering in treacherou ground.

Spitzkasten. Pyramidal boxes wherein ores are concentrated and size by a jet of water fed from below.

Spoon. A long-handled spoon, used to scrape out drill holes.

Sprag. A prop or cross-timber set to secure the hanging wall in stope. A short piece of wood used to block the wheels of a mine car.

Spur. A short, small branch from a vein.

Square Sets. A frame of mine timbers with mortised and tenoned sill top piece and uprights of equal length, joined at right angles.

Squib. A fuse.

Squeeze. The slow settling down of the roof in mine workings without fracture.

Stack. The chimney of a furnace; usually employed to designate a number of furnaces, when used in the plural.

Stamp-Mill. A mill for crushing and concentrating minerals by stamps and jigs, etc.

Stamp-Rock. Ore containing fine copper that must be crushed and jigged to recover the metal. Use restricted to Michigan.

Stamps. Machines to crush rock or ore by heavy blows.

Stamp-Shoe. The heavy chilled iron casting attached to the lower end of a stamp piston, and does the actual crushing of rock in a stamp-mill. It hits against a round steel block called a die.

Stanniferous. Tin-bearing.

Station. A chamber in a shaft, cut out for pumps, landing place, etc.

Station-Pump. A mine pump permanently placed, as distinguished from a movable sinking-pump.

Steatite. Soapstone; a greasy mineral, having a talc base.

Step-Fault. A series of faults, rising like steps.

Stockwerk. A mass of rock penetrated by numerous small stringers of ore, the entire mass averaging sufficiently rich in metallic material to warrant its mining and treatment.

Stone. See Rock.

Stope. (V.) To mine or extract ore. (N.) The workings between levels or drifts, in which ore is broken down in a series of chambers and taken away for treatment.

Stoping. Breaking down the mass of pay-rock or ore above a drift. When stoping in an orebody of average width, miners can break rock much more quickly and cheaply than when driving the drifts.

Stoping Ground. Part of an orebody opened by drifts and raises and ready for breaking down.

Strata. The successive beds or layers of sedimentary rocks.

Stratified. Having regular layers of varying rock varieties.

Stratum. A layer or bed of rock.

Streak. The color given by a mineral when scratched or when rubbed on porcelain.

Strike. The horizontal direction of a vein, measured by the points of the compass; a discovery of ore.

Stringer. A thin seam of ore.

Strip. To remove the overburden of waste, drift, or alluvial soil overlying an orebody.

Stripping. The waste or overburden above an orebody.

Structure. The form of a mineral, whether granular, crystalline or amorphous.

Stull. The top-piece of a set of mine timber. A timber prop supporting the roof of a mine opening.

Sulphate. A chemical compound (or a mineral) of a metal combined with sulphuric acid; an ore of any metal or metals with which sulphur and oxygen are united chemically.

Sulphide. A mineral or ore of any metal or metals with which sulphur is combined chemically.

Sulpho-antimonite. A mineral in which sulphur and antimony are united chemically with a metal.

Sulpho-arsenite. An ore mineral of any metal or metals with which sulphur and arsenic are united chemically.

Sulphuret. A sulphide; term becoming obsolete, but used in California.

Sump. The pit at the bottom of a shaft, where water collects; also in concentrate plants.

Surface Rights. The ownership of the surface of land only, where mineral rights are reserved.

Swabstick. A stick used to clean out drill-holes.

Syncline. Canoe or U-shaped fold of rock layers; the reverse of an anticline.

Table. A concentrating machine for separating finely crushed particles of ore from gangue.

Table Land. A plateau.

Tailings. The sandy and gravelly residue or refuse matter from a concentrating mill.

Tamp. To closely pack clay or other sticky earth into a drill-hole above the cartridges, to give greater force to the blast.

Tap. To draw off molten metal or slag from the vent of a furnace.

Taper Off. Cornish for stopping work temporarily.

Tenor. The percentage or average metallic content of an ore, matte or impure metal.

Terrero. Spanish for heaps of partly leached ore.

Tertiary. The third great geological period preceding the present Quarternary period.

Test-Pit. A shadow pit sunk to look for mineral.

Texture. A rock structure; is fine or coarse grained, porphyritic, etc.

Throw. The displacement of a vein caused by faulting.

Timber. The wooden logs and sticks used for underground supports.

Timberman. One who works at timbering a mine.

Ton. Long, 2,240 lb.; metric, 2,204 lb.; short, 2,000 lb.

Tonelada. Spanish for long ton.

Township. Abbreviated T. or Twp.; see Range.

Trachyte. A light-colored volcanic rock made of alkaline feldspar with black mica and hornblende.

Tram. To load rock or ore in cars and push same to the shaft, a tramway.

Trammers. Men who load and tram the broken rock underground.

Trap. A dense gray, blue or greenish rock of volcanic origin; usually an old and altered basaltic rock.

Trend. The general direction of a mineral body.

Trestle. A frame-work of timbers, carying tram-tracks.

Tribute. The money per ton or percentage of ore extracted which is paid by lessees to owners for the privilege of working a mine.

Tripod. The three-legged iron frame on which the working parts of a power-drill rest; a three-legged wooden frame over the mouth of a pit or shaft.

Trommel. A revolving cylindrical sieve for sizing ore.

Troubled. A vein is sometimes called troubled when disturbed or faulted.

True Fissure Vein. All mineralized fissures are true fissure veins. Term commonly used as meaning a fissure vein with promise of holding to great depth, in contra-distinction to a gash vein.

Tsubo. A Japanese measure of 6 feet square, equalling 36 square feet.

Tube-Mill. A steel cylinder half lined with flint pebbles or steel balls, which crush ore when the tube is revolved.

Tufa. A limestone formed by spring waters. Name frequently used in place of tuff.

Tuff. Volcanic ash, cinder, and lapilli, ejected from volcanic vents and deposited in layers from air or water and solidified by time and superincumbent pressure. Name also used for coarser volcanic debris, including breccia and conglomerate.

Tunnel. A practically horizontal opening entirely through a hill or mountain. Term is commonly used instead of adit, which is a horizontal gallery having only one opening to surface.

Turbine. The most efficient form of water-wheel; also a new form of steam-engine in which the entire movement of the power-producing parts is rotary instead of reciprocating.

Tuyeres. The pipes in a furnace wall by which air is supplied under pressure, to either blast furnaces or bessemer converters.

Unconformable. With a break between rock beds lying at different angles or with erosion surface between.

Underhand Stoping. Cutting out ore from the floor of an opening. Removing ore in descending steps.

Underlay, Underlie. The downward extension of a vein or bed beneath the ground. Is technically the horizontal departure of a vein from the vertical measured in feet, per fathom (or 100′). Mineral bodies lying under a given tract; though not outcropping on surface.

Unpatented. Mining claims to which a deed from the U. S. Govt. has not been received. They are subject to annual assessment work, in order to maintain ownership.

Unstratified. Rock that is not bedded in layers.

Unwater. To free from water; to pump out or drain a mine.

Upcast. A shaft having an upward air current.

Upraise. A raise, an upward opening in a mine. Term almost obsolete, "raise" being preferred.

Van. To wash ore on a shovel, like panning.

Vanner. A concentrating table or machine for dressing ore by means of vibratory motion, aided by jets of water to carry away waste rock.

Vara. A Spanish-American measure of length, of 33 inches.

Vein. A rock fissure filled with mineral matter; a mineral body having defined walls. See contact vein and fissure vein.

Veinstuff. Vein filling; also used for gangue.

Vertical Shaft. One sunk at an angle of 90° with the horizon, or directly downwards toward the center of the earth.

Virgin. Native metal occurring elementally, as distinguished from ore minerals, which are chemical compounds.

Vitreous. Of a glassy nature.

Volatile. That which can be driven off as vapor, by heat.

Vug. A cavity in the rock; usually lined with a crystalline incrustation.

W. The chemical symbol for tungsten.

Wall. The side of a mine opening or drift. The waste or country rock on each side of a vein.

Wall-Plates. Are the two side pieces of a set or frame of shaft timbers, as distinguished from the end pieces.

Water-Jacket. An outer casing for a blast-furnace, in which water circulates, to keep the metallic furnace-walls from melting because of the intense heat of the charge.

Water-Level. The level above which water does not rise, when a mine is allowed to fill. The water-level is often the point below which altered and enriched ores are succeeded by base unaltered sulphides.

Weathered. Changed by long exposure to air and water.

Wet Process. Leaching or lixiviation.

Wheal. Cornish for mine.

Whim. A windlass with a vertical drum revolved by horse-power and used for hoisting.

Whip. A fixed pulley with hoisting rope passed through it and pulled by a horse or mule.

Wilfley. A Wilfley concentrating table; about 20,000 in use throughout the world.

Winch. A windlass.

Winding. Hoisting with rope and drum.

Windlass. A device for hoisting from a pit or shaft, by means of coiling a rope or cable around a drum, with crank handles.

Winze. A shaft, usually short, extending downward from the floor of a mine opening.

Wire Bars. Refined copper cast into bars for wire drawing.

Workings. The underground openings of a mine.

Wulfenite. See molybdenum in minerals.

Zinc Blende. Sphalerite; sulphide of zinc.

Zinckiferous. Carrying zinc.

Zinc Sulphide. A compound of zinc and sulphur. See minerals.

Zn. The chemical symbol for zinc.

CHAPTER II

MINERALOGY OF THE ORE MINERALS

ORE MINERALS:

Ores as mined are very seldom composed entirely of ore minerals, usually consisting of a mixture of quartz, or other non-metallic mineral, or of altered rock and metal-bearing minerals. The mixture constitutes ore when it contains enough value, in one or more metals, to pay for the cost of mining, concentrating, transportation, smelting, and marketing. As this cost varies with each mine and locality, and the price of every metal, save gold, also fluctuates, there is a wide range of value to ore. The Alaska gold quartz mines operating on a gigantic scale can mine, mill, and extract their product for less than $1 per ton, whereas many smaller mines cannot make a profit on $3 ore of similar character. Copper ores show a much greater margin, between the costs at the Utah Copper Co. and those of small vein mines.

In the following pages I have given a list of the more important ore minerals of each metal. It is intended only for general reference, the minerals being arranged under the name of the metal. For sight tests and recognition of ore minerals, see "Practical Field Mineralogy," Farrell-Moses, 1912.

ALUMINUM.

Bauxite. 74% alumina. Hydrated alumina. Regarded as a hot spring deposit. Occurs in pockets in clay in Arkansas.

Corundum. 53% aluminum. A bluish-gray, brown or white mineral which is harder than and will scratch any other mineral except diamond; will scratch steel. The clear red is the gem ruby and the blue, sapphire, found in many basic igneous dikes in Montana, especially in the sapphire mines at Yogo.

Cryolite. 12.8% aluminum, sodium alumina fluoride. A Greenland ore, essential to aluminum reduction.

Gibbsite. 65.4% alumina. Hydrated alumina, derived in Arkansas deposits from decomposition of a granite rock (Elaeolite syenite).

ANTIMONY.

Stibnite. Antimony glance 71.4% antimony. Is the common ore; a sulphide of the metal. Is in process of deposition at Steamboat Springs, Nevada. Antimony occurs in many silver ores. Is common in tetrahedrite or silver-bearing copper minerals. Antimony ores are mined at Pine Creek, near Wardner, Idaho. Specific gravity, 4.5.

ARSENIC.

This metal is largely derived from arsenopyrite deposits, from nickel or cobalt arsenides, common at Cobalt, from enargite, copper arsenide, at Butte.

Arsenopyrite, or **Mispickel,** a sulpharsenide of iron, with 45% arsenic, which looks like iron pyrite, but emits a garlic odor when struck. Occurs in fissure veins, with gold ores. Ruby, silver and other minerals rich in silver also contain arsenic. Gravity, 6.

Bismuthinite. $Bi_2 S_3$, 81.2% bismuth, a sulphide of bismuth. Gravity. 6.4. The metal is a subordinate constituent of many gold, tin, and silver ores, especially those of Leadville, Colo. It is obtained mainly as a by-product from gold-silver and lead ores and not from ores mined for this metal itself.

CADMIUM.

Greenockite. Is the only important ore mineral, the yellow sulphide, which occurs with zinc (sphalerite) ores in the Mississippi states.

CHROMIUM.

Chromite. FeO, Cr_2O_3, or chrome iron ore, with 68% chromium, is the sole ore of commerce. Gravity, 4.5. It resembles magnetite, the black iron oxide ore.

COBALT.

Cobaltite, or cobalt sulpho-arsenide, with 35.4% cobalt.

Erythrite. A cobalt bloom, 37.4% cobalt, a creamy raspberry red mi eral, formed by oxidation; a hydrated arsenious oxide.

Smaltite. Cobalt arsenide with 28.2% arsenious oxide. A silver-whi mineral, harder than cobaltite; garlic odor when struck. Gravity, 6.5.

COPPER. Cu. Native copper. The chemical symbol Cu is an abbr viation of cuprum, the Latin word for copper. The metal, native or refine has the following names in modern languages; kupfer in German; koppar Swedish; kobber in Norwegian; cobre in Spanish and Portuguese; cuivre French, rame in Italian.

Atomic weight, 63.2. Belongs in the first group and is the leader of tl fifth series of Mendeleéf's Periodic System. The group is as follows: hydrogen; 2, lithium; 3, sodium; 4, potassium; 5, copper; 6, rubidium; 7, silve 8, caesium; 9, unknown (possibly terbium, atomic weight 160); 10, gold; 1 unknown. The fifth series, of which copper is the basic leader, is as follows: copper; 2, zinc; 3, gallium; 4, germanium; 5, arsenic; 6, selenium; 7, bromin The three metallic elements falling between series four and five in Mendeleéf table are iron, cobalt, and nickel. The frequency with which these three element are found associated with copper, and the ease with which all four metals replac one another, is notable. The general resemblance between copper, silver and gol which form ascending steps in the same group, is readily apparent.

System of crystallization, isometric. Tetrahexahedronal forms are the mos common, with much twinning. Crystals often show cavernous faces and occa sionally elevations, are often distorted and pass gradually through distortion into filiform and arborescent forms. Native copper also occurs massive, i granular form, and in laminae. In the Lake Superior mines the metal occurs i all observed forms and sizes, including lamellae from microscopic flakes up t sheets of immense size and weight, crystals of greatly varying form and size grains from microscopic size to considerable nodules, and druses, often of considerable size, show various filiform and aborescent shapes. The finest particles are grains and exceedingly minute flakes, occurring in an upper sandstone of the Keweenawan series, while the largest masses, weighing upwards of 500 tons, have been found in contact and fissure veins.

Cleavage, none: fracture hackly; tenacity, second only to that of iron. Is perfectly sectile and highly ductile and malleable, ranking in these particulars with the precious metals. Electrical conductivity, 931, as compared with 1,000 for silver, which possesses the most perfect electrical conductivity of any known metal or alloy. Conductivity for heat, 898, as compared with 1,000 for gold, the most perfect conductor of heat.

Hardness, 2.5 to 3. Specific gravity, in vacuo, at degrees Centigrade (equal to 32°, or freezing point, Fahrenheit); when chemically pure and devoid of porosity, is 8.945. Specific gravity of the ordinary copper of commerce, none of which is free from impurities, varies from about 8.75 when cast, to about 8.95 when rolled, hammered or drawn, the exact gravity depending upon how handled, as well as upon the extent and nature of the impurities contained.

Lustre, metallic. Color, copper-red. Streak, copper-red, metallic, shining. Tarnishes upon exposure to air to brownish red, and is liable to form a coating of verdigris or oxide upon long exposure to air. Atmosphere laden with moisture and carbonic acid is especially favorable to the formation of verdigris.

Fusibility: Copper is fusible at approximately 2,000° Fahrenheit, or a trifle less than 1,100° Centigrade. Color, when fused, sea-green. Copper becomes volatile under the high temperature of the electric arc.

Solubility: Copper is soluble in nitric acid, aqua regia, and strong boiling sulphuric acid, also, slowly, in dilute hydrochloric and sulphuric acids, with admission of air. When in solution in nitric or sulphuric acids will deposit metallic copper on iron immersed therein.

Affinities: Copper has a greater affinity for sulphur than for any other element, possessing also marked affinities for oxygen, carbon dioxide, arsenic, antimony and bismuth, and unites with many other elements.

Alterations: Native copper alters on exposure, especially in damp air, to

the simpler oxide and carbonate ores, such as cuprite malachite and azurite, and occasionally, in time, to the more complex ore forms.

Occurrence: Native copper occurs, usually in small quantities, in most of the principal copper districts of the world. The native metal is mined upon a considerable scale only in Lake Superior, U. S. A., and Bolivia. The Lake Superior native copper carries considerable silver, mechanically admixed, though not alloyed, but carries no gold. In districts outside of Lake Superior and Bolivia the metal occurs most frequently in connection with the oxide and carbonate ores, and occasionally with the secondary sulphide ores.

Impurities: Native copper frequently contains silver, arsenic, bismuth, antimony, zinc and occasionally mercury. Commercial copper, refined from ores, may contain any of the elements already named, and also gold, tin, lead, selenium and tellurium, the latter two elements in very minute quantities.

Azurite. $2CuCO_3Cu(OH)_2$. A basic copper carbonate containing 55.3% copper. Common names, blue carbonate of copper, blue malachite, azure copper ore. Crystallization, monoclinic. Fracture, conchoidal. Tenacity, brittle. Hardness, 3.5 to 4. Gravity, 3.77 to 3.83. Lustre, vitreous. Color, azure blue. Streak, lighter blue. Is subtranslucent to transparent. Occurs frequently in the oxidized zone of copper ore bodies, almost invariably with malachite, but is much less common than malachite. Is a valuable commercial ore of copper.

Bornite. Cu_3FeS_3. A copper and iron sulphide, containing 55.5% copper, 16.4% iron, 28.1% sulphur. Common name, peacock copper ore. Crystallization, rare isometric, with many hexagonal penetration twins. Structure, granular or compact. Fracture, small conchoidal to uneven. Tenacity, brittle. Hardness, 3. Gravity, 4.9 to 5.4. Lustre, metallic. Color, copper red to bluish brown, quickly tarnishing to irridescence, often most brilliant. Streak, pale grayish-black. Is soluble in nitric acid, with separation of sulphur. Is a primary mineral, at Butte and in contact metamorphic ores, but also occurs as the first alteration product from chalcopyrite among the secondary copper sulphides, and often carries nodules and occasionally larger masses of chalcocite. Is one of the most important ores of copper.

Bournonite. 3(Pb, Cu.)S.Sb_2 S_3. A lead and copper sulphantimonite, containing 13% copper and 42.5% lead. Crystallization orthorhombic. Structure, massive, granular and compact. Cleavage, imperfect. Fracture, subconchoidal to uneven. Tenacity, rather brittle. Hardness, 2.5 to3. Gravity, 5.7 to 5.9. Lustre, brilliant metallic. Color and streak, steel-gray, inclining to blackish gray or iron-black. Fuses easily on charcoal and is soluble in acids. Occurrence: in many copper fields.

Brochantite. $4CuO\ SO_3,3H_2O$. A basic copper sulphate containing 56.2% copper. Crystallization, orthorhombic. Fracture, uneven. Hardness, 3.5 to 4. Gravity, 3.9. Lustre, vitreous. Color, emerald-green to blackish green. Streak, paler green. Is translucent to transparent. Is found in many copper fields, and is an important commercial ore in the Clifton district, Graham county, Arizona, and Chuquicamata, Chile.

Chalcanthite. $CuSO_4+5H_2O$. A hydrous copper sulphate containing 25.4% copper. Common names, blue vitriol, bluestone, copper sulphate. Crystallization, triclinic. Structure, massive, stalactitic and reinform, sometimes fibrous. Fracture, conchoidal. Tenacity, brittle. Hardness, 2.5. Gravity, 2.12 to 2.30. Lustre, vitreous. Color, sky-blue. Streak, uncolored. Is translucent to subtransparent. Is soluble in water. Occurs as deposits from mine water in most sulphide copper mines, and is found in impure state, in beds, in Chile.

Chalcocite. Cu_2S. A copper sulphide carrying 79.8% copper. Common names, copper glance, cuprous sulphide. Crystallization, orthorhombic; also occurs massive, with structure granular to compact and impalpable. Cleavage, indistinct. Fracture, conchoidal. Tenacity, brittle. Hardness, 2.5 to 3. Gravity, 5.5 to 5.8. Lustre, metallic. Color and streak, blackish lead-gray, tarnishing to dull green or blue. Is soluble in nitric acid. Occurs in all copper districts, frequently in large quantities. Is the richest commercial ore of copper and yields more than one-half of world's copper supply.

Chalcopyrite. Cu.S $Fe\ S_2$. A copper and iron sulphide containing 34.5% copper and 30.5% iron. Is the primary ore of copper. Crystallization,

tetragonal, sphenoidal, often twinning, also frequently massive and compac Fracture, uneven. Hardness, 3.5 to 4. Gravity, 4.1 to 4.3. Lustre, metalli Color, brass-yellow, often tarnishing to iridescence. Streak, greenish black. I soluble, except sulphur, in nitric acid, and, on being heated, yields a portion of it sulphur. On exposure to moisture and heat becomes hydrated, and copper an iron change readily to sulphates. Alters to azurite, malachite, melaconite, cha cocite, covellite, bornite, brochantite, chrysocolla, tetrahedrite, and tennantite. I found in practically every copper field in the world, and is second only to chalcocit in importance among the commercial ores of copper.

Chrysocolla. $CuSiO_3+2H_2O$. A hydrous copper silicate carrying 36% copper. Common names, mountain green and mountain blue. Structure, crypto crystalline, enamel-like, sometimes botryoidal. Fracture, conchoidal. Is britt and somewhat sectile. Hardness, 2 to 4. Gravity, 2 to 2.24. Lustre, vitreous t earthy. Color, mountain green, bluish green and sky blue to turquoise-blue, wit impure varieties brown to dull black. Streak, white, from pure green and blu varieties. Is opaque to translucent. Is decomposed by acids, without gelatiniza tion. Commonly occurs with carbonate ores in the oxidized zones of copper ore bodies, and is a commercial ore of value in many districts.

Covellite. Covelline. CuS. A beautiful bright blue copper sulphid containing 66.4% copper. Chemical name, cupric sulphide. Crystallization, hexa gonal; also occurs massive. Is flexible in thin layers, with basal cleavage. Hard ness, 1.5 to 2. Gravity, 4.6. Lustre, submetallic on crystals, dull when massiv Color, indigo-blue. Streak, lead-gray to black, shining. Occurs in most sulphid copper districts, as a secondary ore and is a valuable commercial ore of coppe when found in sufficient quantities as in Butte, Mont., Utah, Wyoming an elsewhere.

Crednerite. $3CuO\ 2Mn_2O_3$. A copper manganate containing 34.4% copper. Crystallization, monoclinic. Cleavage, basal, perfect, less distinct i other directions. Hardness, 4.5. Gravity, 4.9 to 5.1. Lustre, metallic. Colo iron-black to steel-gray. Streak, brownish black. Is soluble in hydrochloric aci

Cuprite. Cu_2O. A copper oxide, containing 88.8% copper, being th richest copper ore. Chemical names, cuprous oxide, copper protoxide. Commo names, ruby copper, red glassy copper ore, octrahedral copper ore. Crystallizatio isometric, commonly in octohedrons; also occurs massive, granular and sometime earthy. Fracture, conchoidal. Is brittle. Hardness, 3.5 to 4. Gravity, 5.85 t 6.15. Lustre, adamantine to earthy. Color, light to dark red; when fresh, usuall ruby-red, but fades to duller red. Streak, brownish red, shining. Is subtran parent to subtranslucent. Occurs in most copper districts in the upper oxidize zone, frequently shading into crystals of native copper.

Enargite. $3Cu_2.As_2S_5$. Enargite grades into famatinite. A copp sulpharsenite containing 48.3% copper. Crystallization, orthorhombic; also occu massive and granular. Fracture, uneven. Tenacity, brittle. Hardness, 3. Gravit 4.45. Lustre, metallic. Color and streak, grayish-black to iron-black. Is solub in aqua regia and fusible on charcoal. Occurs in many copper fields, notably Butte, Montana, where it is a common and valuable ore.

Epigenite. Formula probably $4Cu_2S.3FeS.\ As_2S_5$. A copper and iro sulpharsenite, carrying about 41% copper. Crystallization, orthorhombric, in sho prisms. Fracture, uneven. Hardness, 3.5. Lustre, metallic. Color, steel-gra Streak, black. Is soluble in nitric acid. Occurrence: Wittichen, Baden, German

Famatinite. $3Cu.S.Sb_2S$. A copper sulphantimonite carrying 43.3% copper. Crystallization, orthorhombic; is isomorphous with enargite; also occ massive. Fracture, uneven. Tenacity, brittle. Hardness, 3.5. Gravity, 4.5 Color, gray with copper-red tinge. Streak, black. Is fusible on charcoal. D crepitates in closed tube. Occurrence: Sierra de Famatina, Rioja, Argentina and Cerro de Pasco, Junin, Perú.

Glance. Common name for sulphide ores with dark metallic lustr Copper glance is chalcocite.

Malachite. $2CuO.CO_2H_2O$. A basic copper carbonate carrying 57.5% copper. Common names, green copper carbonate, basic cupric carb nate. Crystallization, monoclinic. Commonly masive, but frequently incru tive and sometimes granular or earthy, and disseminated as stains. Fractur

subconchoidal to uneven. Tenacity, brittle. Hardness, 3.5 to 4. Gravity, 3.9 to 4.03. Lustre, of crystals, adamantine, frequently with concretionary bands of varying shades from pistachio-green to bluish-green. Streak, green. Is opaque to translucent. Is soluble in nitric acid. Occurs in most copper districts, in the upper portions of the oxidized zones of ore bodies, and frequently is an important commercial ore. When massive and beautifully marked is a semi-precious stone, used for table tops, etc.

Melaconite. Massive, compact, shining or earthy dull, black copper oxide of same composition as tenorite.

Mohawkite. $(Cu, Ni, Co)_3As$. A copper, nickel and cobalt, arsenide, carrying 63 to 69% copper, 3 to 7% nickel and 0.5 to 2% cobalt, usually somewhat argentiferous. Crystallization, hexagonal, by synthesis, no crystals being found in nature. Cleavage, indistinct. Fracture, uneven. Tenacity, slight. Hardness, 4. Gravity, 8.05. Color, light gray on fresh fractures, tarnishing to purple or brassy yellow. Streak, gray. Is soluble in nitric acid. Occurrence: Mohawk mine, Keweenaw county, Michigan.

Tennantite. $4Cu_2S.As_2S_3$. A copper sulpharsenite containing 57.5% copper when pure, but shading into a great number of varietal forms. Common name, gray copper ore, in common with tetrahedrite, to which tennantite is closely related and joined by a chain of rather obscure minerals shading gradually from tennantite into tetrahedrite. The many varietal forms of this mineral are brought about by part replacement of copper by silver, lead, zinc, iron, mercury, cobalt, nickel, tin, and platinum, with a marked tendency toward mutual substitution of the antimony of tetrahedrite for the arsenic of tennantite, and vice versa, rendering the tetrahedrite-tennantite group unusually prolific. Crystallization, isometric; also occurs massive and granular, compact. Cleavage, none. Fracture, subconchoidal. Tenacity, brittle. Hardness, 3.5 to 4.5. Gravity, 4.4 to 5.1 Lustre, metallic. Color and streak, flint-gray to iron-black. Diaphaneity, opaque to subtranslucent in small splinters. Is soluble in nitric acid and fusible on charcoal. Occurrence: at numerous points, being found in greater or less profusion in most copper districts. Is not regarded usually as a commercial ore, except where argentiferous, which is commonly the case.

Tenorite. Earthy form is known as melaconite. CuO. A copper oxide, containing 79.8% copper. Common names, **Black Copper, Black Oxide of Copper.** Chemical names, copper monoxide, copper peroxide, cupric oxide. Crystallization, monoclinic; also occurs massive, pulverulent and earthy. Fracture, conchoidal to uneven. Hardness, 3 to 4. Gravity, 5.8 to 6.25. Lustre, metallic. Color, dull grayish-black when massive, steel-gray in flakes. Is soluble in nitric and hydrochloric acids. Is found in most copper districts, and is a valuable ore of copper when occurring in quantities, but much of what has been considered tenorite in the past really was chalcocite, for which it is easily mistaken when disseminated. Found in very thin, long, flexible, minute scales of glistening gray color in Vesuvian lavas.

Tetrahedrite. $4Cu_2S.\ Sb_2S_3$. A copper sulphoantimonite containing 52.1% copper. Shades into tennantite, which see, for reference to protean forms of these two closely related and frequently indistinguishable minerals. Common name, gray copper ore. Crystallization, isometric; also occurs massive and granular, coarse to fine, compact. Cleavage, none. Fracture, subconchoidal to uneven. Tenacity, brittle. Hardness, 3.5 to 4.5. Gravity, 4.4 to 5.1. Lustre, metallic, brilliant. Color, flint-gray to iron-black. Streak, grayish-brown to cherry red. Opaque in quantity, but occasionally sub-translucent in very thin splinters, giving cherry red transmitted light. Is soluble in nitric acid and fusible on charcoal. Occurrence: in most copper districts, but commonly is not regarded as a commercial ore, except when argentiferous, which frequently is the case.

GOLD.

Calaverite. A pale bronze yellow telluride of gold with 40% gold, 1-2% silver and balance tellurium. Breaks with uneven fracture and scratches easily. If burned in a forge gives beads of gold. Common at Cripple Creek and Kalgoorlie, Western Australia.

Native. As clean metallic gold; as rusty and mustard colored gold, and as pale colored electrum, an alloy with silver.

also in garnet (Hawthorne, Nev., and Bishop, Calif.). Also in gold ores, as a Grass Valley, Calif.; Seoul, Korea; Murray, Idaho; and in New Zealand.

The field test for tungsten is to crush the specimen and "pan" it, to get th heavy residue; powder a part of the residue and put it in a glass or porcelai dish; add a half ounce (tablespoonfull) of muriatic acid and heat to near boilin for fifteen minutes. Then add a few drops of nitric acid and boil one minut Set aside a moment to settle and pour off liquid into a large tumbler of col water. Also add cold water to residue and stir. Set aside both dishes a fe minutes to settle, then pour off liquid. Canary yellow sediment in dish show tungstic acid.

The more common test is to wrap tin foil about the specimen and boil har in hydrochloric (muriatic) acid for 15 minutes, remove foil; a blue color indicate tungsten, but the test does not always show the color.

URANIUM.

Carnotite. 52 to 57% oxide of uranium. A vanadate of uranium an potassium; a canary yellow powdery mineral occurring in large bedded deposit of impregnated sandstone in southern Utah and southwestern Colorado. Is th chief ore of uranium.

Uraninite. Pitchblende. 65%-80% uranium. A black to dark brown olive green, very heavy mineral, found in Connecticut, Texas, Colorado, Sout Dakota, and in Austria. (See Bull. 70, U. S. Bureau of Mines, for descriptio of mines.)

VANADIUM.

Carnotite. (See above.) 18% vanadium.

Roscoelite. 21%-29% vanadium; a scaly green to brown micaceou mineral mined at Vanadium, Colo., by the Primos Co., and also found in Cali fornia quartz mines.

Vanadinite. 19.4% vanadium oxide. See under lead minerals.

ZINC.

Calamine. Hydrated zinc silicate, 67.5% zinc oxide, balance water an silicon; gravity, 3.9.

Is also the trade name for oxidized zinc ores. Often occurs in clay. I yellow to brown, rarely pale blue or green.

Franklinite. An iron manganese zinc mineral with 5.54% zinc, 51.8% iron and 7.5% manganese; found at Franklin, N. J.

Smithsonite. Zinc carbonate, 64.8% zinc oxide. Dry bone, the whit carbonate of zinc, differs from calamine by effervescing in acid; hardness, 5.

Sphalerite. Blende, black jack, zinc blende, 67% zinc. Is the chie source of the metal; varies from brown to black, rarely clear resinous. Gravity 4. Hardness, 3.5-4. Knife scratch, brown to yellow.

Willemite. Zinc silicate, with 72.9% zinc oxide. Is a greenish yellow to applegreen mineral with resinous lustre. Is only important as an ore minera at Franklin, N. J.

Zincite. Red zinc ores, 80.3% zinc. Occurs at Franklin, N. J.

CHAPTER III

RESUMÉ OF THE MINING INDUSTRY

In this chapter, the essential, vital facts concerning the mining industry, both in the United States and of all countries of the world are presented in a series of tables, giving price and production with trade statistics, covering all the different metals. A list of smelting plants and refineries and their capacities and outputs is also given.

From 1900 to 1914 the total value of the metal production of the United States varied between $513,700,000 and $904,000,000 per annum. The total value of the metals produced for each of the last five years is: $691,000,000 in 1914; $991,730,000 in 1915; $1,620,500,000 in 1916; $2,086,200,000 in 1917; and $2,153,100,000 in 1918.

The 1919 production was lower as a result of a general curtailment and preliminary figures are: 1,278,000,000 lb. of copper, $58,488,000 of gold, 29,700,000 tons of iron, 425,000 tons of lead, 55,285,000 oz. of silver, and 446,000 tons of zinc. In the following table the output of the principal metals is summarized:

PRODUCTION OF METALS IN THE UNITED STATES

Metal	1915	1916	1917	1918
Aluminum, pounds.....	99,000,000	(*e*) 139,000,000	(*e*) 124,000,000	(*e*) 122,500,000
Copper (*a*), pounds.....	1,423,698,160	1,941,900,586	1,886,120,721	1,908,533,595
Ferro-manganese, long tons	239,824	415,534	260,225	306,076
Gold (*b*), dollars.....	101,035,700	92,316,400	83,750,700	68,493,500
Iron, long tons.....	29,916,213	39,434,797	38,612,546	38,230,440
Lead (*c*) short tons....	535,922	583,498	548,450	539,686
Quicksilver, flasks.....	21,033	29,932	36,159	32,883
Silver (*b*), Troy ounces.	74,961,075	72,883,800	71,740,362	67,879,206
Zinc (*d*), short tons....	489,519	667,456	584,597	492,405

(*a*) Production from ore originating in the United States. (*b*) The statistics are final, reported jointly by the directors of the Mint and the U. S. Geological Survey. (*c*) Production of refined lead from ore and scrap originating in the United States; antimonial lead is included. (*d*) Total production of smelters, except those treating dross and junk exclusively; includes spelter derived from imported ore. (*e*) Estimated.

METAL PRICES

The price of each metal (gold excepted, which is fixed by law at $20.67+ per fine ounce) is based upon averages of daily market prices current at New York for silver, copper and lead, and at St. Louis for metallic zinc or spelter. The prices used by the U. S. Geological Survey for calculation of values for years 1850-1918, inclusive, are as follows:

YEARLY AVERAGE

PRICES OF SILVER, COPPER, LEAD, AND ZINC

Year	Silver Fine oz.	Copper Pound	Lead Pound	Zinc Pound
1850	$1.32	$0.22	$0.05	$ ....
1851	1.34	.166	.05	....
1852	1.33	.22	.05	....
1853	1.35	.22	.06	0.055
1854	1.35	.22	.06	....
1855	1.34	.27	.07	....
1856	1.34	.27	.066	....
1857	1.35	.25	.06	....
1858	1.34	.23	.06	....
1859	1.36	.22	.055	....
1860	1.35	.23	.056	....
1861	1.33	.22	.05	....
1862	1.35	.22	.06	....
1863	1.345	.34	.06	....
1864	1.345	.47	.07	.139
1865	1.337	.3925	.066	....
1866	1.339	.3425	.07	....
1867	1.33	.2537	.065	....
1868	1.326	.23	.065	....
1869	1.325	.2425	.06	....
1870	1.328	.2118	.06	....
1871	1.325	.2412	.06	....
1872	1.322	.3556	.064	....
1873	1.297	.2800	.06	....
1874	1.278	.2200	.06	....
1875	1.24	.227	.058	.07
1876	1.16	.21	.061	.072
1877	1.20	.19	.055	.06
1878	1.15	.166	.036	.049
1879	1.12	.186	.041	.052
1880	1.15	.214	.05	.055
1881	1.13	.182	.048	.052
1882	1.14	.191	.049	.053
1883	1.11	.165	.043	.045
1884	1.11	.13	.037	.044
1885	$1.07	$0.108	$0.039	$0.04
1886	.99	.111	.046	.04
1887	.98	.138	.045	.04
1888	.94	.168	.044	.04
1889	.94	.135	.039	.05
1890	1.05	.156	.045	.05
1891	.99	.128	.043	.05
1892	.87	.116	.04	.04
1893	.78	.108	.037	.04
1894	.63	.095	.033	.03
1895	.65	.107	.032	.03
1896	.68	.108	.03	.03
1897	.60	.12	.036	.04
1898	.59	.124	.038	.04
1899	.60	.171	.045	.05
1900	.62	.166	.044	.04
1901	.60	.167	.043	.04
1902	.53	.122	.041	.04
1903	.54	.137	.042	.05
1904	.58	.128	.043	.05
1905	.61	.156	.047	.05
1906	.68	.193	.057	.06
1907	.66	.20	.053	.05
1908	.53	.132	.042	.04
1909	.52	.13	.043	.05
1910	.54	.127	.044	.05
1911	.53	.125	.045	.05
1912	.615	.165	.045	.06
1913	.604	.155	.044	.05
1914	.553	.133	.039	.05
1915	.507	.175	.047	.12
1916	.658	.272	.068	.13
1917	.824	.273	.087	.10
1918	.968	.247	.071	.09
1919	1.111	.189	.581	.73

ALUMINUM

Aluminum Production and Prices of the United States, in Pounds

1883	83	1896	1,300,000
1884	150	1897	4,000,000
1885	283	1898	5,200,000
1886	3,000	1899	6,500,000
1887	18,000	1900	7,150,000
1888	19,000	1901	7,150,000
1889	47,468	1902	7,300,000
1890	61,281	1903	7,500,000
1891	150,000	1904	(a) 8,600,000
1892	259,885	1905	(a) 11,347,000
1893	333,629	1906	(a) 14,910,000
1894	550,000	1907	(a) 17,211,000
1895	920,000	1908	(a) 11,152,000

(a) Consumption.

Aluminum Production and Prices of the United States in Pounds—*Continued*

		Per Lb.			Per Lb.
1909.....	(*a*) 34,210,000	23.18c	1914.....	(*b*) 79,129,000	18.595
1910.....	(*a*) 47,734,000	22.97	1915.....	99,000,000	31.90
1911.....	(*a*) 46,125,000	20.34	1916.....	(*c*) 139,000,000	34.00
1912.....	(*a*) 65,607,000	22.52	1917.....	(*c*) 124,000,000	37.00
1913.....	(*b*) 72,379,000	23.63	1918.....	(*c*) 122,500,000	33.60
			Total.....	941,366,779	....

(*a*) Consumption. (*b*) American Metal Market figures. In 1919, virgin metal, 98 to 99% pure, ranged from 28 to 33 cents per pound, the average being 32.14 cents. Aluminum dust, used in recovery of silver, etc., was steady around 60 cents per pound. This is also used in the explosive 'ammonal.'

EXPORTS OF ALUMINUM OF UNITED STATES PRODUCTION

1908.....	$330,092	1914.....	$1,546,510
1909.....	567,375	1915.....	3,682,117
1910.....	949,215	1916.....	15,419,134
1911.....	1,158,603	1917.....	14,586,467
1912.....	1,347,621	1918.....	10,869,388
1913.....	966,094	1919 (8 months).....	2,587,237

Imports in 1919, to September, were valued at $2,920,163.

ANTIMONY

ANTIMONY PRODUCTION OF THE UNITED STATES, IN SHORT TONS,

	Contained in antimonial lead of domestic origin		Antimony produced from domestic ore		Recovered from old alloys, scrap, dross, etc.		Average price per
Year	Quantity	Value	Quantity	Value	Quantity	Value	pound
1903.....	2,558	$445,092	570	$103,341	....	.....	....
1904.....	2,571	443,598	(*a*) 486	61,926	....	.....	....
1905.....	2,747	588,354	493	117,433	....	.....	....
1906.....	1,362	544,800	(b) 404	58,149	....	.....	20.00c
1907.....	1,561	508,886	(*b*) 351	77,300	....	.....	6.30
1908.....	2,246	359,360	(*c*)	(*c*)	....	.....	8.00
1909.....	1,617	252,252	....	.....	1,556	$242,736	7.80
1910.....	1,598	263,431	....	.....	2,779	457,979	8.24
1911.....	1,543	264,780	....	.....	2,369	406,520	8.58
1912.....	1,224	209,059	....	.....	2,506	428,025	8.54
1913.....	2,204	375,562	....	.....	2,705	460,932	8.52
1914.....	2,530	(*d*) 529,740	....	.....	2,645	(*d*) 555,450	10.50
1915.....	3,425	1,735,105	2,100	1,063,860	3,100	1,811,568	25.33
1916.....	3,496	1,775,968	1,770	.....	4,480	2,270,016	25.37
1917.....	2,759	1,142,226	390	.....	4,961	2,061,700	20.69
1918.....	2,566	646,632	50	.....	....	.....	12.58
1919.....	....	.....	....	.....	....	.....	8.16

(*a*) Estimated from the average content of the ore. (*b*) Figured as 60% of domestic ores only. (*c*) None produced from domestic ore. Figures not collected for foreign ores. (*d*) Includes actual marketed value of a few tons of antimony made as a by-product in the electrolytic refining of copper.

The average price for the 30 years preceding 1914 was 7.5 cts. per pound. The antimony deposits of the U. S. may be classed as those containing antimony only, and those whose antimonial content is a valuable by-product.

Though many deposits of stibnite are known, they cannot be worked with normal prices, because in ordinary years the Chinese and Japanese smelters can supply it cheaper than we can produce it, and because the market is limited and easily glutted, resulting in still lower prices. The domestic production has therefore come almost entirely from the electrolytic refining of antimonial lead and copper metal.

The entire world's consumption up to 1914 was less than ⅙ that of tin or 3% of that of zinc or copper. Antimonial ores to be valuable must be free from arsenic, zinc, and lead.

The Market for Antimony. The principal uses of antimony, the demand for which continues to increase, are in making type metal, babbit and other anti-friction bearing metals, battery plates, siphon tops, cable sheating, white metals for the foundation of silver-plated ware, and other plated ware, such as clock-cases, table-ware, coffin trimmings, and toys. In 1915-16 a great demand was created by the use of antimony in making shrapnel bullets, but this fell off somewhat due to the use of high explosive shells.

Its compounds are used in enamels, rubber vulcanizing, pigments, glass making, and safety matches.

ANTIMONY MINES

Antimony Corp.....Mexico
Antimony Silver Mining Co.....Idaho
Benton Mining Co.....Idaho
Coeur d'Alene Antimony Co....Idaho
Homelode Mining Development Co.....So. Dakota
Howell Mining Co.....Utah
Idaho Antimony Mining Co.....Idaho
Merchants Finance Co. (Western Metals Co.).....Calif.
Pomana Antimony Mine.....Nevada
Stanley Mining Co. (no recent production).....Idaho
Star Antimony Co.....Idaho
Wah-Chang Mining & Smelting Co.....China

ARSENIC

U. S. PRODUCTION OF WHITE ARSENIC, As_2O_3, IN SHORT TONS

Year	Quantity	Value	Year	Quantity	Value	Price per lb.,c.
1901	300	$18,000	1910	1,497	$52,305	3.06
1902	1,353	81,180	1911	3,132	73,408	3.01
1903	611	36,691	1912	3,142	190,757	3.48
1904	36	2,185	1913	2,513	159,236	4.37
1905	754	35,210	1914	4,670	313,147	3.77
1906	737	63,460	1915	5,498	302,116	4.30
1907	1,751	163,000	1916	5,986	555,186	5.70
1908	....	.....	1917	6,151	1,118,313	9.05
1909	1,214	52,946	1918	11,323	2,112,550	9.40

WORLD'S PRODUCTION OF ARSENIC, BY COUNTRIES, IN SHORT TONS

	1913	1914	1915	1916
Great Britain, white arsenic	1,716	2,007	2,536	2,575
Canada, white arsenic	1,538	1,576	2,174	1,983
France (arsenopyrite)	70,613	....	....	....
Germany, oxide and sulphide	5,008	....	....	....
Japan, white arsenic	....	....	15	....
Portugal, ore	925	960	....	....
United States, white arsenic	2,158	4,238	4,990	5,430

The occurrence of arsenic in metal-bearing ores is so common as to be practically universal. This is shown at the smelters treating lead, copper, and zinc ores, which emit over 20,000 tons of arsenious trioxide yearly into the atmosphere in the form of smelter smoke or fume. A small amount is saved at the Anaconda, Mont., smelter, and at the Ontario smelters treating Cobalt ores, and also in Mexico by the Mapimi smelter of the American Metal Co. Allison Butts, in The Mineral Industry for 1916, states that the amount lost yearly from the Anaconda smelter is greater than the American production.

With such an enormous wastage, it is foolish to attempt to work arsenical ores for the arsenic alone. The chief use of the metal is in glass-making and for insecticides in agriculture; the glass industry uses about half of the amount produced in this country.

ARSENIC PRODUCERS

American Smelting & Refining Co.
Canadian Smelting & Refining Co.
Deloro Mining & Reduction Co. Ontario
Metals Chemical Co. ..... Ontario
Nipissing Mining Co., Ltd. ..... Ontario
Puget Sound Reduction Co. ..... Wash.
U. S. Smelting, Refining & Mining Co. ..... Utah

BISMUTH

Occurrence. Bismuth ores are comparatively rare, though the metal occurs in many of the lead ores of the Rocky Mountain regions. The U. S. production comes entirely from electrolytic lead refineries at Grasseli, Ind., Omaha, Neb., and a few other plants. The world's supply comes mainly from Bolivian mines owned by Aramayo Francke Mines, Ltd., at Chorolque and Tasna. Another producer is the Seoul Mining Co., Korea. New South Wales and Tasmania produce a moderate amount. Occasionally lots of gold-silver or lead ore containing from 10 to 20% bismuth have been marketed in the West, but buyers gave nothing for the bismuth contained.

Prices. The price for bismuth in America, ordinarily about 65 cents a pound, was $2.75 per lb. at the beginning of 1915; toward the end of the year it sold to $4 per lb. This declined to $3.25 later on. In London the price was from 10s to 11s. ($2.40 to $2.64) per lb. in 1916. During 1917, 1918, and 1919 the price fluctuated between $3 and $4 per pound.

The price and market for bismuth ores and metal were both artificial, prior to the war, being fixed by a combination of English and German firms, who absolutely controlled the market and shut out competition by most drastic and inquisitorial methods. Were American production constant, domestic producers could have secured the American market. At present the A. S. & R. Co., and U. S. S. R. & M. Co., are the main producers and dealers.

The Anaconda smelter dust carries over 1% bismuth, equal to a daily production of 1,580 lbs., and this plant will probably be a factor in the market.

Uses. Metallic bismuth is employed in making low-fusing alloys or cliché metals which are used in automatic fire sprinklers, fuses for electric wiring, and solders. Some of the salts have a smooth, unctuous feel, and are used in face and toilet powders, and in medicinal preparations. It is also employed to a small extent in making optical glasses.

U. S. IMPORTS OF METALLIC BISMUTH IN POUNDS

Year	Quantity	Value	Year	Quantity	Value
1904	185,905	$339,058	1912	182,840	$316,440
1905	148,589	318,007	1913	117,747	213,257
1906	254,733	318,452	1914	90,505	165,208
1907	259,881	325,015	1915	34,237	72,587
1908	164,793	257,397	1916	64,821	155,925
1909	183,413	286,516	1917	69,250	142,300
1910	198,174	332,668	1918	135,700	277,273
1911	172,093	311,771			

BISMUTH PRODUCERS

American Sm. & Ref. Co.	Wilson Cons. Mining Co.....Utah
U. S. Metals & Refining Co.....N. J.	Seoul Mining Co.....Korea
Anaconda Copper Mining Co..Montana	San Gregorio Mine.....Peru

Australia produced 37 tons in 1916, 30 tons coming from New South Wales deposits.

CADMIUM

The bulk of the world's supply of cadmium used to come from the zinc smelters of Upper Silesia, Germany, with some from American zinc furnaces, as follows:

WORLD'S PRODUCTION OF CADMIUM

1913.....	54,198 lbs.	$0.77	Av. price	1916.....	135,212 "	1.56	"
1914.....	91,409 "	0.89	"	1917.....	207,408 "	1.47	"
1915.....	91,415 "	1.19	"	1918.....	127,164 "	1.48	"

In addition to the above metallic output, the United States produces over 50,000 lbs. of cadmium sulphide per annum, selling for almost the same as the metal.

A recent use for cadmium is as a substitute for tin in solder.

CHROMIUM

The chromium produced in the U. S. all comes from chromite or chrome ore.

U. S. CHROMITE PRODUCTION* (Long Tons)

Year	Quantity	Value	Price	Year	Quantity	Value	Price
1880.....	2,288	$27,808	$12.15	1899.....	....	.....	.....
1881.....	2,000	30,000	15.00	1900.....	140	1,400	10.00
1882.....	2,500	50,000	20.00	1901.....	368	5,790	15.73
1883.....	3,000	60,000	20.00	1902.....	315	4,567	14.50
1884.....	2,000	35,000	17.50	1903.....	150	2,250	15.00
1885.....	2,700	40,000	14.81	1904.....	123	1,845	15.00
1886.....	2,000	30,000	15.00	1905.....	22	375	17.05
1887.....	3,000	40,000	13.33	1906.....	107	1,800	16.82
1888.....	1,500	20,000	13.33	1907.....	290	5,640	19.45
1889.....	2,000	30,000	15.00	1908.....	359	7,230	20.14
1890.....	3,599	53,985	15.00	1909.....	598	8,300	13.88
1891.....	1,372	20,580	15.00	1910.....	205	2,729	13.31
1892.....	1,500	25,000	16.67	1911.....	120	1,629	13.58
1893.....	1,450	21,750	15.00	1912.....	201	2,753	13.70
1894.....	3,680	53,231	14.46	1913.....	255	2,854	11.19
1895.....	1,740	16,795	9.65	1914.....	591	8,715	14.75
1896.....	786	6,667	8.48	1915.....	3,281	36,744	11.20
1897.....	....	.....	.....	1916.....	47,035	726,243	15.44
1898.....	....	.....	.....	1917.....	43,725	1,049,400	24.00
* U. S. Geol. Survey.				1918.....	82,350	3,937,991	47.82

Chromic-iron ore is sold on the basis of 40% chromic oxide and 80% silica. Production is almost entirely from California and Oregon. The output during 1916 was 13 times greater than in 1915.

Occurrence. The chief producing areas are the belts of serpentine in the Sierra Nevada and Coast ranges, the foothill regions being the important producers. Most of the orebodies are small and lenticular in shape, containing only from 1 to 200 tons ore. Others are very irregular. An interesting occurrence is the disseminated ore such as near Red Bluff. This has to be concentrated

Preliminary Report No. 3, Sept., 1917, entitled 'Manganese and Chromium, issued by the California State Mining Bureau, San Francisco, gives the names of all the chrome mines in that State.

Use. Chromic iron ore is used in the manufacture of ferrochrome and steel for high-speed tools, armor plate and projectiles, bichromates of soda and potash, chromic acid, chrome alum and chrome tannage, and refractory brick.

COBALT

No cobalt is produced from domestic ores. That used in making high-priced steels and stellite is generally reduced from the imported oxide. (Stellite is an alloy, 75% cobalt and 25% chromium, valuable for making high-speed steels and non-tarnishable cutlery.) Experimental work has shown that cobalt may be substituted for nickel in plating. Canadian production, mainly from Cobalt, Ont., is as follows:

Year	Metallic Cobalt	Cobalt Oxide	Total Metal
1914, pounds	242,572	899,027	871,891
1915, "	211,610	379,219	477,063
1916, "	215,215	670,760	841,859
1917,* "	295,866	276,769	.....

From Preliminary Reports, Mineral Resources of Canada. * 9 months.

COBALT PRODUCERS

Beaver Mt. Mining Co. (Idle)..Alaska
Canadian Sm. & Refining Co..Ontario
Cobalt Comet Mines Co.....Ontario
Comiagas Mines Ltd.....Ontario
Comiagas Red. Co., Ltd.....Ontario
Deloro Mining & Red. Co....Ontario
Independence Mining Co. (Small quantities) .....Wyoming
Metals Chemical Co.....Ontario
Mine La Motte Co.....Missouri
Nipissing Mining Co., Ltd....Ontario
Peterson Lake S. C. M. Co....Ontario
Pittsburgh & Lorrain Synd...Ontario

COPPER

The Copper industry shared the very great War prosperity of the country early in 1917, but the fixation of the price by the government, September 21, 1917, at 23½ cts., did not give the industry the same ratio of profit granted other industries, and the raise to 26 cts. on July 2, 1918, was so tardy a recognition of this condition that the entire advance was taken up in advanced freight, smelter and labor costs.

A report by the Federal Trade Commission on the cost of producing copper, presents a very interesting summary of costs. This commission, whose methods have been called arbitrary and un-American, made a notable step in the standardization of production and cost.

It was ascertained, as a result of standardization, that the average cost of its companies for the year 1918 was 16.167 cents per pound. The range extended from below 12 cents, where two companies turned out over 122,000,000 pounds jointly, to over 34 cents above which level five small concerns produced approximately 7,000,000 pounds.

Several small Michigan companies which came into being during the regime of high prices were the highest cost properties, as five of them, contributing in all 6,975,960 pounds, had an average cost of 34.614 cents a pound, thereby showing a big loss from the fixed prices of 23½ and 26 cents.

The analysis or sub-division of the items making up the average cost is as follows:

	Cents per Pound	% of Total Cost
Mining	6.94	42.97
Depletion of ore	.72	4.45
Purchases of ore	.51	3.19
Transportation of ore	.83	5.18
Reduction of ore	5.89	36.44

	Cents per Pound	% of Total Cos
Trans. to refinery	.85	5.28
Refining	1.02	6.36
Administrative	.89	5.56
Selling expense	.18	1.16
Credits for precious metals	1.71	10.59
Total	16.17	.....

The above averages are reckoned against an output of 2,258,234,125 pounds of copper by 85 producers. The costs by producing districts are as follows:

Arizona & New Mexico	15.175c
Utah, Nevada and California	16.801
Montana, Idaho & Washington	17.245
Michigan	17.622
Other United States	19.910
Mexico, Cuba & South America	15.648
Canada and Alaska	16.263

Another highly interesting analysis is that showing amounts expended directly for labor, materials, etc. In this table we have:

	Cents per Pound	% of Total
Labor	5.30	32.83
Materials and supplies	3.76	23.28
Overhead	2.14	13.27
Depreciation	.94	5.85
Depletion	.72	4.45
Tolls	4.99	30.91
Credits	1.71	10.59

The largest companies as a rule were the cheapest producers. The average of the porphyry group for 1918 was 14.886 cents.

The allocation of production of copper in 1918 according to cost per pound may be found in the following compilation of the Federal Trade Commission:

Range of Cost	Cos.	Production	% of Total
Cost less than 12 cents	2	122,245,051	5.41
Cost between 12 and 13 cents	4	208,571,191	9.24
" " 13 " 14 "	4	314,553,177	13.93
" " 14 " 15 "	4	359,617,743	15.92
" " 15 " 16 "	2	98,307,293	4.35
" " 16 " 17 "	8	460,528,645	20.39
" " 17 " 18 "	9	255,399,696	11.32
" " 18 " 19 "	3	72,373,388	3.20
" " 19 " 20 "	5	28,491,436	1.26
" " 20 " 21 "	5	36,871,193	1.63
" " 21 " 22 "	9	135,538,602	6.00
" " 22 " 23 "	3	60,861,465	2.70
" " 23 " 24 "	5	44,919,772	1.99
" " 24 " 25 "	1	6,230,694	.28
" " 25 " 26 "	3	7,605,224	.34
Cost over 26 cents	18	46,119,555	2.04
Total all companies	85	2,258,234,125	100.00

The above figures include companies that buy and sell ores so that a duplication approximating 63,700,000 pounds is involved. Of the 85 companies used in the above tabulation 75 are in the United States; one in Alaska, and the remaining nine in Canada, Cuba, Mexico and South America.

Up to the year 1917, few companies reported depletion as a cost; whereas practically all companies now include such a charge based on the re-valuation of their mineral land. This is one of the largest single factors accounting for the large increase in the cost of producing copper in the last year or two.

Depreciation appeared on the books of mining companies at about the same time as depletion and for the same reason. Unfortunately the rates are not based on the life and residual value of particular assets; but are more often

arbitrary amounts based sometimes on what will be allowed as deductions on tax reports and sometimes on the best judgment and opinion of officers or directors.

The commission did not attempt to equalize depreciation for the various companies, usually accepting the depreciation charges as made by the company. In some instances, however, the cost of shafts, tunnels, openings, and underground equipment charged to cost in prior years has been set up on the books and depreciation again charged into cost. The commission did not allow depreciation of this nature, the amounts in any case being but small.

PRODUCTION OF COPPER IN THE UNITED STATES IN 1913-1918

(Smelter output, in pounds fine, U. S. G. S. figures.)

	1913	1914	1915	1916	1917	1918
Alaska	23,423,070	24,985,847	70,695,286	113,823,064	84,759,086	67,061,648
Arizona	404,278,809	382,449,922	432,467,690	694,847,307	719,035,514	769,521,729
California	32,492,265	29,784,173	37,658,444	43,400,876	44,933,846	44,150,761
Colorado	9,052,104	7,316,066	7,272,178	9,536,193	10,054,951	7,591,570
Georgia	.....	.....	.....	803,694	930,691	397,078
Idaho	8,711,490	5,875,205	6,217,728	7,248,799	6,446,224	5,836,795
Maryland	.....	12,248	15,426	126,965	291,501	.....
Michigan	155,715,286	158,009,748	238,956,410	269,794,531	268,508,091	231,096,158
Missouri	576,204	53,519	306,406	877,575	407,141	282,078
Montana	285,719,918	286,805,845	266,263,040	352,139,768	276,225,977	326,426,761
Nevada	85,209,536	60,122,904	67,757,322	100,816,724	115,028,161	106,266,603
New Jersey	.....	.....	.....	4,119	.....	.....
New Mexico	50,196,881	64,204,703	62,817,234	79,868,485	107,593,615	96,559,580
North Carolina	180	19,712	33,383	5,961	125,004	79,200
Oregon	77,812	5,599	797,471	2,433,567	1,105,097	2,630,499
Pennsylvania	245,337	422,741	.....	904	115,000	34,500
South Carolina	.....	.....	.....	.....	210,000	.....
Tennessee	19,489,654	18,661,112	18,205,808	14,556,278	16,093,757	15,053,568
Texas	39,006	84,272	38,971	86,468	2,061,129	13,851
Utah	148,057,450	160,389,660	175,177,695	282,335,950	227,840,447	230,964,906
Vermont	5,771	.....	23,995	324,400	102,522	896,630
Virginia	46,961	17,753	50,008	1,066,143	146,912	1,248
Washington	732,742	683,602	903,661	2,473,481	2,051,416	2,830,568
Wyoming	362,235	17,082	351,871	1,784,351	2,019,767	966,698
Undistributed	51,385	65,479	.....	.....	.....	.....
Total	1,224,484,098	1,150,137,192	1,388,009,627	1,927,850,548	1,886,120,721	1,908,583,595
From imported ores and matte, etc.	390,583,684	383,644,202	246,194,921	331,536,767	542,425,450	523,851,695
Secondary metal	37,222,759	31,926,980	59,574,690	104,423,807	79,116,896	43,692,111
Grand total	1,652,290,541	1,565,708,374	1,693,779,188	2,363,811,122	2,507,663,067	2,476,077,401
Average price, cents per pound.	15.5	13.8	17.5	24.6	27.8	24.7

In considering the copper production of America it is worth while remembering that a very large part of the silver production of the United States and a respectable part of the gold output come from our copper mines. In the last year, several copper companies have also become zinc producers. The new metallurgy has made the recovery of the latter metal profitable in ores formerly worthless because of the presence of zinc. Thus the copper mines around Kennett, Calif., yielded 315,549 tons copper ore in 1915 with a value of $17.97 per ton, made up as follows: gold, $1.51 per ton; silver, $1.26 per ton; copper, $11.96 per ton; zinc, $3.24 per ton. A perusal of statements of several companies at Butte, in another part of this volume will show the advance made along this line.

HIGH, LOW AND AVERAGE PRICES OF COPPER

Year	Highest Price	Lowest Price		Average
1860 Prices per cts. per lb.	24.000	January 19.750	December	22.875
1861	27.000	December 17.500	July	22.250
1862	32.875	November 20.750	May	21.875
1863	38.750	December 29.000	July	33.875
1864 Highest	55.000	July 39.000	January	47.000
1865	50.500	January 28.000	July	39.250
1866	42.000	January 26.500	November	34.250

HIGH, LOW AND AVERAGE PRICES OF COPPER—*Cotninued*

Year	Highest Price	Lowest Price		Averag
1867	29.250	January 21.500	December	25.3
1868	24.500	December 21.500	January	23.0
1869	27.000	February 21.500	December	24.2
1870	23.375	November 19.000	March	21.1
1871	27.000	December 21.250	April	24.1
1872	44.000	April 27.125	January	35.5
1873	35.000	January 21.000	November	28.0
1874	25.000	January 19.000	August	22.0
1875	23.875	September 21.500	January	22.68
1876	23.250	January 18.750	August	21.00
1877	20.500	February 17.500	December	19.0
1878	17.625	January 15.500	October	16.5
1879	21.750	November 15.500	January	18.62
1880	25.000	January 17.875	June	21.43
1881	20,375	December 16.000	July	18.18
1882	20.375	January 17.875	April	19.12
1883	18.125	January 14.875	November	16.50
1884	15.000	December 11.000	December	13.0
1885	11.875	February 9.800	May	10.83
1886	12.125	December 10.000	May	11.06
1887	17.750	December 9.950	May	13.85
1888	17.600	November 15.850	January	16.77
1889	17,500	January 11.000	September	13.49
1890	17.250	July 14.000	March	15.60
1891	15.000	January 10.250	December	12.76
1892	12.375	December 10.500	February	11.56
1893	12.500	January 9.600	August	10.75
1894 Lowest	10.250	January 9.000	June	9.25
1895	12 250	August 9.375	April	10.73
1896	12.000	June 9.750	January	10.98
1897	12.000	January 10.750	November	11.36
1898	13.250	December 11.000	January	12.05
1899	19.375	April 13.250	January	17.76
1900	17.250	April 16.000	February	16.65
1901	17.000	January 13.000	December	16.72
1902	13.500	February 11.000	January	12.16
1903	15.375	March 12.000	December	13.72
1904	15.375	November 12.250	February	13.01
1905	18.875	December 15.000	May	15.89
1906	24.000	December 17.875	February	19.61
1907	26.250	March 12.500	October	20.00
1908	14.750	December 12.500	February	13.50
1909	14.750	January 12.500	March	13.48
1910	14.125	January 12.500	July	13.12
1911	14.250	December 12.250	June	12.77
1912	18.000	October 14.250	January	16.69
1913	17.250	October 14.500	July	16.69
1914	14.491	February 11.739	November	13.602
1915	20.133	December 13.641	January	17.27
1916	33.075	December 24.100	January	28.17
1917	36.000	23.500		29.18
1918	26.000	23.000		24.68
1919	23.500	14.750		18.90

*9 months. No quotations in Aug., Sept., Oct., 1914.

The following table (from the Eng. & Mng. Journal) gives the essentia figures of the Copper Industry for the past twelve years. The column headed "Pounds reported" represents the sales of the eight largest producers aggregating 40% of the United States production, so that the prices given may be considered as representative of the entire industry.

Production, Sale and Price of Copper for 12 Years

Year	Total Production	Pounds Reported	Average Realized, Cents	Quotational Average, Cents
1905	219,000,000	82,372,955	15.597	15.699
1906	224,071,000	113,411,645	19.146	19.616
1907	220,317,041	66,316,025	18.043	20.661
1908	222,267,444	125,949,248	13.348	13.424
1909	226,602,134	136,005,773	13.211	13.335
1910	221,400,864	126,710,763	12.960	13.039
1911	216,412,867	135,329,098	12.657	12.634
1912	1,228,333,298	552,155,308	15.841	16.341
1913	1,406,448,665	658,533,402	15.222	15.269
1914	1,342,634,206	566,687,750	13.458	13.602
1915	1,411,652,418	619,832,987	17.299	17.275
1916	2,300,000,000	1,217,014,743*	25.710	27.202

*15 producers.

COPPER SMELTING WORKS OF NORTH AMERICA

Company	Situation of Works	Blast Furnaces	Annual Capacity	Reverb. Furnaces	Annual Capacity	Converters	Ann'l Capacity in Ore*
American Sm. & Ref. Co.	Aguascalientes, Mex.	10	800,000	..	.....	4	†
American Sm. & Ref. Co.	Perth Amboy, N. J.	1	90,000	..	.....	3	†
American Sm. & Ref. Co.	Omaha, Neb.	..	.....	..	.....	2	†
American Sm. & Ref. Co.	El Paso, Tex.	3	300,000	3	435,000	3	†
American Sm. & Ref. Co.	Matehuala, S.L.P., Mex.	3	325,000	..	.....	..	.....
American Sm. & Ref. Co.	Hayden, Ariz.	..	.....	2	290,000	3	†
American Sm. Sec. Co.	Garfield, Utah	4	800,000	6	875,000	6	†
American Sm. Sec. Co.	Tacoma, Wash.	2	375,000	1	.....	7	†
American Sm. Sec. Co.	Velardena, Dgo., Mex.	3	250,000	..	.....	..	.....
Anaconda C. Mg. Co.	Anaconda, Mont.	3	1,750,000	9	1,750,000	7	105,000
Anaconda C. Mg. Co.	Great Falls, Mont.	2	280,000	2	330,000	2	49,000
Arizona Cop. Co.	Clifton, Ariz.	..	.....	3	360,000	3	.....
Balaklala Cons. Cop. Co.††	Coram, Calif.	3	630,000	1	52,500	2	.....
Compagnie du Boleo	Santa Rosalia, Mex.	3	650,000	..	.....	..	.....
Brit. Col. Cop. Co.	Greenwood, B. C.	3	912,500	..	.....	2	.....
Calumet & Ariz. Mining Co.	Douglas, Ariz.	2	649,500	4	486,500	6	33,500
Canadian Copper Co.	Copperclift, Ont.	7	1,020,000	2	300,000	5	43,200
Cananea Cons. Cop. Co.	Cananea, Son.	3	868,000	2	153,000	6	35,000
Cerro de Pasco Copper Co.	La Fundicion, Peru	4	438,000	6	.....	..	.....
Cons. Ariz. Sm. Co.	Humboldt, Ariz.	..	.....	2	150,000	2	10,000
Cons. Mg. & Smg. Co.	Trail, B. C.	5	450,000	..	.....	2½	.....
Phelps Dodge Corporation	Douglas, Ariz.	10	1,225,000	3	275,000	7	34,160
Detroit Copper Mng. Co.	Morenci, Ariz.	1	132,657	..	.....	3	7,578
Dortdown Sulph., C. & I. Co.	Isabella, Tenn.	2	171,500	..	.....	..	.....
East Butte Cop. Mng. Co.	Butte, Mont.	2	350,000	..	.....	3	5,000
Granby Con. M., S. & P. Co.	Grand Forks, B. C.	8	1,440,000	..	.....	4	7,000
Granby Con. M., S. & P. Co.	Anyox, B. C.	4	1,080,000	..	.....	3	28,000
International Smg. Co.	Tooele, Utah	..	.....	5	525,000	5	14,000
International Smg. Co.	Miami, Ariz.	.	.....	3	120,000	3	7,000
Mt. Lyell M. & R. Co.	Queenstown, Tasmania	3	.....	..	.....	3	.....
Mt. Morgan G. M. Co.	Mt. Morgan, Queensland.	2	.....	..	.....	3	.....
Mammoth Cop. Mng. Co.	Kennett, Calif.	5	780,000	..	.....	2	28,500
Mason Valley Mines Co.††	Thompson, Nev.	2	800,000	..	.....	2	22,000
Mexpil Copper Co.††	Concepcion del Oro, Zac., Mex.	4	250,000	..	.....	..	.....
Mond Nickel Co.	Coniston, Ont.	3	630,000	..	.....	3	70,000
Mountain Cop. Co.	Martinez, Calif.	..	.....	3	125,000	2	**
Nevada Cons. Cop. Co.	McGill, Nev.	1	175,000	5	900,000	4	40,000
Nichols Copper Co.	Laurel Hill, N. Y.	2	94,500	..	.....	2	.....
Norfolk Smelting Co.	West Norfolk, Va.	1	140,000	..	.....	2	4,200
Old Dominion C. M. & S. Co.	Globe, Ariz.	5	562,500	..	.....	1	6,062
Oxford Wks., Int. Nickel Co.	Constable Hook, N. J.	2	94,500	..	.....	3	.....
Penn Mining Co.	Campo Seco, Calif.	1	50,000	2§	96,000	..	.....
Pioneer Smelting Co.	Corwin, Ariz.	1	60,000	..	.....	..	.....
Santa Fe G. & Cop. Co.	San Pedro, N. M.	1	45,000	..	.....	..	.....
Shannon C. G. & C. M. Co.††	Bonse, Ariz.	1	190,000	..	.....	2	.....
Tennessee Copper Co.	Copperhill, Tenn.	7	1,000,000	..	.....	4	15,000
Texas C. M. & S. Co.††	Teziutlan, Puebla, Mex.	2	350,000	..	.....	3	.....

PRODUCTION TABLES

PRODUCTION OF COPPER IN THE UNITED STATES SINCE 1845

Year	Production Pounds	Increase Pounds	Increase Per Cent.	Average Annual Increase, by Decade Pounds	Average Annual Increase, by Decade Per Cent
1845	224,000	.....	....		
1846	336,000	112,000	50.1		
1847	672,000	336,000	100.0		
1848	1,120,000	448,000	67.0	246,400	50.0
1849	1,568,000	448,000	47.0		
1850	1,456,000	—112,000	—7.1		
1851	2,016,000	560,000	38.4		
1852	2,464,000	448,000	22.2		
1853	4,480,000	2,016,000	81.8		
1854	5,040,000	560,000	12.5		
1855	6,720,000	1,730,000	33.3		
1856	8,960,000	2,240,000	33.3	1,472,200	28.5
1857	10,752,000	1,792,000	20.0		
1858	12,320,000	1,568,000	14.6		
1859	14,112,000	1,792,000	14.5		
1860	16,128,000	2,016,000	14.3		
1861	16,800,000	672,000	4.1		
1862	21,160,000	4,360,000	26.0		
1863	19,040,000	—2,120,000	—10.0		
1864	17,920,000	—1,120,000	—5.9		
1865	19,040,000	1,120,000	6.3		
1866	19,936,000	896,000	4.7	1,209,600	6.2
1867	22,400,000	2,464,000	12.3		
1868	25,984,000	3,584,000	16.0		
1869	28,000,000	2,016,000	7.7		
1870	28,224,000	224,000	.8		
1871	29,120,000	896,000	3.2		
1872	28,000,000	—1,120,000	—3.8		
1873	34,720,000	6,720,000	24.0		
1874	39,200,000	4,480,000	12.9		
1875	40,320,000	1,120,000	2.9		
1876	42,560,000	2,240,000	5.6	3,225,600	8.2
1877	47,040,000	4,480,000	10.0		
1878	48,160,000	1,120,000	2.4		
1879	51,520,000	3,360,000	7.0		
1880	60,480,000	8,960,000	17.4		
1881	71,680,000	11,200,000	18.5		
1882	90,646,232	18,966,232	26.5		
1883	115,526,053	24,879,821	27.4		
1884	144,946,653	29,420,600	25.5		
1885	165,875,766	20,929,113	14.4		
1886	156,735,381	—9,140,385	—5.5	18,928,949	14.8
1887	180,920,524	24,185,143	15.4		
1888	226,361,466	45,440,942	25.0		
1889	226,775,962	414,496	.2		
1890	259,763,092	32,987,130	14.5		

PRODUCTION OF COPPER IN THE UNITED STATES SINCE 1845—Continued.

Year	Production Pounds	Increase Pounds	Increase Per Cent.	Average Annual Increase, by Decades Pounds	Average Annual Increase, by Decades Per Cent.
1891	284,121,764	24,358,672	9.4		
1892	344,998,679	60,876,915	21.4		
1893	329,354,398	—15,644,281	—4.5		
1894	354,188,374	24,833,976	7.5		
1895	380,613,404	26,425,030	7.4		
1896	460,061,430	79,448,026	20.9	34,635,407	9.4
1897	494,078,274	34,016,844	7.4		
1898	526,512,987	32,434,713	6.6		
1899	568,666,921	42,153,934	8.0		
1900	606,117,166	37,450,245	6.6		
1901	602,072,519	—4,044,647	—.7		
1902	659,508,644	57,436,125	9.5		
1903	698,044,517	38,535,873	5.8		
1904	812,537,267	114,492,750	16.4		
1905	888,784,267	76,247,000	11.0		
1906	917,805,682	15,897,839	1.7	47,404,234	6.1
1907	868,996,491	—48,809,191	—5.3		
1908	942,570,721	73,074,230	8.4		
1909	1,092,951,624	150,380,903	15.9		
1910	1,080,159,509	—12,792,115	—1.2		
1911	1,097,232,749	17,073,240	1.6	.....	....
1912	1,243,268,720	146,035,971	13.3	.....	....
1913	1,224,484,098	—18,784,622	1.5	.....	....
1914	1,150,137,192	—74,346,906	6.1	.....	....
1915	1,388,009,527	237,872,335	20.7	.....	....
1916	1,927,850,548	539,741,021	28.0	.....	....
1917	1,886,120,721	—41,729,827	—2.21	.....	....
1918	1,908,533,595	22,412,874	1.17	.....	....
1919*	1,278,000,000	630,533,595	...	.....	....
Total	28,396,128,493	.....	....	.....	....

* Estimated.

WORLD'S PRODUCTION OF COPPER

(In Metric Tons)

Country	1912	1913	1914	1915	1916	1917	1918
United States	563,290	555,990	525,529	646,212	881,287	842,013	852,675
Mexico	73,617	58,323	36,337	30,969	55,128	46,752	74,886
Cuba	4,393	3,381	6,251	8,330	7,816	10,150	12,142
Canada	34,213	34,880	34,027	47,202	47,985	49,826	51,860
Australasia	47,772	47,325	37,592	32,512	35,000	37,498	33,303
Peru	26,483	25,487	23,647	32,410	41,625	44,899	44,094
Chile	39,204	39,434	40,876	47,142	64,636	81,786	84,493
Bolivia	4,081	3,658	1,366	3,000	4,000	3,937	3,937
Japan	62,486	73,152	72,938	75,415	81,280	109,498	94,286
Russia	33,550	34,316	31,933	34,918	31,500	15,747	4,922
Germany	24,303	25,308	30,480	34,918	45,000	44,289	39,268
Africa	16,632	22,870	24,135	27,327	34,572	44,424	30,614
Spain and Portugal	59,873	54,696	37,099	46,200	42,000	41,336	40,352
Other countries	29,355	27,158	25,176	25,000	25,000	24,605	24,605
Totals	1,020,922	1,005,978	923,888	1,082,059	1,390,779	1,390,760	1,390,991

Carnotite is a complex ore consisting essentially of vanadium oxide or with potassium as double silicate, and associated with or loosely combined with uranium oxide. A ton of ordinary carnotite ore assaying about 2½% uranium oxide contains only 12.5 milligrams radium, or one part out of a hundred million, recoverable radium. The following firms are producers of radium:

Standard Chemical Co., Pittsburgh, Pa.
W. L. Cummings Chemical Co., Lansdowne, Pa.
Radium Company of America, Sellersville, Pa.
Radium Co. of Colorado, Box 1316, Denver, Colo.
Carnotite Reduction Co., 2600 Iglehart Court, Chicago, Ill.
Pittsburgh Radium Co., Denver, Colo.
Chemical Products Co., Denver, Colo.

RADIUM MINES

National Radium Mines Co. (Uranium and Vanadium)..Utah
National Radium Products Co.....Colorado
Penna. Mining, Power & Reduction Co. (Ore contains uranium and vanadium)....Colo.
Radium Mines Co. (Vanadinite not found in commercial quantities) .....Arizona
Rare Metals Co. (Operates a custom mill).....Colorado
Government mines in Bohemia Austria

SELENIUM

The commercial supply of selenium is obtained from the slime or mud resulting from the electrolytic refining of blister copper.

SELENIUM RECOVERED FROM 100 TONS OF BLISTER COPPER.

Smelter supplying blister copper:	Selenium pounds	Smelter supplying blister copper:	Selenium pounds
Garfield, Utah.....	56	Tacoma, Washington.....	42
Steptoe, Nevada.....	110.1	Aguascalientes, Mexico...	170
Omaha, Nebraska.....	26.0	Cerro de Pasco, Peru....	13.7
Mountain, California.....	36	Mount Lyell, Tasmania...	42

Eilers, A., Notes on the occurrence of some of the rarer metals in blister copper: Am. Inst., Min. Eng. Trans., vol. 47, pp. 217-218, 1914.

SILVER

Average monthly prices of silver per ounce, as published by The American Metal Market:

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
January	52.37	53.79	56.22	62.93	57.56	48.89½	56.77	75.14	88.72	101.12
February	51.53	52.22	59.04	61.64	57.50½	48.48	56.75	77.54	85.79	101.12
March	51.45	52.74	58.37	57.87	58.07	50.24	57.98	74.13	88.11	101.12
April	53.22	53.33	59.23	59.49	58.52	50.25	64.41	72.51	95.35	101.12
May	53.87	53.31	60.88	60.30	58.18	49.91½	74.27	74.61	99.50	107.23
June	53.46	53.04	61.29	58.99	56.47	49.03	65.02	76.44	99.50	110.50
July	54.15	52.63	60.66	58.72	54.68	47.52	62.94	78.92	99.02	106.36
August	52.91	52.17	61.61	59.29	54.34	47.18	66.08	85.40	100.31	111.25
September	53.30	53.43	63.08	60.64	53.29	48.68	68.51	100.73	101.12	113.98
October	55.49	53.34	63.47	60.79	50.65	49.38½	67.85	87.38	101.12	118.19
November	55.64	55.72	62.79	58.99	49.10	51.71	71.00	85.97	101.12	121.53
December	54.43	54.90	63.37	57.76	49.38	54.97	75.76	86.94	101.12	124.07
Average	53.49	53.30	60.83	59.79½	54.31	49.89	65.66	81.49	96.77	113.96

The silver output of this country during 1918, as compiled by the Bureau of the Mint, is as follows:

State or Territory	Fine ounces	Value
Alaska	796,836	$796,836
Alabama	2	2
Arizona	6,771,490	6,771,490
California	1.555,417	1,555,417
Colorado	6,982,313	6,982,313
Georgia	41	41
Idaho	10,188,056	10,188,056
Illinois	8,939	8,939
Maryland	164	164
Michigan	491,939	491,939
Missouri	40,948	40,948
Montana	15,341,793	15,341,793
Nevada	10,113,405	10,113,405
New Mexico	763,758	763,758
North Carolina	9	9
Oregon	150,207	150,207
Philippine Islands	12,597	12,597
South Dakota	165,865	165,865
Tennessee	131,931	131,931
Texas	612,436	612,436
Utah	13,439,811	13,439,811
Vermont	5.117	5,117
Virginia	2,967	2,967
Washington	302,446	302,446
Wyoming	719	719
Totals	67,879,206	$67,879,206

*$1 per oz., the price paid by the Government.
The output in 1919 was 55,285,196 oz., valued at $61,966,412.

SILVER PRODUCTION OF THE UNITED STATES, IN OUNCES.

Year	Quantity	Commercial Value	Year	Quantity	Commercial Value
1880....	30,318,700	$34,717,000	1901....	55,214,000	$33,128,400
1881....	33,257,800	37,657,500	1902....	55,500,000	29,415,000
1882....	36,196,900	41,105,900	1903....	54,300,000	29,322,000
1883....	35,732,800	39,618,400	1904....	57,682,800	33,456,000
1884....	37,743,800	41,921,300	1905....	56,101,600	34,222,000
1885....	39,909,400	42,503,500	1906....	56,517,900	38,256,400
1886....	39,694,000	39,482,400	1907....	56,514,700	37,299,700
1887....	41,721,600	40,887,200	1908....	52,440,800	28,050,600
1888....	45,792,700	43,045,100	1909....	54,721,500	28,455,200
1889....	50,094,500	46,838,400	1910....	57,137,900	30,854,500
1890....	54,516,300	57,242,100	1911....	60,399,400	32,615,700
1891....	58,330,000	57,630,000	1912....	63,766,800	39,197,500
1892....	63,500,000	55,662,500	1913....	66,801,500	40,348,100
1893....	60,000,000	46,800,000	1914....	72,455,100	40.067.700
1894....	49,500,000	31,422,100	1915....	74,961,075	37.397,300
1895....	55,727,000	36,445,500	1916....	74,414,802	48,953,000
1896....	58,834,800	39,654,600	1917....	71.740,362	59.078,100
1897....	53,860,000	32,316,000	1918....	67,879,206	67,879,206
1898....	54,438,000	32,118,400	1919....	55,285,196	61.966,412
1899....	54,764,500	32,858,700			
1900....	57,647,000	35,741,100	Total.	2.175,414,441	$1.615.630,518

AMERICAN SILVER-LEAD SMELTING WORKS

Company—	Place	Furnaces	Annual Capacity
American Smelting and Refining Co....	Chicago†	1	36,0
American Smelting and Refining Co....	Denver	7	510,0
American Smelting and Refining Co....	Durango	4	210,0
American Smelting and Refining Co....	East Helena.....	4	306,0
American Smelting and Refining Co....	El Paso.....	6	380,0
American Smelting and Refining Co....	Leadville	10	510,0
American Smelting and Refining Co....	Murray	8	657,0
American Smelting and Refining Co....	Omaha†	2	82,0
American Smelting and Refining Co....	Perth Amboy†.....	4	170,0
American Smelting and Refining Co....	Pueblo	7	380,0
Bunker Hill & Sullivan M. & C. Co.....	Kellogg, Idaho.....	3	200,0
International Smelting Co.....	Tooele, Utah.....	5	525,0
Needles Smelting Co.....	Needles, Cal.‡.....	2	70,0
Northport Smelting and Refining Co...	Northport, Wash...	3	300,0
Ohio & Colorado Smelting Co.....	Salida, Colo.....	4	345,0
Pennsylvania Smelting Co.....	Carnegie, Pa.....	2	60,0
Selby Smelting Works.....	Selby	3	210,0
United States Smelting Co.....	Midvale, Utah.....	6	500,0
Totals, United States.....		78	4,951,0
American Smelting and Refining Co....	Monterey	10	584,0
American Smelting and Refining Co....	Aguascalientes	1	40,0
American Smelters Securities Co.....	Chihuahua	7	400,0
Compañia Metalurgica Mexicana.....	Velardeña	3	150,0
Compañia Metalurgica de Torreon.....	San Luis Potosi....	10	250,0
	Torreon	8	360,0
Compañia Minera de Penoles.....	Mapimi‡	6	325,0
Totals, Mexico.....		45	2,109,0
Consolidated Mining and Smelting Co..	Trail, B. C.....	4	140,0

* Tons of charge. † Smelt chiefly refinery between-products. ‡ N
operated in 1914 and 1915. § Plant being remodeled.

SILVER PRODUCTION OF THE WORLD

(Report of the Director U. S. Mint)

	Quantity	Value		Quantity	Value
1882.....	86,472,091	$98,232,300	1901.....	173,011,283	$103,806,7
1883.....	89,175,023	98,984,300	1902.....	162,763,483	86,264,7
1884.....	81,567,801	90,785,000	1903.....	167,689,322	90,552,3
1885.....	91,609,959	97,518,800	1904.....	164,195,266	95,233,3
1886.....	93,297,290	92,793,500	1905.....	172,317,688	105,113,7
1887.....	96,123,586	94,031,000	1906.....	165,054,497	111,721,3
1888.....	108,827,606	102,185,900	1907.....	184,206,984	121,577,3
1889.....	120,213,611	112,414,100	1908.....	203,131,404	108,655,1
1890.....	126,095,062	131,937,000	1909.....	212,149,023	110,364,4
1891.....	137,170,000	135,500,200	1910.....	221,715,763	119,22
1892.....	153,151,762	133,404,400	1911	230,192,940	123,143
1893.....	165,472,621	129,115,000	1912	214,310,854	2
1894.....	164,610,394	104,4	1913	224,677,841	
1895.....	167,500,960	10		231,811,5	
1896.....	157,061,370	10			
1897.....	160,421,082	9			
1898.....	169,055,253	9			
1899.....	168,337,452	10			
1900.....	173,591,364	10			

TIN

Very little tin is produced in this country, and the most of it comes from Alaska, which yielded 68 tons metal during 1918. In 1914 South Dakota furnished a few hundred pounds of stream tin, and there are promises of a revival in lode mining in that State. Workable deposits exist near Deeth, Nevada; El Paso, Texas; and on Irish Creek, Virginia. Practically all the tin used in the United States is brought from the Straits Settlements and Bolivia, the latter ranking second to the former as a tin producer.

UNITED STATES TIN PRODUCTION (U. S. GEOL. SURVEY)

Year	Tons Concentrates	Percent Tin	Value
1918	130	60	$118,000
1917	141	60	111,000
1916	232	66	122,000
1914	200	66	.....
1913	157.5	66	66,560
1912	84	60	36,970
	147	60	124,800

Secondary tin recovered in the United States:

Year	Tons	Value
1917	19,400	$23,920,200
1916	17,400	15,131,040
1915	13,650	10,544,180
1914	12,447	8,887,158

The United States is the largest user (50% of the world's output) of among the countries of the world, and hence a large importer of the al. The U. S. Steel Corporation is the greatest single user of the metal.

Tin Prices in New York

Extreme fluctuations and yearly average prices of Pig Tin in New York:

Year	Highest	Lowest	Aver.
1902	30.62½	22.60	26.95
1903	30.80	24.95	28.19
1904	30.12½	25.75	28.08
1905	36.45	28.65	31.55
1906	50.00	35.65	39.82
1907	44.10	26.00	38.43
1908	32.37½	26.45	29.54
1909	34.12½	27.30	29.76
1910	38.75	31.75	34.27
1911	48.50	37.60	42.68
1912	51.05	42.05	46.43
1913	51.00	36.75	44.32
1914	65.00	28.50	35.70
1915	57.00	32.00	38.66
1916	56.00	37.50	43.48
	86.00	42.50	61.65
	139.00	70.00	86.80
	00	52.12	62.14
		years	30.48

price of tin was
55 cents

ade 60%
ion. The

supply of rutile comes from Virginia, being mined by the American Rut Co. at Roseland, Nelson county. Its output in 1914 was 94 tons of ruti containing 95% oxide, and 89 tons of ilmenite, with 55% oxide.

Rutile is used for making ferro-titanium, used in cast iron and steel, electrodes for arc lamps, in dyeing leather and wool and in chemicals little ilmenite has been used in making ferro-titanium and arc lam electrodes.

TUNGSTEN

Prior to 1914, the domestic output of this valuable mineral, used main in tool-steel and incandescent lamps, varied from 1,100 to 1,800 tons of co centrate per annum, since when the yield has been as below:

Year	Tons	Per unit	Total valu
1910	1,821	$7.62	$832.9
1911	1,139	5.97	407.9
1912	1,330	6.28	502.1
1913	1,537	7.30	672.1
1914	900	7.31	435.0
1915	2,332	29.33	4,100.0
1916	5,923	33.97	12,074.0
1917	6,144	18.40	6,783.0
1918	5,041	22.48	6,802.0

URANIUM

As uranium is the source of radium, the production of uranium ore ha already been given under radium. Uranium ores occur in many places i the United States, but are found in greatest abundance in the Paradox Va ley region of Colorado and Utah.

VANADIUM

Vanadium occurs with uranium in carnotite, the mineral of greates commercial importance. When vanadium is 14% and uranium but 3% th mineral is a dark olive green; when the uranium content is 20%, the miner is a beautiful yellow. The ore is usually low-grade, 2 to 4%, but of wide spread occurrence, the sandstone looking as if dusted with sulphur.

The Vanadium Corporation of America is said to control 92% of th world's vanadium supply. The demand is for vanadium steel, used in air plane construction, in automobiles, for military helmets, and wherever ex treme strength and lightness are required. American production in 191 was 276 tons of vanadium from 18,860 tons of ores.

The three principal producers in the United States are:

Primos Chemical Co., Primos, Pa. Mines at Vanadium, San Migue County, Colo.

Standard Chemical Co., Pittsburgh, Pa. Mines in Colorado.

Vanadium Corporation of America, Pittsburgh, Pa. Minas-ragra, Per

VANADIUM MINES

Vanadium Corporation.....Peru
Primos Chemical Co..Colorado (etc.)
Shattuck-Arizona Copper Co.Arizona
Standard Chemical Co....Colorado
Utal

ZINC (Spelter)

This is one of the important metals mined in the United States, thi country containing several of the largest mines in the world.

Spelter Prices in New York

Highest, lowest and average yearly prices of spelter in New York:

Year	Highest	Lowest	Average	Year	Highest	Lowest	Average
1885.....	4.62½c	4.00c	4.34c	1903.....	6.25	4.70	5.62
1886.....	4.60	4.25	4.40	1904.....	6.12½	4.75	5.17
1887.....	5.62½	4.40	4.62½	1905.....	6.65	5.30	6.00
1888.....	5.50	4.50	4.91	1906.....	6 85	6.00	6.27½
1889.....	5.40	4.62½	5.02	1907.....	7.25	4.35	6.20½
1890.....	6.17½	5.00	5.55	1908.....	5.17½	4.35	4.74
1891.....	6.00	4.65	5.02	1909.....	6.50	4.75	5.52
1892.....	4.90	4.35	4.63	1910.....	6.35	5.25	5.66
1893.....	4.50	3.55	4.08	1911.....	7.00	5.50	5.91
1894.....	4 00	3.25	3.52	1912.....	7.65	6.45	7.11
1895.....	4.35	3.10	3.63	1913.....	7.35	5.10	5.80
1896.....	4.25	3.60	3.94	1914.....	6.20	4.75	5.30
1897.....	4.35	3.75	4.12	1915.....27.50		5 70	14.44
1898.....	5 30	3.87½	4.57	1916.....21.17		8.37½	13.75
1899.....	7.00	4.45	5.75	1917.....11.05		7.67½	9.11
1900.....	4.80	4.10	4.40	1918.....	9 85	6.82½	8.31
1901.....	4.50	3.90	4.08½	1919.....	9.00	6.00	7.04
1902.....	5.62½	4.10	4.90				

Average price for 32 years, 5.88 cents.
From American Metal Market.

Annual Production of Spelter in the United States from Domestic and Foreign Ores, in Short Tons.*

Year	From Foreign Ore	From Domestic Ore	Total	Year	From Foreign Ore	From Domestic Ore	Total
1873.....	.....	7,343	7,343	1899.....	.....	129,051	129,051
1875.....	.....	15,833	15,833	1900.....	.....	123,886	123,886
1880 (Census)	.....	23,239	23,239	1901.....	.....	140,822	140,822
1882.....	.....	33,765	33,765	1902.....	.....	156,927	156,927
1883.....	.....	36,872	36,872	1903.....	.....	159,219	159,219
1884.....	.....	38,544	38,544	1904.....	.....	186,702	186,702
1885.....	.....	40,688	40,688	1905.....	.....	203,849	203,849
1886.....	.....	42,641	42,641	1906.....	25,076	199,694	224,770
1887.....	.....	50,340	50,340	1907.....	26,115	223,745	249,860
1888.....	.....	55.903	55,903	1908.....	19.675	190.749	210,424
1889.....	.....	58,860	58,860	1909.....	25,535	230,225	255,760
1890.....	.....	63,683	63,683	1910.....	16,705	252,479	269,184
1891.....	.....	80,873	80,873	1911.....	14,905	271,621	286,526
1892.....	.....	87,260	87,260	1912.....	14,899	323,907	338,806
1893.....	.....	78,832	78,832	1913.....	9,424	337,252	346,676
1894.....	.....	75,328	75,328	1914.....	9,631	343,418	353,049
1895.....	.....	89,686	89,686	1915.....	31,384	458,135	489,519
1896.....	.....	81,499	81,499	1916.....	104,005	563,451	667,456
1897.....	.....	99,980	99,980	1917.....	84,976	584,597	669,573
1898.....	.....	115.399	115,399	1918.....	25,522	492,405	517,927

*U. S. Geological Survey.

MINES OF THE UNITED STATES

CHAPTER IV

THE MINING COMPANIES AND MINES OF THE UNITED STATES

Those of other countries are in separate chapters. See alphabetical index in front of book.

The descriptions of the active and most of the inactive mining corporations, and operating mines of the various States are arranged by States and often grouped by counties and towns. The arrangement permits ready identification of companies whose exact title may often be difficult to recall and it enables the reader to tell what companies are operating near each mining center.

The descriptions of foreign mining companies are grouped under the name of each country, arranged alphabetically by countries and by companies.

UNITED STATES

A complete index in the front of the book makes quick reference possible if the name of the company is known.

The companies given under this general heading, operate properties in so many districts that the descriptions cannot be properly given under any one state. References are, however, given in the appropriate places to the local holdings.

ALUMINUM COMPANY OF AMERICA.

Offices: Oliver Bldg., Pittsburgh, Pa., and 120 Broadway, New York.

Officers: Arthur V. Davis, pres.; G. R. Gibbons, v. p.-sec.-asst. treas.; R. E. Withers, treas.-asst. sec., Pittsburgh, Pa.; with D. L. Gillespie, Roy A. Hunt, Alvah K. Lawrie, A. W. Mellon, George V. Clapp and R. B. Mellon, directors.

Inc. 1888 in Pa., as the Pittsburgh Reduction Co.; name changed to present title, Jan. 1, 1907. Cap. authorized, $20,000,000; $100 par; outstanding, $19,000,000. Debentures, $12,000,000, 6% serial gold notes dated March 1, 1919, and maturing $4,000,000 annually from March 1, 1921 to 1923 inclusive. These notes are a direct obligation of the company. Dividends: 1906, 3⅛%; 1907, 11%; 1908, 1%; 1909, 2%; 1910-1913, 4% yearly; 1914, 6%; 1915, 6½%; 1916, 8%; 1917, 8%; 1918, 10%.

Controls the St. Lawrence River Power Co., the Northern Aluminum Co., the St. Lawrence Transmission Co. and the **Tallassee Power Co.** On Nov. 1, 1915, acquired control of the **Southern Aluminum Co.,** with its unfinished hydro-electric and aluminum manufacturing plants near Whitney, N. C. This company was controlled by French interests until the outbreak of the European war in 1914. The plants were to have cost upward of $10,000,000. The

Aluminum Co. of America formed the Tallassee Power Co., capital $1,000,00 to complete both plants.

Company owns extensive bauxite deposits in Saline Co., Ark., from whic it secures most of its aluminum ore. About 6 tons of ore yields one ton of meta Equipment at the property consists of crushing and drying machinery. Th bauxite is shipped to a refining plant at East St. Louis, Ill., where the impuritie are removed. There are also reduction works at Niagara Falls and Massena N. Y., where there is a wire and cable mill, and at Maryville, Tenn. The com pany has a general fabricating plant at New Kensington, Pa., also a plant fo the manufacture of aluminum bronze powder and aluminum foil.

The Northern Aluminum Co. is a Canadian corporation, which has a reduc tion plant and wire mill at Shawinigan Falls, Que., and a fabricating plant a Toronto, Ont.

Production: about 80% of the total aluminum product of the U. S., whic in 1918, was about 122,000,000 lbs. Annual capacity of all plants estimated a 175,000,000 lbs.

AMALGAMATED COPPER CO.

Company dissolved in 1916. Fully described in previous issues of this book Vols. XI and XII.

AMERICAN FINANCE & SECURITIES CO. (THE)

Involuntary petition in bankruptcy filed June 22, 1915. Adjudicated bank rupt, May 15, 1916. Henry J. West, Camden, N. J., trustee. See Mines Hand book, Vol. XII.

AMERICAN METAL CO., LTD (THE)

Offices: 61 Broadway, New York; Oliver Bldg., Pittsburgh, Pa. Boatmens Bank Bldg., St. Louis, Mo.; Foster Bldg., Denver, Colo.

Officers: Berthold Hochschild, New York, Chairman of the Board C. M. Loeb, pres.; Otto Sussman, Henry Bruére, Julius Loeb, Ludwig Vogel stein, and Harold K. Hochschild, v. p's.; Julian Beaty, treas.; Julius Goldman sec., with Henry V. Putzel, S. Roos and M. Schott, directors.

Trustees: Henry Morgenthau, Berthold Hochschild, J. F. Guffey, F. I Crocker, C. B. de Camp, J. P. Grier, and Ludwig Vogelstein.

Inc. 1887 in New York, as refiners, exporters, importers, and dealer in metals and chemicals. Cap., $25,000,000; $100 par; 70,000 issued. Th capital in 1891 was $200,000.

For an analysis of the ramifications and connections of this company, ref erence should be made to the report made by the Alien Property Custodian i April, 1919. This includes the partnerships with Aron Hirsch & Sohn; Bee Sondheimer & Co.; The Metallgesellschaft and Vogelstein & Co., the las named being absorbed by American Metal Co. in December, 1919, thereby con trolling the U. S. Metals Refining Co., which see below.

When the Alien Property Custodian seized the 34,644 shares of Germa owned stock, these shares and all but 200 of the American held shares were pl into a five-year voting trust. This voting trust does not include 16,736 shar belonging to H. R. Merton & Co.. The German-owned shares sold at publ auction for $5,750,904, were bought by a syndicate, by which Ludwig Vogelstei acquired a 20% interest of 14,000 shares, making him the largest individu stockholder. The Cerro de Pasco Copper Corporation owns 4,500 shares; L. Haggin, 1,000; J. Horace Harding, 1,000; H. C. Frick, est., 1,000; C. D. Barne 1,200, and E. H. Clark, 1,500 shares.

The American Metal Co. owns the following companies: American Zinc Chemical Co., Langeloth, Pa.; Bartlesville Zinc Co., Bartlesville and Blackwel Oklahoma; Clarkesburg Clinkering Co., Bridgeport, West Virginia; Chanu Spelter Co., Cherokee county, Kansas; Metallurgical Co. of America, Americ Metal Transport Co. American Metal Co. has large interests in the following Ohio & Colorado Smelting & Refining Co., Salida, Colorado; Balbach Smel ing & Refining Co., Newark, New Jersey; Nichols Copper Co., Laurel Hill, Lon Island, N. Y.; South American Metal Co. (The), Chile; Fundición de Guayaca Guayacan, Chile; Compania de Minerales y Metales, Mexico; Providencia Min Zacatecas, Mexico; Parrena Mining Co., Coahuila, Mexico; Cía. Mineral Palom y Cabrillas, S. A. Higueras, Coahuila, Mexico; Compania Minera Petole Durango, Mexico; Compania Metallurgica de Torreon, Torreon, Mexico; Fund dora y Afinadora Monterrey, S. A., Monterrey, Mexico.

The corporation, through its subsidiaries and allied companies, owns or controls the following products, the average annual quantities produced being as indicated below:

Electrolytic copper, pounds	100,000,000	to	125,000,000
Zinc (spelter), all grades, tons	75,000	"	100,000
Lead, bonded (Mexican), tons	60,000	"	75,000
Lead, domestic, tons	12,000	"	15,000
Sulphuric acid, tons	80,000	"	100,000
White arsenic, tons	4,000	"	6,000
Coal in Pennsylvania, tons	350,000	"	400,000
Coal in Mexico, tons	500,000	"	600,000
Silver, ounces	12,000,000	"	15,000,000
Zinc oxide (Polar and Arctic brands), tons	7,000	"	10,000
Zinc-dust (American extra pure and Zenith brands), tons	3,000	"	4,000
Antimonial lead, tons	1,000	"	1,500
Molybdenum concentrate, tons	500	"	1,000

In addition to its own production of metals, the company buys and sells metals in the open market and also contracts to take the entire output of various mines, smelters and refineries in the United States, Canada, Mexico and South America.

The company has contracts with large mines in North America calling for their entire production, totaling 159,000,000 lbs. of copper per annum. Copper received during 1918 from these and others amounted to 141,398,982 lbs. Refineries in which the company has an interest, treated this metal. The entire yearly turnover of the company, in copper, is 250,000,000 lbs.

Contracts with zinc mines called for 546,919,000 lbs. of ore during the year ended June 30, 1917. This was treated at the company's smelters. In 2 years, ended June 30, 1917, the zinc ore purchased amounted to 1,700,000,000 lbs., plus 585,000,000 lbs. of spelter bought in the open market.

The lead turnover in 1917 was 168,000,000 lbs.

The growth of the company is indicated by the following statistics:

Total sales and net earnings of the corporation, after deducting all expenses, profit-sharing, taxes, fixed charges, etc., during the past 10 years, have been as follows (year ending July 1):

	Capital Stock Outstanding	Total Sales	Net Earnings		Capital Stock Outstanding	Total Sales	Net Earnings
1909	$3,120,000	$64,274,040	$ 854,719	1915	3,500,000	$68,468,179	$2,498,639
1910	3,500,000	84,402,083	685,334	1916	3,500,000	153,796,848	7,638,336
1911	3,500,000	68,519,484	842,780	1916(a)	3,500,000	82,615,281	4,899,750
1912	3,500,000	57,060,048	1,365,816	1917(a)	7,000,000	149,216,409	2,892,387
1913	3,500,000	79,243,602	1,001,895	1918(a)	7,000,000	106,166,089	832,157
1914	3,500,000	68,835,488	1,088,770	1919(b)	7,000,000	29,268,252	330,004

(a) Half year ending Dec. 31.
(b) Half year ending June 30.

The company's operations have hitherto been kept closely guarded, but a more liberal policy is apparently now to be followed. The company is really one of the few big metal companies of the world, and its operations are matters of great public importance. Such information concerning its subsidiaries as is available is given under their respective titles.

United States Metals Refining Co.

Formerly owned by U. S. S. R. & M. Co., but control secured by American Metal Co. in Dec., 1919.

Officers: Ludwig Vogelstein, pres.; F. Y. Roberston, v. p. and gen. mgr.; [illegible] Sussman, v. p.; J. B. Beatty, sec.-treas., with J. A. Schloss, E. H.

Clark, and A. G. Todd, directors. R. E. Empey, controller and asst. treas E. H. Probst, asst. sec.

Staff: R. W. Deacon, gen. supt.; B. B. Hood, asst. supt.; F. R. Pyn asst. plant supt.; C. L. Colbert, smelter supt.; M. A. Koechert, producti supt.; W. C. Smith, met.; L. V. Reese, chief eng.; H. D. Greenwood, chi chemist; Sidney Rolle, supt. of dept. of indus. relations; W. W. Conne power supt.; C. E. Smith, purch. agt.; Jacob Roth, chief clerk; J. C. Clar supt. of silver refinery; H. W. Thorn, supt. of yards; H. M. Green, supt. tank-house; August Marks, supt. of casting dept.; Harry Moorecraft, sup of weighing and sampling.

Inc. in New Jersey. **Cap.,** 20,000 pfd. shares and 20,000 com. share both $100 par value. 15,500 shares of each kind are issued, of which the U. S. R. & M. Co. owns 10,433 pfd. and 10,800 com.

Works: The U. S. M. R. Co. owns electrolytic copper refinery, havin a capacity of refining 240,000,000 lb. of copper annually, a copper smelter, con sisting of two blast-furnaces, with an annual capacity of smelting 200,000 tons charge. The copper smelter purchased its ores under long contracts with mine in Canada, Spain, Cuba, and the western coast of South America; and con sequently, is assured a long life, as it is not dependent on any one mine. Th refinery enters into long time contracts for the refining of other copper beside that produced by the U. S. S. R. & M. Co. These two plants are located o 159 acres of ground at Chrome, N. J. This property is at tide-water, permittin ocean-going steamers to discharge direct into the plant, and is also connecte with the Central Railroad of New Jersey.

The smelter has two 42x186" blast furnaces, 3 converter stands using 84x12 basic-lined converters, two 60x6' rotary kilns for sintering fine material, an one Dwight-Lloyd sintering machine. The smelter is further equipped with 500' steamship dock, with berth for 2 steamers, the most modern type of Fai banks scales, having a sensitiveness of 10 lb. on a load of 200,000 lbs., and very complete automatic sampling mill equipped with Brunton samplers.

The refinery has two 225-ton and two 175-ton anode furnaces and thre 225-ton wire-bar furnaces, equipped with charging cranes, casting wheels, wast heat boilers and the most modern devices for mechanical handling. The tan house has 1,228 tanks arranged on the Walker system. The weighing is don on tandem Fairbanks scales, sensitive to 1 lb. in 15,000 lbs.

The power house is steam-driven and arranged for highest economy wit economizer and superheater equipment, 3 compound condensing units and triple expansion units, using exhaust steam turbines for the third expansio Current is generated at the rate of 11,000 amperes. Three circuits are carrie in the tank house with a voltage of 115 volts each, 1 power unit being carried i reserve.

The anode slimes are refined by the usual processes, the doré bullion pro duced being parted electrolytically. Some of the rarer elements are recovere as by-products.

A new $100,000 laboratory with the most modern equipment was complete in 1917.

The new laboratory at Chrome is described in the "Eng. & Min. Jour." o March 9, 1918.

The company also owns a lead refining plant, with an annual capacity o 72,000,000 lb. of lead. This plant is at East Chicago, Indiana, on 70 acres land. Wm. Thum, supt. It is connected with the following railways: Indian Harbor Belt, Pennsylvania, and Baltimore & Ohio Terminal. It utilizes th Betts electrolytic lead refining process, by which the purest quality of lead produced. The process also permits the recovery of bismuth and other b products in the bullion.

plants of the United States Metals Refining Co. are strictly modern equipment and are noted for the technical excellence of their practi of their commercial products.

AMERICAN SMELTING & REFINING CO.

Gen. Offices: 120 Broadway, New York; Corporate office: 15 Exchange Place, Jersey City, N. J.; City of Mexico office: Edificio 'La Mutua' Despacho No. 200, Mexico, D. F. Valparaiso office: Casilla 12, Valparaiso, Chile.

General Officers: Simon Guggenheim, pres.; Jos. Clendenin, J. K. MacGowan and F. H. Brownell, v. p.'s; Isaac Guggenheim, treas.; F. W. Hills, compt.; L. A. Chapin, asst. treas; W E. Merriss, sec.; R. P. Reese, aud.

Directors. L. Newhouse, chairman; Simon Guggenheim, Jos. Clendenin, Chas. Earl, Leopold Frederick, Isaac Guggenheim, F. W. Hills, Wm. Loeb, Jr., John K. MacGowan, W. S. McCormick, W. S. Morse, Walter T. Page, H. A. Prosser, E. B. Schley, John N. Steele, C. W. Whitley, F. H. Brownell, C. A. H. de Saulles, Roger W. Straus, W. M. Drury, L. G. Eakins, H. A. Guess, W. E. Merriss, F. R. Raiff, and H. R. Wagner.

Executive Committee: Simon Guggenheim, chairman; Jos. Clendenin, Chas. Earl, F. W. Hills, Wm. Loeb, Jr., J. K. MacGowan, W. S. Morse, E. L. Newhouse, H. A. Prosser, F. H. Brownell, H. A. Guess and H. R. Wagner.

Finance Committee: F. H. Brownell, chairman; Simon Guggenheim, and E. L. Newhouse.

Legal Committee: J. N. Steele, cons. counsel; F. H. Brownell, gen. counsel; F. R. Foraker and Charles Earl, associates counsel.

Operating Officials: Wm. Loeb, Jr., managing director labor and welfare dept.; E. R. Reets, purch. agt.; F. R. Raiff, traffic mgr.; G. H. Cole, asst. traffic mgr.; E. L. Carpenter, fuel agt.; C. W. Whitley, gen. mgr. Utah dept.; C. A. H. de Saulles, gen. mgr. Colo. dept.; H. A. Guess, managing director mng. dept.; W. M. Drury, mgr. mng. dept.; C. L. Baker, gen. mgr. Mex. dept.; R. T. White, gen. mgr. Chile; Kuno Doerr, gen. mgr. S. W. dept.; Samuel Metzger, mgr. ins. dept.; E. A. Behr, sales agt. lead dept.; H. M. Brush, asst. agt. copper sales dept.

Foreign representatives: W. A. Price and Geo. T. Ewart, fin. agts., El Paso, Texas; R. E. Mora, gen. rep., and J. A. Hendry, asst. treas. for Mexico.

On January 15, 1919, Daniel, Murry, and S. R. Guggenheim retired from the directorate, after 18 years' active participation in the company's varied operations. Since 1901, when they became connected with the company, the annual turnover increased from $82,000,000 to $390,000,000, and the profit and loss account from $2,900,000 to $27,000,000.

Inc. April 4, 1899, in New Jersey. **Cap.**, $115,000,000, with $65,000,000 common and $50,000,000 cumulative 7% preferred stock, $100 par. Original capitalization was $54,600,000, increased to $100,000,000 and again increased in 1911, by $15,000,000 common stock authorized to exchange for 6% debenture bonds of American Smelters Securities Co. at any time before Aug., 1918, that bonds may sell at par. Annual meeting, first Wednesday in April. Has about 4,000 shareholders.

Transfer agt., Ralph M. Leonard, New York; registrar, Chase National Bank, New York.

The A. S. & R. Co. owns all the common stock of the American Smelters Securities Co. and, $30,000,000, 80% of pfd. B and 35% of pfd. A. This was acquired by giving its 1st mtge. 5% bonds in exchange for the series B, 5% preferred stock of the Securities Co., par for par. The 5% cumulative-preferred stock, series B, of the Securities Co. is guaranteed by the Smelting Co., both as to interest and principal, and is, therefore, an obligation of the Smelting Co., prior to its preferred stock.

Consolidated Income Account

	1919*	1918	1917
Smelters, etc.	$5,285,698	$13,234,711	$24,125,685
Mining properties	428,081	2,686,840	4,069,243
Other sources	307,905	2,390,017	3,407,688
Gross income	$6,021,684	$18,311,568	$31,602,616

Charges Against Gross Income

Administ., research, exam., exp.	$522,691	$1,305,934	$1,482,45
Corporate taxes	412,355	1,252,356	3,849,97
Interest, amort., discount bonds	796,793	1,616,109	1,234,24
Deprec., deplet., ore res.	2,140,686	5,439,631	4,954,48
Appropriation, bonus, pension	.....	250,000	600,00
Miscellaneous	.....	740,038	985,83
Total charges	$3,872,524	$10,604,068	$13,106,99
Net income	$2,149,160	$7,707,500	$18,495,64
Dividends on pfd. stock	2,124,664	4,247,774	4,712,66
Balance	$24,496	$3,459,726	$13,782,99
Dividends on com. stock	1,219,960	3,354,890	4,269,86
Balance transferred to surplus†	$1,195,464	$104,834	$9,513,10
Previous surplus	27,060,229	26,955,394	23,442,29
Total surplus	$25,864,765	$27,060,228	$32,955,39
Special appropriations	.....	.....	6,000,00
Profit and loss surplus	$25,864,765	$27,060,228	$26,955,39

* Half year. † Deficit. For previous years, see Vol. XIII.

Consolidated General Balance Sheet

ASSETS

Year	Property	Investments	Net Value Metal Stocks	Working Assets	Current Assets	Special Funds	Total
1919*.....	$132,674,323	$1,558,057	$46,433,509	$8,884,410	$19,538,398	$1,368,623	$210,457,3
1918.....	133,245,835	1,742,604	40,921,155	9,070,477	35,530,676	1,369,338	221,880,0
1917.....	136,797,476	1,057,313	36,339,500	8,009,234	32,280,808	1,373,423	221,857,7
1916.....	141,165,684	827,277	27,477,650	4,601,312	42,430,207	823,003	217,325,1
1915.....	141,442,998	639,667	23,618,862	3,312,877	31,147,388	1,654,559	201,816,3

Current assets and special funds are mostly cash; working assets are mostly supplies. * Half year.

LIABILITIES

Year	Pfd. Stock Outstanding	Com. Stock Outstanding	Bonds Outstanding	Current Liabilities	Res. and Sus. Accounts	P. and L. Surplus	Total
1919*.....	$62,926,500	$60,998,000	$32,210,300	$20,398,016	$8,050,740	$25,864,765	$210,457,3
1918.....	63,175,000	60,998,000	31,961,700	30,654,731	8,036,324	27,060,228	221,880,0
1917.....	63,674,800	60,998,000	31,881,400	27,694,865	10,653,294	26,955,395	221,857,7
1916.....	96,458,800	54,299,000	6,699,000	27,468,288	8,957,750	23,442,295	217,325,1
1915.....	96,049,800	50,108,000	12,612,500	16,750,117	6,135,497	19,560,389	201,816,3

Current liabilities are mostly accounts payable, and dividends accrued. * Half year.

Statement for the half-year ended June 30, 1919, shows the following tion: Net income, $2,149,160, after paying de... interest. Preferred shares received, $2,12... period ending with a deficit of $1,195,464 ... output due to lack of demand for metals ... rent assets totaled $19,538,398, and current ...

Dividends—Common Shares:

Year	%	Year	
1919 (to Dec. 15)....	4	1914.....	
1918.....	6	1913.....	
1917.....	7	1912.....	
1916.....	6½	1911.....	
1915.....	4	1910.....	

Preferred shares received 7% per annum from Oct., 1899, up to the curren
year. In 1900, an additional ⅞ of 1% was paid to cover the period of April 1
to 30, 1899.

Volume of Business

	1918	1917	1916
Balance from previous year:			
Cash, loans, Liberty bonds	$18,320,968	$19,941,492	$18,642,460
Sales of metals	360,060,487	405,616,167	330,297,952
From mining profits	10,117,969	8,788,455	5,661,198
From manufactured products	14,006,145	22,785,294	16,304,914
Miscellaneous	2,390,017	3,407,688	2,818,082
Bankers' accep., special funds, dec. net current assets, etc.	5,426,537	3,382,698	3,035,690
Total cash to be accounted for	$410,322,123	$463,921,794	$376,760,296

For ore and bullion purchased, expenses, taxes	$376,970,009	$426,017,668	$335,851,619
Expended on property, net	4,887,990	6,586,274	8,175,743
For investments acquired, etc., net	325,569	857,282	1,041,686
For A. S. R. Co. pfd. stock bought, net	129,400	672,207	2,615,922
For A. S. & R. bonds purchased, interest, etc.	1,915,469	2,484,868	
Dividends paid	7,602,664	8,982,525	9,133,834
Balance at end of year:			
Cash and Liberty bonds	18,491,022	18,320,967	19,941,492
Total	$410,322,123	$463,921,791	$376,760,296

Operating Statistics

	1918	1917	1916	1915
Men employed, exclud- ing Mexico	21,765	24,698	21,073	15,556
Total wages and salaries, excluding Mexico	$25,516,467	$24,497,836	$17,047,944	$11,392,503
Average per 8-hour day	$3.91	$3.31	$2.70	$2.44
Bullion refined, tons	680,099	706,875	677,460	579,080
Charge smelted, tons	5,658,232	5,918,924	4,789,474	4,153,092
Coal used, tons	765,124	787,890	724,595	604,204
Coke used, tons	545,003	592,765	454,468	401,511
Fuel-oil used, bbls	1,659,337	1,560,535	1,107,285	829,304
Gas used, cubic ft	2,372,000,103	3,032,908,373	2,130,460,328	1,071,593,000
Ore mined, tons	2,535,281	2,018,925	1,038,566	1,578,611
Coal mined, tons	160,140	259,499	224,807	235,222
Coke produced, tons	271,343	186,107	140,961	120,660

Metal Products—*Continued*

Copper sulphate, lb.....	5,164,000	7,598,000	13,046,000	8,366,00
By-product metals, lb...	1,870,662	4,131,709	5,671,827	2,229,88
Copper and brass mfd., lb.	.....	39,767,274	31,597,489	8,763,48
Test lead and litharge sold, lb.....	.....	426,472	417,898	355,22
Loaded cartridges sold, number	.....	14,180,000	15,338,000	12,898,00
Sheet lead, pipe, etc., sold, lb.....	.....	13,678,245	21,713,331	9,638,20
Mixed metals sold, lb...	.....	5,188,045	2,831,617	2,566,25

The business of the company is so varied that it almost defies analysis, sav by a certified accountant. It mines gold, silver, copper, lead, zinc ores and coal It smelts its own ores of all these metals, and also most of the ore produced b the lesser mines of America. It refines not only these five metals, but manu factures them into copper sheets, rods, tubes, etc., at Baltimore; makes whit lead, sheet lead, etc., at Selby; zinc white, etc., at its zinc smelters; sulphuric aci at Perth Amboy, N. J., and Garfield, Utah, and coke at its mines. It refines an sells bismuth, cadmium, arsenic, nickel and platinum, palladium and seleniun largely from the slime of its electrolytic refineries, and makes blue vitriol; als smelts tin ore and concentrate from Bolivia.

It owns and operates over 30 mines in Mexico and a number of railway under the title of the Mine Lines of Mexico, and the Mexican Union R. R., and owns and operates the following smelting plants, etc.

Lead Smelting

Plant—	Location	Manager	Supt.	Furnaces	(c) Tons
Globe	Denver, Colo	L. G. Eakins	F. Roeser	7	
Pueblo	Pueblo, Colo	L. G. Eakins	G. A. Marsh	7	
Durango	Durango, Colo	F. C. Gilbert	M. H. Kaufman	3	
Ark. Valley	Leadville, Colo	W. B. McDonald	B. Hogarty	10	
Murray	Murray, Utah	C. W. Whitley	W. W. Norton	8	
Helena	Helena, Mont	C. W. Adams	R. L. Strobel	4	
Perth Amboy	Maurer, N. J	H. H. Alexander	G. G. Griswold	4	
Omaha	Omaha, Neb	Walter T. Page	W. P. Olds	3	
El Paso	El Paso, Tex	Kuno Doerr	J. Heggie	6	
Monterey	Monterey, Mex	C. L. Baker	J. R. Enlow	10	
Chihuahua	Chihuahua, Mex	C. L. Baker		2	
Selby	Selby, Calif	F. B. Braden	E. N. Englehardt	4	
Federal	Federal, Ill	Rudolph Porter	O. Ohnsorg	2	
Velardena	Asarco, Mex	C. L. Baker	L. B. Harrison	3	

Copper Smelting

Perth Amboy	Maurer, N. J	H. H. Alexander	J. F. Austin	1	
El Paso	El Paso, Tex	Kuno Doerr	J. Heggie	2(a) 8(b)	
Aguas Cal's	Aguas Cal's Mex	C. L. Baker	A. McL. Hamilton	8	
Matehuala	Matehuala, Mex	C. L. Baker	A. Grabill	3	
Hayden	Hayden, Ariz	H. E. Eye	J. J. Ormsbee	2	
Tacoma	Tacoma, Wash	H. Y. Walker	W. V. Morse	8	
Garfield	Garfield, Utah	C. W. Whitley	M. P. McElroy	4(a)	
Sasco	Silverbell, Ariz	R. B. Green		6(a)	
Velardena	Asarco, Mex	C. L. Baker	J.	8	

(a) Blast furnaces. (b) Reverberato

Blende Blende, Colo
Sand Spgs Sand Spgs., Okla
Henryette Henryette, Okla

Tin Smelters

		Yearly Cap.
Perth Amboy	Maurer, N. J.	18,000 tons

Refining Plants

Plant—		Gold Oz.	Yearly Capacity Silver Oz.	Lead Tons	Copper Tons
Omaha	Omaha, Neb. W. T. Page, mgr.; E. B. Lefferts, supt.	500,000	36,000,000	180,000	.....
Perth Amboy	Maurer, N. J. H. H. Alexander, mgr.; G. Griswold, supt.	500,000	48,000,000	108,000	120,000
Selby	Selby, Calif. E. R. Braden, v. p.; E. N. Engelhardt, supt.	2,400,000	18,000,000	36,000	.....
Federal	Federal, Ill. Rudolph Porter, mgr.; O. Ohnsorg, supt.	.....	.....	60,000	.....
Baltimore	Baltimore, Md. W. H. Pierce, mgr.; C. N. Sapping-, ton, supt.	300,000	30,000,000	.....	240,000
Tacoma	Tacoma, Wash. H. Y. Walker, mgr.; G. A. Kerr, supt. supt.	.....	.....	.....	72,000

The smelting and refining capacity of the company is equal to 1,150,000,000 lb. of electrolytic copper per annum.

The Mining Properties of the company are under the general charge of W. M. Drury, general manager; R. F. Manahan, assistant. The operating mines are as follows:

Imperial mine, Julius Kruttschnitt, mgr., Ed. Thornton, supt., Silverbell, Arizona; Blue Hill mine, Douglas, Hancock county, Maine; George Copper mine, Portland Canal division, British Columbia, bonded in 1919 for $100,000; Silver Lake mine, L. R. Clapp, supt., Silver Lake, Colo.; Premier (Bush) Silver mine, near Stewart, British Columbia, in which 1,000,000 tons of $30 ore is exposed. A 40% interest was acquired in Oct., 1919.

The Imperial was acquired early in 1918, after being operated by the A. S. & R. Co. under lease from the trustee in bankruptcy of the Imperial Copper Co.

Production: 1918, 120,320 tons ore, 2.8% copper,; 1917, 123,729 tons ore, 3.0% copper; 1916, 73,729 tons ore, 3.0% copper. For full description of property, see Vol. XIII of this book.

The Douglas mine was acquired in 1917. It contains 60,000 tons of ore, low in copper, but high in sulphur. Concentrate is sent to Perth Amboy, N. J.

The Revenue, near Ouray, Colorado, held under option, was abandoned in November, 1919. It has yielded $16,000,000 in silver and lead.

The Mexican mines owned or controlled by the company can produce 2,500,000 tons of ore per annum. In August, 1919, they were operating at 80% capacity.

Mexican Properties of the A. S. & R. Co.

State	Unit	Mine
[illegible]	Sta. Eulalia (W. J. Deavitt, supt.)	Mina Vieja, Sin Nombre, Velardena, San Antonio, Santo Domingo.
	Magistral	Orizaba, La Union, etc.
	Calera	Prieta and Buena Vista.
	Dolores (F. E. Reyer, supt.,)	Jibosa.
	Cordero	La Luz and Parcionera.
	Esperanza	Guadalupe.
	[illegible] (W. P. Schu-	Tecolotes and Montezuma.
	[illegible]	San Diego and Alfarena.
	[illegible]	Veta Grande, Veta Colorado, etc.

Mexican Properties of the A. S. & R. Co.—*Continued*

State	Unit	Mine
Coahuila	Sierra Mojada (W. B. Gates, supt.)	San Jose, Trinidad, Volcar Dolores.
Durango	Velardena (R. E. Adams, supt.)	San Lorenzo, Sta. Maria Copper Queen, Sta. Juana
Aguascalientes	Asientos	Sta. Francisca.
Michoacan	Anganaueo (A. W. Edelen, supt.)	San Cristobal, Carmen, etc
San Luis Potosi	Charcas (S. F. Shaw, supt.)	Tiro General.
	Matehuala	Dolores.
Zacatecas	Bonanza	Bonanza.

American Smelters Securities Co.'s properties are all included in the above; the same applies to the National Metallurgical Co., the Tacoma Smelter, the Baltimore Copper S. & R. Co., the Selby Smelting Works, the Federal Lead Co. and the Garfield Smelting Co.

The Federal Smelter is supplied with ores principally from the company's mining operations in southeast Missouri. At present the output of ore is, roughly speaking, 1,500,000 tons per annum, which is concentrated into approximately 75,000 tons of concentrates, containing about 60,000 tons of lead. About $750,000 has been spent in enlarging the milling and smelting works, and extending the development of mines of the company in Missouri. The production of pig lead has been increased from 42,000 tons at the beginning of 1916 to 66,000 tons per annum.

The installation of an electrolytic zinc plant at the Murray, Utah, smelter, and construction of a 200-ton sulphuric acid plant, using the chamber process, at Garfield, Utah, show that the company is still in the fore in its metallurgical practice.

None of the Mexican smelters were operated during 1916. In the first half of 1917, the Aguascalientes, Matehuala, and Monterrey plants were started, continuing through 1918. Four of the five were in blast early in 1919, and were sufficient to smelt the product of the mines listed above, excepting copper ores at Chihuahua. By August, 1919, all smelters were in blast.

The company, during 1916, entered the mining and smelting business in Chile and bought the Caldera smelter including many mines—imperfectly developed—and the stock of the Carrizal smelter.

The tin plant has a capacity of 18,000 tons of pig tin per annum.

The American Smelting & Refining Co. is the largest general smelting and metallurgical enterprise in the world. The company will continue to expand and prosper because of its superior metallurgical and business ability, backed by large and modern works and adequate capital.

In 1917 the company suffered from the entire lack of economic law, as the value of its metal products were fixed by the Government, while the cost of labor and supplies mounted high, the latter from 50 to 150% above normal. In 1918, the company obtained no direct advantage from the increased value of the metals, and, on account of the complexities of the ore and metal markets, a conservative program had to be maintained, so that dividends were not increased beyond 6%. The high costs of smelting and refining have been discouraging, but these items have lately been lowered; and although pre-war costs may never be realized again, the directors expect that pre-war profits per ton of ore smelted will be obtained as soon as normal business is resumed.

The company is keen on safety and welfare work among employees. The accident rate for 1918 was 28% less than in 1917.

The company is a dominating factor in the lead business of the United States, handling nearly 50% of the domestic output of primary lead. The company practically makes the price of lead, the St. Joseph Lead Co. being the only other concern that makes an independent price. The company's policy is to make exclusive contracts for the smelting of lead ores. In April, 1918, a bitter dispute over smelting contracts with the Bunker Hill & Sullivan com-

was settled out of court, after the B. H. & S. company had erected a smelter at Kellogg, Idaho. The contract between these companies was for a period of 25 years, from 1905, but provided fixed terms for only the first 5 years, covering such of the B. H. & S. output as contained between 30 and 75% lead. The agreement did not require the B. H. & S. to put its ore through a mill, and as the ore from the mine averaged less than 15%, it was possible to contend that none of the ore came within the limits specified. The B. H. & S. actually did concentrate most of its ore, and at times nearly a third of its total output was a concentrate carrying over 75% lead. These, and other points, coupled with competition of the B. H. & S. and A. S. & R. for local ores, treatment rates, etc., led to final cancellation of the contract.

The A. S. & R. Co. also smelts a great deal of custom copper ores in various States, but many mine-owners protest against its methods of payment, especially when the market is erratic.

American Smelters Securities Co. United States & Mexico.

Office: 120 Broadway, New York.

Inc. March 25, 1905, in New Jersey, and name changed to present title, May, 1905. **Cap.**, $77,000,000, shares $100 par, in $17,000,000 Series A cumulative 6% pfd. stock; outstanding, July 1, 1919, $15,814,000; $30,000,000 series B com. 5% pfd. stock and $30,000,000 com. stock. Series A has preference as to dividends, and both preference series have equal rights as to assets, both having priority rights to assets and dividends over common stock. A sinking fund, started July 1, 1914, provides for the calling each year of the original $17,000,000 preferred A shares outstanding, and an additional sum equal to 6% of the aggregate amount of the issues previously retired. Financial statement is consolidated with that of the A. S. & R. Co.

Company owns, in fee, mines in different districts in Mexico, and copper and lead smelting and refining plants in the United States. It also owns all or a controlling part of the stock of a large number of subsidiary companies.

AMERICAN ZINC, LEAD & SMELTING CO.

General Offices. 55 Congress St., Boston, Mass. Sales office: 120 Broadway, New York. Operating office: 1012 Pierce Bldg., St. Louis, Mo. Corporate office: 85 Exchange St., Portland, Maine. H. P. Sweetser, clerk.

Officers: C. W. Baker, chairman of directors; W. A. Ogg, pres.; L. A. Coolidge, C. A. Hight, P. E. Coyle, W. F. Rossman, J. N. Houser, and H. A. Wentworth, v. p.'s; F. W. Batchelder, sec-treas.; M. A. Donovan, asst. sec.-treas.; H. L. Smith, comptroller; H. I. Young, mgr. Missouri mines; C. D. Strachan, mgr. Tennessee mines; A. W. Dodd, mgr. of sales.

Directors: term expires 1919, L. A. Coolidge, B. P. Bole, C. A. Hight, F. H. Goff, and H. S. Kimball. Term expires 1920—E. P. Brown, E. A. Clark, G. L. Stone, and W. A. Ogg. Term expires 1921—C. W. Baker, W. H. Coolidge, J. N. Lovell, F. W. Batchelder, and C. D. Spalding. Transfer agents: the company, at 55 Congress St., Boston, Mass., and Guaranty Trust Co., New York. Registrars: First National Bank, Boston, Mass., and Bankers Trust Co., New York.

Inc. Jan. 26, 1899, in Maine. **Cap.** $500,000; $25 par; increased on April 22, 1889, to $2,500,000; on October 16, 1906, decreased to $1,250,000; on December 18, 1906, increased to $3,750,000; on April 10, 1912, increased to $7,500,000; outstanding December 31, 1915, $4,828,000. At the annual meeting in April, 1916, the authorized capital stock consisting of $7,500,000, divided into 300,000 shares of the par value of $25, was classified as follows: 100,000 of the authorized shares unissued and in the treasury at that date were classified as pfd. stock, and the remaining 200,000 shares were classified as common stock, so that the present authorized capital consists of 100,000 shares of pfd. stock and 200,000 shares of common stock, of which 96,560 and 193,120, respectively are outstanding. Stock is listed on Boston and New York Stock Exchanges. Annual meeting, second Wednesday in April.

Earnings

	1918	1917	1916
Price of spelter, cents	7.89	8.73	12.63
Net profits from operations—			
Sale of zinc and lead ores and metals, oxide, acid, and royalties	$857,193	$1,694,551	$9,161,211
Miscellaneous profit	54,223	85,613	146,757
	.....	$1,780,164	.....
Deduct settlement with Minerals Separation	.....	250,000	.....
Total profits	$911,416	$1,530,164	$9,307,968
Surplus at end of previous year	4,546,943	4,792,906	5,855,641
Total	$5,458,359	$6,323,070	$15,163,609
Less dividends on:			
Preferred shares	482,637	483,237	2,670,649
Common shares	.....	386,240	.....
Applied on Granby purchase	.....	.....	3,282,644
Paid to Granby Company	.....	.....	2,300,000
Depletion and deprec. reserves	554,000	859,094	2,006,000
Surplus at end of year	$4,421,722	$4,594,497	$4,904,316

Consolidated balance sheet:

Assets

Year	Property	Investments	Advances to Subsidiaries	Current	Deferred Charges	Sinking Fund	Total
1918	$11,552,060	$2,206,893	$.....	$5,112,156	$ 159,798	$ 27,350	$19,057,757
1917	11,993,782	2,477,896	.....	5,748,092	141,660	.....	20,361,380
1916	12,310,404	1,679,569	300,000	6,280,781	71,087	.....	20,591,841

Liabilities

Year	Cap. Stock	Bonds	Reserve Funds	Current	Net Surplus	Total
1918	$7,242,000	$1,782,500	$4,889,038	$ 722,507	$4,421,721	$19,057,757
1917	7,242,000	1,900,000	5,203,413	1,421,469	4,594,497	20,361,380
1916	7,242,000	2,000,000	4,603,864	1,841,661	4,904,316	20,591,841

Dividends: $2 in 1899, $1 in 1900, $1.25 in 1907, $1.50 in 1910, $2 in 1911 and 1912, and $1 in 1913. In June, 1916, a stock dividend was declared, each share of com. stock issued received one-half share of pfd. stock, equivalent at par to $12.50. In 1917 the com. shares received $2. The pfd. stock is entitled to cumulative dividends of $6 per annum. In the event of any liquidation or dissolution of the company, holders of the pfd. stock are entitled to be paid $100 per share and accrued dividends. During 1916, $3 per share was paid on the pfd., $6 in 1917, $6 in 1918, $4.50 in 1919; and $1 in 1920, on Feb. 2.

The A. Z. L. & S. Co. is an operating and holding company, owning the following: American Zinc Co. of Tenn., American Zinc Co. of Ill., American Ballast Co., American Zinc Ore Separating Co., and 649,774 shares of 925,000 shares issued of the Wisconsin Zinc Co. These Companies are listed under their own title but are described below.

For the first quarter of 1919 the company made a loss of $651, against a profit of $18,278 in the last period of 1918, while the second quarter resulted in a loss of $13,950. The third quarter showed a loss of $6,300, which was converted into a profit of $367,568 by the sale of Carson Hill stock.

The American Pipeline Co., another subsidiary, was sold in 1917 with its lands, wells, pipelines, etc., to the Cities Service Co. of Kansas, for $870,000 of its 6% cum. pfd. stock.

In 1916 company purchased all the assets of the Granby Mining & Smelting Co., consisting of about 30,000 acres of mineral lands in the Joplin district Missouri, 10,000 acres of coal lands in Illinois, a zinc smelter at East St. Louis Ill., a zinc smelter at Neodesha, Kan., and a lead smelter at Granby, Mo. All of the above are described below.

In August, 1919, company sold at a profit of $430,000 the 28,000 shares of Carson Hill Gold Mining Co. it held, having received this as a bonus for the loan of $600,000 made to the Carson Hill for its development. The latter paid off the loan in October.

Property: in the Joplin district, Mo., the company owns 32,160 acres of mineral land. The principal operations are at the Davey mines on the 655-acre Davey property, the Vogey mine on a 40-acre tract in the Porto Rico district, the Klondike, Mascot, and Golden Rule mines near Granby, Mo., a 600-ton custom mill near Granby, Mo., and the B. & H. mine near Joplin. There are 4 mines in the Davey group, 2 worked out and 2 producing.

The company had 3 smelters in the gas belt at Caney, Dearing, and Neodesha, Kan., but on account of exhaustion of the gas supply, the last two mentioned were dismantled during 1918. At Caney there are 6,080, at Dearing there were 4,480, and at Neodesha, 3,760 retorts; combined yearly capacity was 150,000 tons of concentrates. The company also leases from the Owen Zinc Co. at Caney, Kan., two blocks of furnaces, and in 1916 added one furnace block, making a total of 1920 retorts. The life of these smelters depends upon the fuel-supply of natural gas, now obtained from the Oklahoma-Kansas field.

The company owns a lead smelter with a yearly capacity of 10,000 tons of ore at Granby, Mo.

American Zinc Co. of Tennessee

O. C. Burrell, mgr., Mascot, Tenn.

Inc. Feb. 24, 1911, in Maine. **Cap.** $10,000; $1 par, all owned and issued by A. Z. L. & S. Co.

Principal mining operations of the Tennessee Co. are at Mascot, Knox county, where the company owns 2,400 acres, and in Jefferson county, adjoining Knox on the east, where company owns 400 acres of land.

Orebodies of the Mascot mines occur in the Knox dolomite, dip 15° to 30° south and strike north of east, in lenses of varying sizes and in well-defined brecciated areas which lie in certain recognized zones or bedding planes. The ore is a light colored sphalerite. The zinc formation may be followed for many miles from Knoxville, in an easterly direction. In 1910 the company obtained an option on the Holston property, started drilling and proved up a large tonnage of pay ore. A 3-compartment shaft, mine No. 1, was sunk in 1911 and the orebody developed in 1912. The main orebody is developed on the 280′ level, and, as exposed, is 1,300′ long, 700′ to 880′ wide, and 30′ to 40′ thick. Limits of the orebody have not been reached. In 1913, a 4-compartment shaft, mine No. 2, was sunk 2,000′ east of No. 1, and a second orebody developed with length of 1,500′, thickness of 40′ to 125′, width of 300′ and limits not yet reached. Average grade of ore as shown by drill records is 5% to 5½% zinc. Greatest depth of workings, 800′, is at mine No. 2. A tramway connects No. 2 mine with No. 1 mill. Development has shown the ore to be continuous between No. 1 and No. 2 orebodies. Further drilling 3,000′ east of eastern limits of mine No. 2 has indicated a third orebody; this will not be developed until some future time.

Mining methods at the Mascot mines are described by H. A. Coy and H. B. Hengar in the Sept., 1917, Bulletin of American Institute of Mining Engineers. Costs totaled 70c per ton.

From the east to west the ore development as now shown is 7,900′ in length. There has been blocked out 4,000,000 to 5,000,000 tons of ore, which will average 4% zinc.

In May, 1913, mill No. 1, with 1,000 tons daily capacity, was completed. Additions to this mill were finished in July, 1915, bringing its daily capacity up to 2,200 tons. It is now treating over 2,400 tons daily. On the Roseberry property adjoining the Holston on the west, Mascot No. 3 mill has been completed having a daily capacity of 700 tons. Mill equipment at Mascot consists of crushers, rolls, jigs and tables, followed by flotation treatment of slime and fine sand. Mascot No. 1 mill was enlarged by addition of 55 tables, jigs, etc.

Power is obtained from the Tennessee Power Co.

Mascot concentrates average about 60% zinc and are of high quality, in fact,

the lowest lead and iron of any produced in quantity in the U. S., the spelter produced therefrom commands a substantial premium per pound over Prime Western quotations.

The company has developed the town of Mascot, owning 350 houses, a company store, and hotel.

Mossy Creek mine at Jefferson City was opened during 1916, and ore is being shipped to Mascot No. 1 mill for treatment.

A modern plant was built near No. 1 mill during 1916 to prepare agricultural limestone, asphalt-filler and fertilizer, from tailings from the Moscot concentrating mills.

Wisconsin Zinc Co.

A. M. Plumb, mgr., Platteville, Wis.

Inc. June 27, 1908, in Maine. **Cap.**, $1,000,000; $1 par, issued 925,000 shares, owned by A. Z. L. & S. Co., 649,774 shares.

Property: in S. W. part of the State. The ore deposits exist in the forms of flats and pitches, the flats being horizontal deposits along the bedding planes of the rocks, while the pitches are dipping crevices. The chief deposits lie in the lower part of the Galena limestone at a depth of 100′ to 200′ and vary in length from 1,000′ to 5,000′, in width from 30′ to 300′, and in height from 12′ to 60′. The ores consist of the sulphides of zinc, lead and iron, the latter in the form of marcasite.

The principal operations in the Wisconsin field are as follows:

Champion property, 434 acres, on which there has been developed an orebody 1,500′ long, 800′ wide, and 40′ high. A mill of 500 tons daily capacity is in operation.

Winskell mine, operated on leased land, 10% of gross output going to the land owners. A mill of 450 tons daily capacity is in operation. Total production to end of 1914 was 31,089 tons zinc concentrates, averaging 36.51% zinc, and 1,073 tons lead concentrates, averaging 76.28% lead.

The life of the Champion property, with its surrounding leases, as estimated at present, is from 5 to 10 years.

Longhorn property, operated on leased land at 10% royalty, has ore reserves of 175,000 tons high grade ore. The 350-ton mill is in operation.

The Thompson mine, operated on leased land at 10% royalty, has ore reserves of 200,000 tons high grade ore; equipped with 350-ton mill.

Company owns a number of other leases in the district on which valuable ore reserves have been proved by drilling. The Copeland property will be developed by shaft and equipped with mill in the near future.

The life of the Champion property, with its surrounding leases, as estimated at present, is from 5 to 10 years.

The policy of the company is to maintain a drilling campaign for new orebodies, with the purpose of keeping 5 to 10 years' production in sight.

The low grade of concentrates in the Wisconsin district necessitates treatment by means of part roast and magnetic separation. The company has a plant for this purpose, equipped with a 7-hearth roaster of the Skinner type near the Champion property. This plant has 200 tons daily capacity, producing a finished concentrate assaying 58 to 60% zinc.

American Zinc Co. of Illinois.

Inc. Aug. 15, 1911, in Maine. **Cap.** $10,000; $1 par, all issued and owned by the Am. Z. L. & Sm. Co.

Property: at Hillsboro, Ill., consists of 600 acres, on which has been built a modern smelter plant of 4,800 retorts furnace capacity, capable of distilling 48,000 tons of concentrates per year; 3 Hegeler muffle-kilns, pottery, machine-shop, warehouse, ore storage bins and sulphuric acid plant producing 45,000 tons of 60° acid annually; also a zinc-oxide plant of 24 furnaces, enlarged during 1918.

East St. Louis property consists of 143 acres, on which is a modern smelter plant of 5,600 retorts capacity, capable of treating 54,000 tons of concentrates

annually; Hegeler and De Spirlet roasting kiln, pottery, sulphuric acid plant, oxide plant of 8 furnaces, with auxiliary buildings. Sulphuric acid plant produced 50,000 tons 60° sulphuric acid annually, but was enlarged in 1918.

American Zinc Ore Separating Co.

Inc. Oct. 13, 1908, in Maine. **Cap.** $25,000; $5 par; all issued and owned by A. Z. L. & S. Co. This company owns certain patents for the separating of zinc ores by the Huff electrostatic methods. Its business is to lease machines constructed under these patents on a royalty basis.

American Ballast Co.

Mascot, Tenn. **Inc.** Nov. 9, 1911. **Cap.** $2,000; $1 par; 5 shares issued and owned by A. Z. & L. S. Co. The company disposes of mill tailings of the Mascot mill of the American Zinc Co. of Tenn. Table and flotation tailings are sold for fertilizing purposes; other tailings are sold for railroad ballast, road construction, etc.

Granby Mining & Smelting Co. of Missouri

Granby, Newton Co., Mo. **Inc.** in 1864. In June, 1916, net quick assets exceeded $2,750,000, of which nearly $1,000,000 was in cash; current liabilities, less than $300,000. Reported in June that company had declared a dividend of $2,000,000 in the form of 10-year, 5% bonds, secured by mortgage of its real estate, and the company subject to this mortgage, had been taken over by the Granby Co. of Maine, to be then taken over by the American Zinc, Lead & Smelting Co. Purchase price, $8,000,000. The $2,000,000 bond issue has been taken as part payment; and it is proposed to furnish $2,000,000 additional by an issue of 40,000 shares of common stock of the A. Z. L. & S. Co., to be offered stockholders at $50, stock to be underwritten without commission; remaining $4,000,000 to be paid for out of earnings. Value and earning capacities of properties based on a 5-ct. spelter market.

Property: owns in fee simple about 30,000 acres of land in the zinc district of southwestern Missouri. For nearly 50 years its revenue has come from royalties paid by lessees operating on these lands. It has developed a large tonnage of rich ore near Granby. Company has been a dividend payer almost from its inception, and has, out of earnings, acquired 10,000 acres of coal land in Illinois; built a new coal zinc smelter and sulphuric acid plant in East St. Louis; bought and improved a gas zinc smelter at Neodesha, Kansas, and acquired a small lead smelter at Granby. All the sulphuric acid output has been sold up to and through 1920.

The ore, sulphides of lead and zinc, occurs in bands between the barren zones of flint that comprise the Grand Falls chert. It is from this formation that the term 'sheet-ground mines' is derived, and in it the ore is generally uniform in character and covers large areas. In the Davey mines, 124 acres have been mined out in one continuous chamber. Ore faces are from 14 to 20′ in height.

Development is by means of 6 vertical 2-compartment shafts, all in the ore formation. Two shafts are used for mining purposes, and 4 for ventilation. The ore level is at 250′ depth. The ore is very low grade, zinc concentrates recovered representing 1.79% and the lead concentrates 0.67% of ore treated. Ore output has been approximately 50,000 tons ore per acre, from 15 to 20% ore being left as pillars. Reserves are about 1,500,000 tons. Timbering is not necessary. The blanket formation permits of development, in wide areas, average yearly advance on all faces in the mine is 125′.

There are two mills on the property, No. 3 mill of 1,200 tons, and No. 4 of 1,000 tons daily capacity.

The Vogey mine is similar to the Davey. Operations have been irregular, depending on price of zinc and lead concentrates. Zinc concentrates recovered represent 1.76% and lead concentrates 0.20% of rock hoisted. There is a mill on the property, with daily capacity of 1,000 tons.

The Klondike, Mascot, and Golden Rule mines are in sheet-ground formation. Recovery in zinc concentrates represents from 2 to 4% of rock hoisted. The Klondike is developed by 3 shafts and equipped with a 1,000-ton mill; th

Mascot, by 3 shafts, and a 350-ton mill; the Golden Rule by 1 shaft and a 300-ton mill; the B. & H. mine, near Joplin, by 1 shaft and a 250-ton mill. All mills are operated by electric power, with the exception of the B. & H., which has a steam plant.

There are also many mines being operated under lease on a royalty basis on the company's lands in the Granby district. An extensive drilling campaign is being carried on to determine values and possibilities on these holdings.

Operations of the smelting properties purchased from Granby M. & S. met expectations during 1919, but production and ore developments were not satisfactory.

COPPER EXPORT ASSOCIATION **U. S. A.**

Office: 60 Broadway, New York City.

Officers: Simon Guggenheim, chairman of the board; John D. Ryan, pres.; Walter Douglas, 1st v. p.; R. L. Agassiz, 2nd v. p.; C. W. Welch, sec-treas.

Directors: Murry Guggenheim, Simon Guggenheim and F. H. Brownell for A. S. & R. Co.; John D. Ryan, Cornelius F. Kelley and Benj. B. Thayer for Anaconda Copper Mng. Co. and Inspiration Cons. Copper Co.; Chas. Hayden, Chas. M. MacNeill and D. C. Jackling for Utah Copper Co., Nevada Cons. Copper Co., Ray Cons. Copper Co. and Chino Copper Co.; Walter Douglas and Jas. McLean for Phelps Dodge Corporation; R. L. Agassiz and Jas. MacNaughton for Calumet and Hecla Mng. Co.; Stephen Birch, for Kennecott Copper Corporation; Wm. A. Clark for United Verde Copper Co.; Archibald Douglas for United Verde Extension Copper Co.; Gordon R. Campbell for Calumet & Arizona Mng. Co.

Selling Committee: Jos. Clendenin, A. S. & R.; T. Wolfson, U. Metals Selling Co.; C. A. Austin, Phelps Dodge Corpn.; F. S. Gourley, Calumet & Hecla Mng. Co., H. M. Brush, secretary; Edward Mosehauer, representative in Germany.

Inc. December, 1918, in Delaware. **Cap.** 2,500 shares, 7 per cent Pfd., par $100, also 500 shares common, no par value. Annual meeting May 13th.

The object of this corporation is to handle export sales of copper on a basis whereby orders for export copper will be allocated to members according to production and at the same price f. o. b. seaboard. All producers of copper, large or small, are invited to join on the same terms. It is stated over 80% of the U. S. production, amounting to 1,800,000,000 lb. copper during 1918, is represented by membership in this corporation.

The members own the indicated percentage in the plants named.

ANACONDA COPPER MINING CO.

Smelters:

100% Tooele smelter, International, Utah (Intern. S. & R. Co.)
100% Miami, Arizona (Intern. S. & R. Co.)
100% Washoe smelter, Anaconda, Mont.
100% Anaconda smelter, Great Falls, Mont.

Refineries:

100% Great Falls, Mont.
100% Raritan Copper Works, Perth Amboy, N. J.

Metal Selling Agencies.

100% United Metals Selling Co.

Copper Mining Companies:

100% large holdings at Butte, Mont.
41-3% Inspiration Copper Co. (50,900 shares).
100% Andes Copper Mng. Co., Chile.
80% Santiago Mining Co., Chile.

AMERICAN SMELTING & REFINING CO.

Smelters:

100% American Smelters Securities Co.
100% Hayden, Ariz.
100% Perth Amboy, Maurier, N. J.
100% Cons. Kansas City S. & R. Co., El Paso, Tex.
100% Garfield Sm. Co., Garfield, Utah.

100% Sasco Plant, Silverbell, Ariz.
100% Tacoma Smelting Co., Tacoma, Wash.
100% Velardena M. & S. Co., Velardena, Dgo, Mexico.
100% National Metallurgical Co., Matehuala, Mexico.
100% Aguascalientes, Mexico.
100% Caldera, Chile.
95% Soc. de Minas & Fundiciones de Carrizal, Chile.

Refineries:
Omaha, Neb.
Perth Amboy, N. J.
Selby, Calif.
Baltimore, Md.
Tacoma, Wash.

Copper Mining:
100% Velardena M. & S. Co., Velardena, Dgo. Mexico.
100% Caldera, Chile.
Chile Copper Co., Chile.
Kennecott Copper Co., Alaska (30% given A. S. & R. stockholders).
77% Neg. Minera de Jesis Maria, Mexico.
95% Soc. de Mines y Fundiciones, Carrizal, Chile.

INSPIRATION CONSOLIDATED COPPER CO.
100% Mines at Miami, Arizona.

GREENE CANANEA COPPER CO.

Smelter:
100% Cananea, Sonora, Mexico.

Copper Mining:
100% Greene Cananea (30,748 acres) Cananea, Mexico.

RAY CONSOLIDATED COPPER CO.
No interest in other companies. Ore purchased and smelted by A. S. & R. Co., at Hayden smelter.

CHINO COPPER CO.
No interest in other companies.

NEVADA CONSOLIDATED COPPER CO.

Smelter:
100% Steptoe smelter, McGill, Nevada.

UTAH COPPER CO.

Copper Mining:
100% Utah Copper.
50% Nevada Con. Copper Co.

PHELPS DODGE CORPORATION.

Smelters:
100% Copper Queen smelter, Douglas, Arizona, smelter at Morenci, Arizona.

Selling Agents:
for the various Phelps Dodge companies and smelters.

Copper Mining.
Large holdings at Bisbee, Morenci, Tombstone, Copper Basin, Arizona; Burro Mountain, N. M.; Moctezuma Copper Co., Mexico.
Directors personally control and own large holdings in Old Dominion Co.

CALUMET & HECLA MINING CO.

Smelters:
Torch Lake, Centennial Copper Co.

Refinery:
Torch Lake, Centennial Copper Co.

Copper Mining:
100% Tamarack Mining Co.
100% Laurium Mining Co.
50% Ahmeek Mining Co.
41% Allouez Mining Co.

36% Centennial Copper Mng. Co.
48% Cliff Mining Co.
50% Gratiot Mining Co.
22½ Isle Royale Copper Co.
50% La Salle Copper Co.
35% Osceola Cons. Mining Co.
42% White Pine Copper Co. (common).
55% White Pine Copper Co. (preferred).

KENNECOTT COPPER CORPORATION

Copper Mining:
99% Braden Copper Co., Chile.
38% Utah Copper Co.
Alaska Dev. & Mng. Co.

A. LEWISOHN & SON: GENERAL DEVELOPMENT CO.

Copper Mining:
25% Miami Copper Co.
Controls: New Cornelia Copper Co., Ariz.; San Cayetano Mines, Ltd., Mex.; Naumkeag Copper Co., Mich.; New Planet Copper Co., Ariz.; Bagdad Copper Co., Ariz.; Tennessee Copper Co. and others.

UNITED VERDE COPPER CO.

Smelter:
Clarkdale, Ariz.
Refinery:
Clarkdale, Ariz. (converter plant).
Copper Mining:
Hull Copper Co.

UNITED VERDE EXTENSION MINING CO.

(Closely connected through stockholders with Phelps Dodge Corp'n.)
Smelter.
Verde, Ariz.
Refinery:
Verde, Arizona (converter plant).
Copper Mining:
Interest in other companies $1,614,837 (December, 1918).

U. S. SMELTING, REFINING & MINING CO.

Smelter:
100% U. S. Smelting Co., owning copper smelters at Midvale, Utah; Kennett, Calif.; Chrome, N. J.
Refinery:
At Chrome, N. J.
Copper Mining:
Minority interest in several small producers.

CALUMET & ARIZONA MINING CO.

Smelter:
100% at Douglas, Ariz.
Copper Mining:
Mines at Bisbee, Ariz.
76½% New Cornelia Copper Co.
70% Gadsden Copper Co., Jerome, Arizona (under option).

UNITED METALS SELLING CO.

Selling Agents:
Anaconda Copper Mining Co. and allied interests.

TENNESSEE COPPER CO.

Smelter.
Ducktown, Tenn. Treats own and custom ore.
Sales Agents:
Represented by A. S. & R. Co.

ARIZONA COPPER CO., LTD.

Owns and operates its own mines and smelter in Clifton-Morenci district, Arizona.

CONSOLIDATED COPPERMINES CO.

Owns and operates mines and smelter under own name near Ely, Nevada.

Copper Mining:

Controls 79% Butte & Ely Copper Co.

INTERNATIONAL SMELTING CO.

Owned by Anaconda Copper Mng. Co., which see.

NEW CORNELIA COPPER CO.

Subsidiary of Calumet & Arizona Mng. Co.

Refinery:

Electrolytic refinery, Ajo, Ariz.

NORTH BUTTE MINING CO.

Owns and operates own mines at Butte, Mont.

GENERAL DEVELOPMENT CO.

Office. 61 Broadway, New York.

Officers: Adolph Lewisohn, pres.; J. Parke Channing, v. p.-cons. engr.; Theo. L. Herrmann, sec.; Sam A. Lewisohn, treas.; preceding officers, Samuel Untermeyer, Herman Sielcken, D. M. Hyman, W. T. Rosen, A. S. Rossin, J. H. Susmann, E. H. Westlake, Arthur Lehman, B. Hochschild, F. W. Estabrook and S. S. Rosenstamm, directors.

Inc. 1906, in Delaware. **Cap.** $2,000,000, increased to $2,500,000, increased 1909 to $2,600,000, and again increased, 1913, to $3,000,000; $25 par, 120,000 issued. Equitable Trust Co. of New York, registrar. Dividends paid 1908, 1½%, 90% in 1909, 15% in 1910; 1½% in 1913; 6% in 1915; 23% in 1916; 28% in 1917, and 11% in 1918.

Company is a securities holding corporation, which owns nearly one share of Miami stock for each issued share of its own, and also owns a large block of dividend paying Kerr Lake stock, and of New Cornelia Copper. It also controls, through stock ownership the Colorado Gold Dredging Co., San Cayetano Mines, Ltd., and Naumkeag Copper Co. The increase of capitalization, 1913, was to finance the merger of the Silver Mines Exploration Co., the corporation which developed and promoted the Kerr Lake and Wettlaufer-Lorrain companies of Cobalt, Ont. Company has extensive stock interests in New Planet Copper Co., Bagdad Copper Co., with other mining interests in the United States, Canada, and Mexico.

In 1918, the San Cayetano Mines in Mexico, required $10,000 for payment of taxes and protection while General Development Co. was a creditor to the amount of $67,000, but as subscriptions to the fund, of $10,000 were so small the property became subject to sale by the Mexican authorities.

The General Development Co. is a parent corporation examining, developing and financing mining properties which, when they have reached the self-supporting producing stage, are turned over to operating companies. It is a powerful factor in the copper industry, and with the wide experience and astute guidance of Adolph Lewisohn, combined with the technical skill and great ability of J. Parke Channing, its consulting engineer, promises to become increasingly important.

GOLD FIELDS AMERICAN DEVELOPMENT CO., LTD.

Offices: 233 Broadway, New York, and 8 Old Jewry, London, E. C., England.

Officers: S. Christopherson, chairman; E. S. Birkenruth, Lord Brabourne, Lord Harris, J. C. Prinsep, and H. L. Sapte, directors. Advisory committee in America: J. McDougall, Alfred de Ropp, and H. H. Webb.

Inc. March 10, 1911, in England. **Cap.** £2,500,000; £1 par; 2,000,000 issued, 1,000,000 being fully paid and 1,000,000 with 10s. called. Reports are only issued to shareholders.

Dividends: 5% paid in June, 1918.

Company acquired from Consolidated Gold Fields of South Africa Ltd. (which see) latter's interests in America, including shares in Natomas Consolidated, Oroville Dredging, Sierra Pacific Electric, Mississippi River

Power Co., Yuba Consolidated Gold Fields, Granville Mining, Vera Cruz Mexican Oil, Trans-continental Consolidated Oil, International Petroleum Co., Foreign Mines Development, La Grange Mining, American Trona Corp., and others. The mining companies named herein will be found described under their respective titles, excepting the last named, which is essentially a chemical producer, extracting potash, borax, and other salts from the brine of Searles Lake, California. A large sum of money has been spent there in erection of extensive equipment. Reserves are enormous; at least 4,000,000 tons of potash remains. The output in 1918 was 24,00 tons of salts.

GUGGENHEIM EXPLORATION CO.

Dissolution completed in 1916. See previous volumes for past operations, also American Smelting & Refining Co., Braden Copper Co., Chile Copper Corporation, and Kennecott Copper Corporation.

INTERNATIONAL AGRICULTURAL CORPORATION

Office: 61 Broadway, New York City.

Officers: S. B. Fleming, pres.; Albert French, v. p.; J. J. Watson, Jr., v. p.-treas.; F. F. Ward, v. p.-asst. sec.; J. R. Floyd, sec.-asst. treas.; with F. P.Garvan, E. B. Sweezy, T. W. Lamont, W. Schmidtmann, D. E. Pomeroy, F. M. Weld, and A. H. Wiggin, directors.

Inc. June 14, 1909, in New York. **Cap.** authorized 7% cumulative preferred $18,000,000 and $18,000,000 common. Issued $13,055,500 pfd., $7,260,600 com., and $10,275,600 in bonds.

Results have been as follows, years ending June 30:

Year	Gross profit	Operating profit	Net profit	Surplus for year	Current assets	Current liabilities
1918.....	$4,504.583	$2,595,723	$1,944,933	$1,168,270	$10.336,947	$4,961.641
1917.....	2,851,408	1,894,003	.....	636,812	7,075,523	3,845,338
1916.....	2,793,898	2,051,303	1,034,054	1,279,832	5,201,549	1,863,274

Dividends: Pfd. shares received 7% per annum until January, 1913, but none since, and none on common shares.

Company has 15 large acidulating and fertilizer plants, mostly in the South, a large number of distributing plants, and holds 50% interest in some German potash mines.

Property: 42,226 acres of phosphate lands in Florida; also extensive areas in Tennessee. In 17,000 acres explored, reserves are estimated at 41,500,000 tons. In all properties there is supposed to be nearly 100,000,000 tons. To make this rock soluble, sulphuric acid, bought from the Tennessee Copper Co., and Ducktown Copper, Sulphur & Iron Co., is mixed with it. A contract with the former, until December 31, 1920, calls for 175,000 tons of acid a year at $4.81 per ton, also any excess at that price. During 1918, an arrangement called for 225,000 tons at $4.81, all above that to be paid up to $10 per ton.

The company is included herein, because it is carrying on extensive mining operations, and has important relations with large mining companies.

INTERNATIONAL METALS SELLING CO.

Subsidiary of the U. S. Smelting, Refining & Mining Co. and was managed by Vogelstein & Co., 42 Broadway, New York, which was absorbed in Dec., 1919, by the American Metal Co., Ltd.

INTERNATIONAL SMELTING CO.

Office: 42 Broadway, New York.

Officers: Cornelius F. Kelley, pres.; Wm. D. Thornton, 1st v. p.; L. D. Ricketts, 2nd v. p.; Albert H. Melin, treas.; with C. E. Mills, Benj. B. Thayer, and John D. Ryan, directors. David B. Hennessy, sec. J. B. Whitehill, ore purchasing agent.

Inc. in Montana. Cap. $15,000,000. Stock entirely owned by Anaconda Copper Mining Co. Company is a reorganization of the International Sm. & Ref. Co.

Company operates smelters at Tooele, Utah, and Miami, Ariz., the

Raritan Copper Works at Perth Amboy, N. J., and the smelter of the International Lead Refining Co., at East Chicago, Ind.

Miami Smelter

The Miami smelting plant, Miami, Ariz., C. E. Mills, gen. mgr.; L. R. Wallace, supt., built primarily to smelt the concentrates produced by the mills of the Inspiration Cons. Copper Co. and the Miami Copper Co., is equipped to handle custom ores. The plant is situated about a mile E. of Miami and 6 miles W. of Globe, on the Inspiration Co.'s industrial railway connecting with the Arizona Eastern R. R. at Miami.

The smelter is essentially a reverberatory plant, which on account of the high copper content of the concentrates treated has been built to minimize losses in the handling of material from one department to another, and the prevention of dust losses, as far as possible.

Material from both Miami and Inspiration mills is largely flotation concentrate hauled to the smelting plant in 60-ton steel cars especially designed to handle sticky, fine material of this nature.

Bins: concentrates are first bedded in three 3,000-ton V-bottom bins with the necessary limestone, pyrite, first-class ore and secondaries to give a proper smelting mixture. First-class ores go to receiving bins with capacity of 1,350 tons.

Crushing and Sampling Plant: 22'x40', 5-stories high, contains: 18"x30" Blake crusher; 1 set 54"x16" rolls; 3 sets 42"x16" rolls; 16" Snyder sampler; three 27" Snyder samplers; two 24"x8" rolls.

Steel storage bins of 1,500 tons capacity are provided for the storage of crushed ore and fluxing material.

Roaster and Dryer Plant: 67'x97' and 93' high, contains 5 Wedge roasting furnaces, 22'6" in diam., each having 5 regular hearths and a dryer hearth. Oil burners operating in combustion chambers supply the heat for drying. No roasting is permitted, as the sulphur content of the concentrates is so low that it is necessary to add pyrite to keep matte down to a proper grade.

Each furnace is fed from 190-ton storage bin directly over it. The gases pass directly to a header flue, and then into Cottrell treaters located above the charge floor. The Cottrell treaters in this plant practically prevent the loss of any flue dust.

Reverberatory Plant: the reverberatory building, 134'x176', contains 3 reverberatory furnaces with hearth areas of 21'x120'. The furnaces are oil fired and discharge their gases through Stirling boilers, according to the usual practice. There are seven 712-h. p. waste heat Stirling boilers.

Converter Plant: is 58'x380'x49' to the top of crane rail. Two 40-ton magnet switch controlled electric traveling cranes are provided.

The plant contains 5 converter stands of 12' electrically operated Great Falls type converters; 2 straight line casting machines with 5'6"x16'6" tilting furnaces, 1 skullbreaker, etc. Silica bins filled by belt conveyors discharge into weighing hoppers, which measure out a pre-determined charge, delivering it directly into the mouth of the converter through pivoted spout.

The gases from the converters are passed through Cottrell treaters, before being discharged into the chimney, which give a high recovery of the precious metal values contained in the gases.

Power Plant: at the smelting works is operated by the Inspiration Co., the smelting plant selling its steam to, and purchasing its power from the Inspiration company. The power plant buildings are of steel and reinforced concrete construction throughout. The main units consist of three 6,000-k. w. turbo-generators and 3 cross-compound, 15,000 cu. ft. blowing engines, switchboard, etc. Modern auxiliary apparatus is provided for condensing, automatically measuring steam and feed water, recording temperatures, pressures, etc. The boiler houses contains six 712-h. p. oil fired Stirling boilers equipped with superheater and economizer.

The plant operates at high efficiency.

Shops, Offices, Etc.: a steel shop building, equipped with traveling crane, is divided into four departments, viz., machine, blacksmith, boiler, electrical and carpenter shops, all well equipped with modern tools.

The warehouse building and general office and laboratory buildings are of reinforced concrete throughout and there are 8 reinforced concrete cottages at the smelting plant for its staff. Water for the plant is obtained from the Inspiration Co.'s water main.

On account of the high copper contents of the concentrates which the plant receives, it has a production capacity of 16,000,000 lbs. of copper per month, with spare reverberatory furnace and converter stand.

Production:

Year	Concentrate tons	Ore tons	Copper lb.	Gold oz.	Silver oz.
1918.....	332,644	45,290	173,043,136	4,256	252,437
1917.....	242,936	26,839	138,762,411	2,954	201,860
1916.....	295,075	37,891	181,518,396	2,882	257,543

Tooele Smelter

Tooele Smelter: Wm. Wraith, gen. mgr., Kearns Blk., Salt Lake City, Utah. The smelter is 6½ miles from Tooele Junction on the main line of the Los Angeles & Salt Lake Railroad, where connection is made with the Tooele Valley railroad, and plants and yards cover one-half square mile.

Crushing and sampling 5-story building, 2 complete sections using the Brunton system of sampling, contains 8 Blake type crushers, 9 to 12"x15" to 24" in size and 8 rolls, 12 to 15" wide and 26", 42", and 48" diameter. Each sampling section contains 4 Brunton sample cutters. In the copper plant ore is crushed to ⅜", conveyed from sample mill to roaster storage bins (5,000 tons capacity) by belt conveyor, thence to roaster feed hoppers by belt conveyor.

Copper Department: The McDougall roaster building contains 2 sections, each 64x162' holding 32 furnaces. These furnaces are 16' in diameter, 18' high and have 6 hearths. Roaster gases pass through a 120x140' hopper bottomed brick dust chamber 30' high above hoppers, containing two 4' banks of wires; thence through brick flue 255' long to stack. The brick stack is 350' high and 25' inside diameter at the top. The reverberatory plant receives the calcine by electric tram system. It contains 5 coal-fired furnaces, Anaconda type, 1 with 19'x90' hearth, 4 with 19'x102' hearths. Each furnace is equipped with 750-h. p. waste-heat Stirling boiler. Gases go through a brick flue 1,360' long to stack.

The converter plant has 5 electric-driven stands for 96x150" shells and a 60-ton crane. Converter shells are lined with magnesite brick. Copper is cast in steel moulds by 30-ton crane. Slag is cast in beds and broken up and sent to the lead blast furnaces. Gases from plant go through a steel flue to a 50x126' brick bag house containing 960 31x176" woolen bags. From the bag house the gas is discharged through a 150' stack 15' in diameter at the top.

The power house contains 2 Corliss engines direct-connected to 250-k. w. 500-v.d.c. generators; 2 vertical triple-expansion engines direct-connected to 750-kva. 2,200-v. generators; 2 converter blowing engines, 15 lbs. air; 1 steam-driven 90 lb. air compressor; 1 electric-driven 90 lb. air compressor; 2 No. 10 Roots blowers, direct-connected to tandem compound Corliss engines; one 750-k. w. Westinghouse-Parsons turbo-generator; and 2 Leblanc condensers and necessary auxiliaries. Condensing water is cooled in natural draft cooling tower. In addition to the waste-heat boilers, there are 3 hand-fired 350-h. p. Stirling boilers.

Lead Department: The lead plant contains blast furnaces, sinter plant and charge bins. There are 26 double steel bins with a capacity of 10,000 tons of ore and concentrate, receiving material from the crushing plant by belt conveyor. Fine concentrates and ores already sampled can be

dumped direct. Charges for blast furnaces and sinter machines are weighed in scale hoppers and dropped into charge cars, going direct to furnaces, but sinter charges go by car to a hopper-feeding belt conveyor delivering to sintering machines.

The sinter plant contains 10 Dwight-Lloyd machines, 42x264", rated capacity 100 tons per day per machine. Sinter from machines goes to blast-furnace charge bins by standard railway cars.

The blast-furnace plant is a steel and concrete building with two 45x180" and two 60x180" furnaces whose daily capacity averages 250 tons of charge. Gases pass to brick bag house containing 1,440 bags, lead to drossing plant and the lead-copper matte to the converter plant. A slag settling furnace is being erected. The drossing plant has four 30-ton kettles and uses a Howard press.

Tooele Valley railway has 7 miles of main line; 1 locomotive, 6-wheel switching type, 57 tons weight; 1 locomotive Mogul type, 60½ tons weight; 2 locomotives, Consolidation type, 96 tons; 30 steel hopper-bottom ore cars; 3 flat cars and 4 passenger coaches.

This plant has a fully-equipped assay office and laboratory, shops, weather observation department, emergency hospital, offices, etc.

Industrial equipment consists of four 18-ton and four 12-ton electric locomotives, with necessary slag trucks, matte trucks, calcine and coal cars. All buildings are of steel and concrete construction.

The smelting practice of copper ores largely follows Anaconda methods. The sulphide fines are roasted with a certain amount of silicious ore added upon the fifth hearth of the roasters to heat the ore and keep the temperature at the right point. The ore is roasted down to 0.7% sulphur corresponding to a matte fall of 15 to 18 tons per day. The reverberatory slag, carrying 40 to 42% silica, is tapped at the back of the furnace and the matte, carrying 20 to 30% copper, conveyed in ladles to the converters. The converters, when operated only on day shift, are kept hot over night by filling them with cinders from the reverberatory furnaces. Silica is applied to the converter in lump ore, 2 boats to each 8-ton charge. The bag-house dust from the smelter fumes is removed by reversing the fan and direction of current, drawing the dust into the chamber beneath.

The Utah Metal Mining Co.'s 11,000' tunnel, completed in 1913, gives direct connection with the Bingham mines.

Production:

Year	Copper ore tons	Lead ore tons	Copper lb.	Lead lb.	Gold oz.	Silver oz.
1918.....	262,723	297,847	21,821,657	62,034,920	36,317	5,827,135
1917.....	320,510	334,274	17,385,090	84,726,315	31,495	4,439,290
1916.....	442,756	421,197	20,041,089	117,976,091	40,009	5,549,777

Raritan Copper Works

E. C. Clark, supt., Perth Amboy, N. J. The works on New York harbor, completed 1899, and since enlarged repeatedly, is one of the largest and most modern electrolytic copper refineries in the world.

The smelting department consists of one 200-ton, one 150-ton and one 100-ton furnaces for casting anodes, and two 225-ton, one 150-ton and two 100-ton furnaces for casting wire bars, ingots and cakes.

The electrolytic refinery includes 2 tank houses with their respective power houses; power consumption being about 7,000 k. w. The department has special shears for trimming cathode sheets and Morrow loop machines for attaching copper lugs to the cathode starting-sheets.

The tank house No. 1 has 1,800 tanks and a capacity of 22,000,000 lb. per month. The general arrangement and method of operation is very similar to that in No. 2 tank room. This room is 210x582'.

No. 1 power house, which furnishes power for No. 1 tank room, contains four 1,000-k. w. Nordberg triple-expansion Corliss engines and Allis-Chalmers barometric condensers. The engines are direct-connected to

1,000-k. w. electric generators, 2 being furnished by the General Electri Co. and 2 by the Crocker-Wheeler Co.

No. 2 tank house has 3 bays running lengthwise, with two 10-ton 3 motor Whiting cranes in each bay, equipped with special devices for hand ling an entire tankful of anodes or cathodes at 1 load. There are 3 elec tric circuits running lengthwise, 1 in each bay, each circuit of 396 tank being handled from the power house by an electric generator. Current is 7,500 amperes, giving a current density of 20 amperes per sq. ft. The main conductor has a cross-sectional area of 12¾". There are 1,188 depositing tanks arranged in 108 nests of 11 cells each, with electrode arrangement on the Walker system.

Production:

Year	Bullion treated tons	Silver treated oz.	Copper lb.	Gold oz.	Silver oz.
1918.....	222,628	7,016,213	394,968,011	132,254	21,440,611
1917.....	209,557	5,806,924	411,933,742	137,465	19,938,375
1916.....	233,956	4,531,771	462,666,262	167,024	18,606,866

International Lead Refining Co.

Wm. Wraith, gen. mgr; G. P. Hulst, supt.

An extensive plant located at 151st St. and McCook Ave., East Chicago, Ind., with 64 acres of ground. Construction work started April 20, 1912, and plant was in operation Oct. 3, 1912. Plant comprises main refinery building, all steel and concrete, with 3 standard-gauge tracks entering the building. There are 2 crane runways running the full length of the building, with 3 traveling cranes. A change-house, of brick, is equipped with toilets, shower-baths, steel lockers, and a dining room. Bag-house is constructed of brick and concrete, divided into 4 compartments of 114 bags, 30'x18".

Equipment: consists of one 12,000-ton battery Parkes process, two 300-ton softeners, four 60-ton desilverizing kettles, one 300-ton refining furnace, and one 200-ton molding furnace. The bullion comes in on a high track, is charged into furnace with charging machine and flows by gravity through the plant. Lead is hand-molded and trucked into cars. Sampling is done in two 40-ton kettles and bullion pumped into softeners with centrifugal pump. Residues are worked up in three 30-ton reverberatory furnaces. There are two 40-ton blast furnaces, 1 for antimonial slag, and 1 for by-products and ores; 8 retort furnaces for treating zinc skim and two 5-ton cupels for treating high-grade retort metal.

Common lead is double refined by crystallization in kettles in the corroding lead plant. Refining plant is in complete operation. All furnace gases except softeners and retorts are drawn through a sheet flue 700' long and passed through the bag house.

According to Mr. Hulst (Bull. 153 Sept., 1919, A. I. M. & M. E.) the works are able to treat both oxide and sulphide ores of antimony. All silver-bearing antimony ore is heated in the residue furnace, while antimony slag, produced was low enough in silver to warrant being smelted in two 42" round blast furnaces to antimonial lead. When the domestic output of antimony ore increased in 1916, the International was ready to treat it. The two furnaces reduced from 60 to 90 tons of lead and antimonial material daily, producing 30 to 35 tons of metal carrying 13% antimony, 86.1% lead, 0.15% copper, and 0.75% arsenic.

Power is supplied by the Northern Indiana Gas & Electric Co. Two waste-heat boilers supply steam for compressors and refinery. High-pressure air is supplied by centrifugal air compressor and air for blast furnaces is supplied by a Connersville blower. A 50,000-gal. tank elevated 50', and 100,000-gal. sump tank, waste running back into sump tank and pumped into the 50,000-gal tank, the elevated tank being connected with the East Chicago Water Co.'s mains. Oil storage capacity, two 12,000-gal. oil tanks.

Production:

Year	Lead bullion treated tons	Other ore and bullion tons	Com. and corrod. lead lb.	Antimonial lead lb.	Gold oz.	Silver oz.
1918.....	31,766	34,119	113,074,263	13,018,043	36,361	7,004,176
1917.....	41,682	23,558	117,922,724	11,525,365	24,673	5,259,738
1916.....	58,769	6,148	108,009,116	15,682,151	20,580	4,468,775

The International is not burdened by old smelters acquired at exorbitant prices, but has new and up-to-date plants, capable of handling ore as cheap, if not cheaper, than any of its competitors and is a big factor in the mining world. It is in strong and competent hands, both technical and financial, and its profitable operation is assured.

INTERNATIONAL SMELTING AND REFINING CO.

Properties and assets: purchased 1914 by Anaconda Copper Mng. Co. for $10,392,709. Company dissolved and properties transferred to International Smelting Co., and described thereunder.

METALLURGICAL COMPANY OF AMERICA

Office: 61 Broadway, New York.

Officers: C. M. Loeb, pres.-gen. mgr.; B. Hochschild v. p. Julian B. Beaty, treas.; with Otto Sussman, Harold K. Hochschild and Edw. Randolph, directors; Julius Goldman, sec.

Inc. May 19, 1904, in New Jersey. **Cap.** $100,000; $100 par. Annual meeting second Tuesday in April, at Jersey City, N. J.

Company is controlled by American Metal Co., Ltd., and was organized for the purpose of carrying on experiments in metallurgy, perfecting and improving metallurgical processes, and holding all metallurgical patents in which the A. M. Co. was interested. It is now merely a department of the A. M. Co.

MINERALS SEPARATION NORTH AMERICAN CORPORATION

Offices: 61 Broadway, New York City; engineering office and testing laboratories, 220 Battery Street, San Francisco, Calif.; experimental and research laboratories, Long Island City, New York.

Officers: Dr. S. Gregory, v. p.; with Frank Altschul, Alfred A. Cook and F Perry, directors; Chester B. Allen, sec.; chief engineer, Edward H. Nutter.

Inc. in Maryland, Dec. 1, 1916. **Cap.** $500,000 shares of no par value; all stock placed in voting trust. The voting trustees are Dr. S. Gregory and Frank Altschul.

Dividends: May 29, 1918, $1.50 out of capital assets and 50c out of current earnings: July 1, 1919, $1.50 out of capital assets and 50c out of current earnings; both distributions made in U. S. Government Liberty Loan bonds.

Company owns all United States, Canadian, Mexican and Cuban patents for flotation processes of ore concentration originally owned by Minerals Separation, Ltd., of London, England. Rights to use processes are licensed on a royalty basis, licensees being given privilege of electing any one of four different methods of royalty payments applicable to their ores, namely. (1) Flat Rate—based on payments per ton of total ore milled (this is limited to straight copper ores); (2) Unitage Rate—based on payments per unit of various metals recovered from total ore milled; (3) Percentage Rate—based on percentage of value of all metals recovered from total ore milled; (4) Poundage Rate—based on payments per pound (or per ounce, in case of precious metals) of all metals recovered from any material treated by flotation. Details of these royalty payments will be found in a 24-page booklet published by the company in 1919.

Ore treated by licensees in North America during 1915, was about 4,500,000 tons; in 1916, about 12,000,000 tons; in 1917, about 22,000,000 tons; in 1918, about 28,000,000 tons. It is estimated that during 1918 between

55,000,000 and 60,000,000 tons of ore was treated in whole or in part by flotation, of which about one-half was treated by 110 licensees of Minerals Separation, the remaining one-half by somewhat over 400 unlicensed users. Licensees of the company include Anaconda, Inspiration, Arizona Copper, New Cornelia, Greene Cananea, Consolidated Coppermines, Calumet & Hecla and affiliated companies, Phelps Dodge Corporation, Federal Mining & Smelting, American Zinc Lead & Smelting, Elm Orlu, St. Joseph Lead, Doe Run Lead, Britannia Copper (B. C.), and many others, totaling about 115 active users in 1919.

The flotation processes are now used extensively throughout the world for treating various ores of copper, zinc, lead, gold, silver, graphite and molybdenum. Their economic value for treatment of base-metal ores is firmly established. Although not universally applicable to all ores, flotation is an invaluable adjunct to almost every concentrating plant. At Calumet & Hecla it has insured the recovery of the very fine metallic copper and, combined with a special method of leaching it has practically created a large new and profitable source of copper in that company's old dumps. In several important mills, notably Inspiration, substantially all sulphide recoveries are effected by means of flotation. In other mills, the coarser minerals are roughed out by gravity concentration methods and the fines recovered by flotation. Differential flotation is finding a wider range of application in the treatment of complex sulphide ores. By means of this modification, close separations are made as between exceedingly fine lead and zinc sulphides, or between valuable copper pyrites and relatively worthless iron pyrite. The Consolidated Interstate-Callahan (Idaho) and the Sunnyside (Colorado) mills afford excellent examples of the great economic value of this development in the process.

If the various alleged infringing methods of flotation were allowed to be used unchallenged, Minerals Separation would lose large sums due as royalty for the use of its patents. Litigation over United States patents was first provoked by the installation made in 1911 by James M. Hyde (formerly an employee of Minerals Separation, Ltd.) at the mill of the Butte & Superior Mining Co. In that suit (Minerals Separation v. Hyde) the District Court at Butte, Montana, sustained U. S. Patent No. 835,120 and found infringement as to 7 claims. In 1914, the Ninth Circuit Court of Appeals, at San Francisco, reversed this decision, but on writ of certiorari the U. S. Supreme Court on Dec. 11, 1916, unanimously adjudged this basic patent for air-froth flotation valid as to 10 of its 13 claims. The remaining 3 claims, which specified the use of "a small quantity of oil," and which the court held to be invalid, have since, by disclaimer, been brought within the scope of the Supreme Court's decision.

Following this decision of the Supreme Court in the Hyde case, the Butte & Superior began using oil in minimum quantities of ½ of 1%, contending that this relieved it of liability for infringement. This issue was tried in the suit of Minerals Separation v. Butte & Superior, and on May 4, 1917, the United States District Court at Butte, Mont., found validity and infringement as to the 10 claims (3 modified by disclaimer) previously litigated. On May 13, 1918, the Ninth Circuit Court of Appeals at San Francisco partly reversed this decision, holding the patent limited to ½ of 1% of oil on the ore. The United States Supreme Court reviewed this case on writ of certiorari, and on June 2, 1919, partly reversed the decision of the Circuit Court of Appeals, holding that the patent extended to and covered the use of oils in amounts equal to any and every fraction of 1% on the ore. Pursuant to this decision, the District Court of Montana entered its decree on July 19, 1919, issued a permanent injunction against the Butte & Superior, and held it to account for all profits made by reason of its infringement. This accounting was set for October 27, 1919.

In the suit of Minerals Separation v. Miami Copper Co., before United States District Court at Wilmington, Del., three patents were involved, namely 835,120 for air-froth flotation, 962,678 for soluble frothing agents,

and 1,099,699 for the use of aromatic hydroxy compounds in cold circuit. In September, 1916, the Court found the first two patents valid and infringed, except as to one claim of 835,120, which has since been modified by disclaimer, but held the third patent to be void. On appeal to the Third Circuit Court of Appeals at Philadelphia, this decision was affirmed except as to the third patent, which was also held to be valid and infringed. Miami did not appeal from this decision, and the District Court issued a permanent injunction against that company. Accounting proceedings are now being held before a Master in Chancery, who is also trying out numerous variations of alleged infringements which the Miami company has used since being placed under injunction.

It results from these litigations that infringement of Minerals Separation's main patent, No. 835,120, cannot be avoided by any variation in the form of apparatus so long as a mineral-bearing froth is produced by the use, at any stage of the operations, of less than 1% of oil on the ore. The type of apparatus, character and extent of agitation are held to be immaterial. In addition to this, the validity of patent No. 962,678 precludes the use of soluble frothing agents in any form or amount whatsoever, except under license from Minerals Separation, as the Third Circuit Court of Appeals held that the Miami company infringed this patent when using oils that were partly soluble in water. This point is especially important because most of the effective oils used in flotation operations have soluble compounds. This seems to place Minerals Separation in an exceedingly strong position and appears to exhaust the possibilities of successfully evading its patents.

In September, 1919, Minerals Separation brought suit against Nevada Consolidated Copper Co., alleging infringement of its patents claiming damages, and seeking an injunction against further infringement. Also against Ray Hercules Copper Co. and Magma Copper Co., and a further case against Miami in November.

The above review is apropos in The Mines Handbook, inasmuch as hundreds of the companies listed herein are using flotation in some form, and their future profits depend largely on their use of flotation methods.

MINES EXPLORATION SYNDICATE

Office: Makeever Bros., mgrs., 170 Broadway, New York. Operating dept., 1553 Harvard Ave., Salt Lake City, Utah. Walter Neal, engineer.

Organized Aug., 1916, "to investigate and develop worthy mining properties." Over 200 mines were examined but only 3 taken over for development, at last accounts.

Property: Lookout mines in Montana, the Herb Lake (Rex) mines in Northern Manitoba, Can., and the Candelaria mines in Jalisco, Mex.

The Lookout group of 3 claims in Montana (location not stated) is said to show a series of veins carrying gold-silver-copper values. Average values are given as $14.52 to $26.41 per ton based on 60c silver and 25c copper. About 500' of work is reported done on 3 tunnels, a road built and necessary buildings put up.

The Rex mine on Herb Lake, Manitoba, Canada, is developed by a 60' shaft and vein is reported to average 48" in width. Average assay is given as $48.60 gold. Makeever's engineer estimated that ore extracted in shaft sinking and on dump totaled $5,054, and also assumed that a stope of such ore 100' long by 100' high will pay for the mine, development, mill, equipment, operation and metallurgical loss. A 30-ton mill to be installed.

The Candelaria mine, Jalisco, Mex., is an old mine credited with past production of rich ore. In August, 1919, it was under development.

MINING & DEVELOPMENT CORPORATION

Address. E. O. Holter and H. P. Henderson, 60 Broadway, New York.

Officers: Edwin O. Holter, pres.; Harold Kingsmill, v. p.; Howard D. Smith, v. p.; Robert Frese, sec.-treas., with Norman B. Holter, directors.

Inc. Feb. 1918, in Maine. **Cap.** 3,000 shares of no par value.

An exploration company having varied interests in the United States,

Mexico, and South America. $300,000 is to be spent on the Richmond-Eureka Mining Co. (which see), at Eureka, Nevada.

NATIONAL LEAD CO.

Main office: 1 Exchange Place, Jersey City, N. J. Executive and transfer office: 111 Broadway, New York.

Officers: E. J. Cornish, pres.; Geo. O. Carpenter, R. P. Rowe and N. B. Gregg, v. ps.; M. D. Cole, asst. to the pres.; Chas. Davison, sec.; S. A. Miller, asst. sec.; Fred R. Fortmeyer, treas.; Chas. Simon, asst. treas.; Alexander & Green, gen. counsel; Executive committee: E. J. Cornish, chairman; E. F. Beale, R. P. Rowe, J. R. Wettstein and G. D. Dorsey.

Directors: Edward F. Beale, Geo. O. Carpenter, Fred M. Carter, R. R. Colgate, E. J. Cornish, G. D. Dorsey, Chas. E. Field, Geo. W. Fortmeyer, E. C. Goshorn, Morris B. Gregg, R. P. Rowe, W. N. Taylor, Walter Tufts, J. R. Wettstein, and G. W. Thompson.

Committees:

Manufacturing—C. P. Tolman, chairman; L. T. Beale, H. P. Cavarly, Evans McCarty and G. W. Thompson.

Sales: O. C. Harn, chairman; L. T. Beale, C. C. Foerstner, O. H. Greene and W. N. Taylor.

Metal: E. J. Cornish, chairman; S. A. Miller, secretary; W. H. Baker, L. T. Beale, W. C. Beschorman, A. F. Curtis, G. D. Dorsey, S. E. Lindsley, H. J. McBirney, Sheldon Thompson, C. F. Wells, Jr. and J. R. Wettstein.

Departments:

Advertising: O. C. Harn, manager.

Laboratory: G. W. Thompson, chief chemist and A. H. Sabin, consulting chemist.

Metal: A. B. Hall, manager.

Flaxseed. Charles T. Nolan, manager.

Insurance: I. M. Stettenheim, manager.

Traffic: W. S. Mellen, manager.

Branches of National Lead Co.:

Atlantic, R. P. Rowe, mgr, 111 Broadway, New York, N. Y. Buffalo, Sheldon Thompson, mgr., Buffalo, N. Y. Cleveland, C. C. Foerstner, mgr., Cleveland, Ohio. Cincinnati, E. C. Goshorn, mgr., Cincinnati, Ohio. Chicago, Chas. E. Field, mgr., Chicago, Ill. St. Louis, Geo. O. Carpenter, mgr., St. Louis, Mo. John T. Lewis & Bros. Co., Edward F. Beale, pres., Philadelphia, Pa. National Lead & Oil Co., of Pennsylvania, W. N. Taylor, pres, 316 Fourth Avenue, Pittsburgh, Pa. National Lead Co., of Massachusetts, Walter Tufts, treas., 131 State Street, Boston, Mass. National Lead Co., of California, Jas. B. Keister, v. p., Merchants Exchange Building, San Francisco, Cal., and National Lead Co. of Argentina, G. D. Dorsey, pres, 25 de Mayo, No. 158, Buenos Aires, Argentina.

The National Lead Co. is interested through ownership of all or part of the capital stock in the following:

Baker Castor Oil Co., F. C. Marsh, pres., New York. Bass-Hueter Paint Co., Norris B. Gregg, pres., manufacturers of mixed paints, varnishes, and paint specialties, San Francisco, Cal. Carter White Lead Co., Fred. M. Carter, pres., white lead corroders, Chicago and Omaha. Cinch Expansion Bolt & Engineering Co., Grafton D. Dorsey, pres., manufacturers of expansion bolts, New York. Heath & Milligan Manufacturing Co., Norris B. Gregg, pres., manufacturers of paints and colors, Chicago. Magnus Co., Inc., H. H. Hewitt, pres., brass founders, New York. Matheson Lead Co., W. J. Matheson, pres., white lead corroders and manufacturers of oxides of lead, Long Island City, N. Y. River Smelting & Refining Co., Edward J. Cornish, pres., smelters and refiners of zinc, St. Louis, Mo. St. Louis Smelting & Refining Co., J. A. Caselton, 2nd v. p. and sec., miners, smelters, and refiners of lead, St. Louis, Mo. United Lead Co., J. R. Wettstein, pres., manufacturers of all products of lead, smelters of drosses and residues, New York. United States Cartridge Co., Paul Butler, treas., manufacturers of metallic and sporting ammunition, Lowell, Mass. Williams Harvey & Co., Ltd., Richard F. Pearce, managing director, smelters and refiners of tin, Liverpool, England. Williams Harvey Corp., Edward J. Cornish pres., smelters and refiners of tin, New York.

Inc. Dec. 7, 1891, in New Jersey. **Cap.** $25,000,000 common and $25,000,000 preferred stock; $100 par; $20,655,400 common stock and $24,367,600 preferred stock outstanding. Listed on New York Stock Exchange. Bankers Trust Co., New York, registrar. Annual meeting, third Thursday in April. Company had 6,640 stockholders in 1916; 7,152 in 1917; and 7,286 in 1918.

Comparative General Balance Sheet:

ASSETS

Year	Plant Invest.	Other Invest's.	Stock On Hand	Other Current	Total
1918.....	$41,933,059	$10,153,095	$15,027,156	$20,263,936	$87,376,245
1917.....	25,229,672	18,753,768	8,222,782	6,517,408	58,722,630
1916.....	23,805,234	17,982,307	7,320,170	6,058,190	55,163,901
1915.....	23,785,822	17,520,916	6,267,772	5,884,460	53,458,970
1914.....	23,768,789	16,963,718	7,164,475	4,467,083	52,364,065

LIABILITIES

Year	Capital Stock	Insurance Fund	Bonds of Subs.	Reserves	Current*	Surplus	Total
1918.....	$45,022,000	$1,400,000	$9,715,000	$8,103,467	$7,874,871	$16,659,907	$87,876,245
1917.....	45,022,000	1,400,000	.....	3,293,241	664,826	8,341,564	58,722,630
1916.....	45,022,000	1,200,000	.....	700,000	2,057,788	6,183,113	55,163,901
1915.....	45,022,000	1,100,000	.....	300,000	1,298,608	5,737,362	53,458,970
1914.....	45,022,000	1,000,000	.....	.....	988,835	5,352,230	52,364,065

* Includes accounts audited but not due subsidiaries.

Comparative Income Account:

	Net Income	Dividends Pfd.	Dividends Com.	Surplus Year	P. & L. Surplus
1918.....	$4,692,815	$1,705,732	$1,342,601	$1,644,482	$16,659,907
1917.....	4,896,953	1,705,732	1,032,770	2,158,450	8,341,564
1916.....	2,977,699	1,705,732	826,216	445,751	6,183,113
1915.....	2,710,526	1,705,732	619,662	385,132	5,737,362
1914.....	2,476,293	1,705,732	619,662	150,899	5,352,230
1913.....	2,458,306	1,705,732	619,662	132,912	5,201,331

Dividends:

	1918 %	1917 %	1916 %	1911-15 %	1910 %	1908-9 %	1907 %	1906 %	1901-5 %	1898-00 %	1896-7 %
Preferred.....	7	7	7	7	7	7	7	7	7	7	7
Common.....	6½	5	4	3	4	5	4¾	2	..	1	..

Present rate: preferred 7%, payable quarterly, March 15, etc.; common 3%, increased to 4% March, 1916, payable quarterly, March 30, etc.

NEW JERSEY ZINC CO.

Offices: 810 Broad St., Newark, N. J., 160 Front St., New York.

Officers: Edgar Palmer, pres.; A. P. Cobb, v. p.; J. E. Hayes, v. p.; A. B. Schultz, sec.; H. S. Wardner, treas.; G. T. Wolff, comptroller.

Directors: Edgar Palmer, C. W. Cox, August Heckscher, T. D. Jones, E. S. Marston, J. J. Riker, E. M. Squier, W. P. Hardenbergh and A. B. Schultz. H. G. Clopper, gen. sales mgr.; E. V. Peters, asst. gen. sales mgr.; H. Hardenbergh, gen. purch. agt.; W. J. Lee, purch. agt.; Arthur Thacher, Western mgr.

Inc. Oct. 30, 1880, in New Jersey as the New Jersey Zinc & Iron Co. Name changed 1897 to present title and capital increased from $3,000,000 to $10,000,000. Stock increased to $35,000,000 by payment of stock dividend of 250% July 7, 1915. Cap., $35,000,000; $100 par; all outstanding. Transfer office: 160 Front St., New York. Registrar: Farmers Loan & Trust Co., N. Y.

Bonded debt: the unretired balance of bonds authorized Oct. 1, 1901, due Oct. 1, 1926, First Gold, 4%. Original authorized issue, $10,000,000, of which $4,000,000 were issued, the balance to be issued only for the purchase of new property, stock of new corporations, the erection of new plants, etc. Of the $6,000,000 of unissued bonds, $3,400,000 had been retired up to Jan. 1, 1919, leaving a present authorized amount $6,600,000. The mortgage provides for the cancellation of $200,000 of unissued bonds yearly on Oct. 1, beginning 1902, the

authorized amount of bonds to be reduced accordingly, and after all such unissu bonds have been canceled, the company is required to pay to the trustee, annuall on Oct. 1, $200,000 as a sinking fund for the purchase or redemption of ou standing bonds at not exceeding par and interest.

Dividends: regular quarterly at rate of 20% per annum have been pa from 1906 to July, 1915, and quarterly at rate of 2½% in Aug. and Nov., 191 On Feb. 10, 1916, and regularly since, quarterly at rate of 16% per annum.

Extra distributions: 10% in 1907, 5% in 1909, 10% each in 1910 and 191 10% each 3 times in 1912, 10% each 3 times in 1913, 10% each twice in 1914, 5 each twice in 1914, 2%, 10% and 30% in 1915, 250% stock dividend in July, 191 10% each 4 times and 5% 4 times in 1916, 10% in Jan., and 4% each Mar., Apr June, July, and Sept.,1917; 4% July, 1918, and 2% July, 1919.

No balance sheets are available, but the following gives an idea of gener results:

Year	Net Income	Dividends	Surplus
1919*.....	$6,272,682	$4,200,000	$2,072,682
1918.....	11,904,759	7,000,000	4,094,759
1917.....	19,086,601	12,600,000	6,486,601
1916.....	34,488,239	26,600,000	7,888,239

*9 months. Last quarter of 1919 returned $2,675,412 net.

Property: the famous zinc mines at Franklin, New Jersey. The di ferent original holdings were consolidated as a result of litigation and to effe better mine operations. It was upon the economies due to a single control the great orebody and to the discovery by J. P. Wetherill of a process for trea ing the manganese-zinc ores that the fortunes of the company were built. Fo geology of mine see Lindgren's "Ore Deposits," p. 709; also U. S. Geologic Survey Folio, No. 161.

Company owns the New Jersey Zinc Co. of Pa., with operating plan at Palmerton and Freemansburgh, Pa.; operating mines near Benton and High land, Wis. (Mineral Point Zinc Co.); many other producing properties an reduction works, including the Empire Zinc Co. of Mo., not operating an property at present, the Empire Zinc Co. of Colorado, and mines at Iola, Kansa

The Franklin mine in New Jersey produces the high-grade ore from whic the Horsehead brand of spelter is made. The reserves are unofficially reporte to be in blocked out ore, sufficient for a thirty-year supply at the present rat Custom ores are also bought for treatment. The products include oxide of zin spelter, sheet zinc, zinc dust, spiegeleisen, sulphuric acid, lithophone, and zin chloride.

Production: no reports are published, but it is known that the compan has a yearly smelting capacity of 160,000,000 to 170,000,000 lb. of spelter, an the 1917 production is estimated at 250,000,000 lb. of zinc, besides other product One mine alone, the Franklin, is credited with 119,736 tons, or 16.9% of th country's total output during 1917.

During 1917 the following papers were published in the Engineering an Mining Journal: "Hoist Record at Palmer Shaft," by H. H. Hodgkinson. Thi shaft is 1,510′ deep at an angle of 47°, and has 4 compartments. Two 22x48 duplex, direct acting hoists are used, with ore loading pockets at 800 and 1,150 On July 14, 1916, one engine hoisted 3,079 tons in 10 hours. This shaft has pro duced 76,018 tons in one month. In the issue of Sept. 8, the company's Frankli laboratory was described by D. Jenkins. A paper prepared for the A. I. M. E. b W. R. Ingalls, in issue of Sept. 15, discusses "Zinc Burning as a Metallurgica Process," covering in part work of New Jersey Zinc. In Sept. Bulletin of th A. I. M. E., G. C. Stone discusses "Oxide of Zinc," as made by the New Jerse company. In the Oct. Bull. of the A. I. M. E. "Zinc Mining at Franklin, N. J." was the title of a 106-page article by C. M. Haight and B. F. Tillson. Compan publishes a monthly organ entitled "Zinc."

Company apparently carefully conceals its vast financial operations from curious public, but it is well if somewhat "closely" managed, and is doing excellent educational work in spreading knowledge of the uses and properties of zinc.

PHELPS DODGE CORPORATION

Office: 99 John St., New York.

Officers: Walter Douglas, pres.; Cleveland H. Dodge, Arthur Curtiss James, v. p.'s.; with Geo. B. Agnew, Francis L. Hine, Wm. Church Osborn and E. Hayward Ferry, directors; P. G. Beckett, gen. mgr.; Geo. Notman, sec.-treas.; C. W. Parsons, asst. sec.-treas.; W. K. Flora, asst. sec.; A. T. Thomson (New York), assts. to president; John Macnair, comptroller; T. H. O'Brien, mgr. dept. of indus. relations; H. Kenyon Burch, cons. eng.; Gerald Sherman, cons. min. eng.

James Douglas, through whose efforts and foresight the company attained its present importance as a metal producer, died in 1918, a loss to the entire mining profession.

Phelps Dodge Corporation assumed all the assets and liabilities on April 1, 1917, of Phelps, Dodge & Co., Inc., and continued the business of the former company with the same board of directors and official staff.

Phelps, Dodge & Co., Inc., was the holding company for its subsidiary companies. Under the new plan the name of the Copper Queen Cons. Mining Co. was changed to the Phelps Dodge Corporation, its capital stock increased, and the properties of the Detroit Copper Mining Co., the Burro Mountain Copper Co., and the Stag Cañon Fuel Co. were transferred to it, also stocks of the Moctezuma Copper Co., Bunker Hill Mines Co., and the Phelps Dodge Mercantile Co., together with the remaining assets of Phelps, Dodge & Co., Inc. This gives direct ownership and operation by a single company. The former companies are known as branches, with the exception of the Moctezuma Copper Co. and the Bunker Hill Mines Co.

Phelps, Dodge & Co., Inc., was organized as the successor of the firm of Phelps, Dodge & Co., which had a history of nearly a century, its founder, Wm. Earle Dodge, having been one of the great pioneer merchants of America and a noted philanthropist.

Inc. Aug. 10, 1885, in New York. **Cap.** $2,000,000; $10 par; increased to $50,000,000 in March, 1917; $100 par; $45,000,000 of which is now outstanding, having been exchanged share for share for stock of Phelps, Dodge & Co., incorporated, Dec. 14, 1908, in New York. The capital stock was issued for the purchase of the entire stock of the Copper Queen Consolidated Mining Co., at $135 for each $10 share, $27,000,000; Moctezuma Copper Co., at $307 9/13 for each $100 share, $8,000,000; Detroit Copper Mining Co. of Arizona, at $150 for each $25 share, $6,000,000; Stag Cañon Fuel Co., at $800 for each $100 share, $4,000,000; held for future issue, $5,000,000; total, $50,000,000. Stock listed on New York Stock Exchange. Annual meeting, first Tuesday after first Monday in April, at 99 John St., New York. Books close 10 days before and reopen day after annual meeting. Stock transferred at office of the company. Farmers' Loan & Trust Co., New York, registrar.

Comparative General Balance Sheet:

ASSETS

Year	Property and Equip.	Investments	Deferred	Cash	Other Current	Total
1918..	$198,551,420	$3,657,214	$.....	$12,985,403	$26,238,391	$241,432,428
1917..	195,405,392	3,129,481	.....	13,775,628	20,057,238	232,367,739
1916..	39,268,558	.....	2,763,213	7,746,519	15,735,612	66,513,903
1915..	38,550,942	.....	2,130,583	5,889,305	11,375,526	57,946,356
1914..	49,392,281	.....	264,076	4,891,697	4,687,999	59,236,053

LIABILITIES

Year	Capital Stock	Current	Reserve for deplet. and deprec.	Surplus	Total
1918.....	$45,000,000	$15,463,003	$49,589,707	$131,379,717	$241,432,428
1917.....	45,000,000	9,523,198	45,947,694	131,896,846	232,367,739
1916.....	45,000,000	5,826,777	.....	15,687,126	66,513,903
1915.....	45,000,000	4,608,492	.....	8,337,864	57,946,356
1914.....	45,000,000	7,224,944	.....	7,011,109	59,236,053

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Recent earnings: $6,025,740 in 1909; $9,099,910 in 1910; $7,283,509 1911; $10,411,535 in 1912; $9,581,494 in 1913; $6,891,651 in 1914; $10,981,512 1915; $24,030,904 in 1916.

Income Account:

Year	Sales of metals, etc, Supplies, etc.	Expenses, includ. taxes	Profit	Dividends	Surplus for year
1918.....	$59,483,208	$43,537,525	$15,945,683	$10,800,000	$5,145,6
1917.....	62,262,186	39,805,279	22,456,906	10,800,000	11,656,9

Dividends: company pays a regular quarterly dividend of $2.50 p share and also extra dividends; these were $2 per share in 1909, 1910, 1911; $ ni 1912; $6.50 in 1913; $4 in 1914; $10 in 1915; $22.50 in 1916; $14 in 1917; $ in 1918; $7.50 in 1919, and $2.50 in 1920 to Jan. 2. The grand total is $83,471,52

Company controls through personal holdings of its officers, the Old Dominio Co. and Commercial Mining Co. Members of the old firm also control th El Paso & Southwestern railway, a road that, while built originally as an outl for the Copper Queen mine, has expanded steadily and bids fair to develo eventually into a transcontinental trunk line. The same interests are very larg shareholders in the Rock Island and Great Northern railways.

The company controls some of the richest and most productive copper min in existence, all able to make copper at unusually low costs, as is evidenced b the great increase in dividends of subsidiaries in 1910 over 1909, in a year whe decreased dividends were the rule with a great majority of the large coppe producers of the world.

Production: comparative statement of total production, of company' branches, years ending Dec. 31—

	Tons of Ore							
Year	Extracted	Milled	Charge Smelted	Co. Ore Smelted	Copper, lb.	Silver oz.	Gold, oz.	Lead, lb
1919.....	.....	.....	.....	.....	110,000,000	.....	.....	.....
1918.....	2,684,701	1,797,161	1,400,911	1,168,882	169,085,687	1,772,119	30,434	1,683,11
1917.....	2,756,587	1,581,293	1,389,464	.....	153,974,692	1,524,632	24,423	8,136,35
1916.....	2,305,072	1,422,468	1,389,192	1,200,090	152,263,729	1,642,055	28,873	10,404,34
1915.....	1,588,364	800,600	1,129,766	1,016,746	140,478,003	1,655,060	31,696	9,525,58
1914.....	1,777,243	1,046,728	917,204	855,594	131,662,824	1,769,626	28,518	8,936,07
1913.....	1,978,892	1,122,372	1,035,367	856,520	155,665,712	1,870,162	31,141	5,701,62
1912.....	1,893,244	.....	1,051,315	953,741	148,678,889	1,689,152	27,687	.....
1911.....	1,841,210	1,017,852	930,331	822,647	184,149,627	1,794,895	27,154	.....

Company also took over the metals selling agency of the old firm, and i addition to marketing the product of its own mines, acts as sales agent for th Calumet & Arizona and other producers.

Comparative Statement of Copper Sales:

Year	Total	Own Comp.	Outside Product on Comm.	Domestic Trade	Foreign Trade	Aver Price Cent
1918.....	294,237,716	153,541,647	140,977,101	214,237,716	80,281,032	24.55
1917.....	290,522,569	156,114,518	134,408,051	185,131,891	105,390,678	26.67
1916.....	247,303,587	138,968,320	108,335,267	176,468,527	70,835,060	24.48
1915.....	194,925,668	139,351,785	55,573,883	97,122,436	97,803,232	16.07
1914.....	188,687,378	134,553,404	54,133,974	80,978,884	107,708,494	13.57
1913.....	201,489,796	151,080,018	50,409,778	83,552,432	117,937,364	15.37
1912.....	192,297,374	139,759,515	52,537,859	98,267,037	94,030,337	15.51
1911.....	180,301,965	131,327,002	48,974,963	69,483,782	110,818,183	12.36
1910.....	194,138,698	139,297,409	54,841,289	100,819,254	93,319,444	12.82

Phelps Dodge Corporation, is one of the few new companies in the copper mining industry that is under-capitalized rather than over-capitalized, and this is but a detail in a general business policy that, while thoroughly progressive and abreast with the times, retains the fundamentally sound and conservative policies developed by the old firm in nearly a century of honorable and markedly successful business life.

Branches and Subsidiaries

Burro Mountain Branch.
Bunker Hill Mines Co.
Copper Basin Branch.

Copper Queen Branch.
Moctezuma Copper Co.
Morenci Branch.
Phelps Dodge Mercantile Co
Stag Cañon Branch.

BUNKER HILL MINES CO.

Mine office: Tombstone, Ariz.
Officer. John H. Davis, supt.

Inc. to take over and operate the property of the old Tombstone Cons. Mines Co. at Tombstone, discovered in 1878, and at one time one of the largest producers of gold-silver-lead ore in the Southwest. At a depth of 560' the volume of water became so great all attempts to handle it were unsuccessful and operations were discontinued until Phelps Dodge Corp. acquired possession.

Development: extensions were 5,049' in 1915; 8,177' in 1916; 11,598' in 1917; and 2,996' in 1918. Results from prospecting in the old workings and in new ground have not yet shown orebodies of great size or commercial importance. Lessees were granted blocks of ground in 1918, shipping 1,000 tons monthly.

The old cyanide plant of the Tombstone Cons. was converted into an experimental plant for the testing of Tombstone ores and was put into operation in June, 1915. Flotation of the gold-silver-lead ore was unsatisfactory. Half of the plant is utilized in concentrating manganese ore, producing for steel plants and silver-bearing tailing for the smelter at Douglas.

Power is supplied by a central plant.

Production:

Year	Ore Tons	Gold Oz.	Silver Oz.	Lead Lb.	Copper Lb.	Manganese Lb.	Employees
1918.....	19,312	1,335	276,007	448,616	39,209	834,337	103
1917.....	69,418	2,872	397,253	1,049,445	13,357	3,930,901	386
1916.....	59,299	3,950	343,453	983,983	131,546	1,061,409	403
1915.....	10,746	1,373	109,783	269,303	23,760	1,171,509	297

BURRO MOUNTAIN BRANCH

Mine office: Tyrone, Grant Co., New Mexico. E. M. Sawyer mgr.; E. F. Pelton, supt.

Property: 60 claims, 1,000 acres, bought 1906, from Southwestern Copper Co. The Savanna Copper Co.'s holdings of 2,600 acres were added in 1915, bringing the total acreage up to 4,464 acres. Property shows 36 porphyry dikes, carrying 5 orebodies of disseminated ore having 2 to 5% copper. The old mine, 15 claims, known as the St. Louis, is said to have produced upwards of $1,000,000 worth of ore, under former ownership, shipping ores ranging 15 to 25% in copper.

Geology: property contains a number of large orebodies of disseminated chalcocite, so-called porphyry ore, that are genetically dependant upon intrusions of monzonite, in pre-Cambrian granite, both rocks being shattered and faulted. The largest orebody is entirely in porphyry, the next largest in a brecciated zone, associated with dikes of aplite and dark felsite (phases of the porphyry), cutting through granite. Actual stoping and milling operations began in March, 1916. The East orebody is mined by milling the ore into 55° chutes going down to the 4,700' Niagara tunnel, where it is loaded directly into standard gauge railway cars. The Breccia orebody is mined through No. 3 shaft, hoisted in 2-ton skips, dumped on an inclined belt conveyor, and discharged on a horizontal conveyor loading by tripping device into railway cars. Company has 5 Star churn drills, one electrically-driven.

The Burro Mountain and Chemung mines have been united by the Niagara haulage tunnel, starting at the Tyrone terminus of the Burro Mountain branch of the A. T. & S. Fé railroad; this tunnel, 8x9', was driven to Leopold, a distance of about 1 mile, and serves the double purpose of drainage and haulage. While driving this tunnel the so-called Bison orebody was found. Development increases its size, but the oxide content is high.

Lands include a complete town, improved with waterworks, electric light, substantial buildings, numerous dwellings, bank, store, theatre, etc.

Development: in 1914-15, work consisted mainly in completing opening by underground work and churn drilling of orebodies already known. At the end of 1914, thirteen holes, with an aggregate of 11,571′, had been drilled. This work continued throughout 1915 and 1916, the holes being rather widely scattered and no effort being made to define ore limits, so that estimates of tonnage are not yet possible. The orebodies on the Mohawk and Thistle claims have been considerably extended as a result of drilling during the year. An unusual feature is the prospecting of the Mangas valley where several holes passed through as much as 1,000′ of recent valley gravel before reaching bed rock.

In 1917, there were 52 holes drilled an average depth of 587′. Discoveries were satisfactory. The Azure Mining Co.'s ground, held under option, was also partly drilled, so far without encouraging results. To open the Thistle and Mohawk deposits, widely separated, considerable work was started for their extraction.

In 1918, drilling was done in 23 holes to an average depth of 489′. Nothing important was found. Although development decreased by 7,519′, reserves were increased by 235,000 tons. The cost of ore extraction was reduced by the better condition of stopes and to increased drawing from the broken ore reserves in shrinkage stopes. The caving system is employed successfully.

The old concentrator, built.1905, and twice remodeled, has been dismantled. A standard-gauge 18-mile spur was built in 1913, at a cost of $350,000, from the main line of the Santa Fé railroad to the mine and mill. A central power plant equipped with four 1,000-h. p. Diesel engines, was built at Tyrone, near the collar of No. 2 shaft. Labor is almost exclusively Mexican, only the bosses being Americans. The concentrator at Tyrone, of daily capacity of 1,700 tons, with flotation equipment, went into operation April 12, 1916. It consists of two units and is 3 miles from the portal of the haulage tunnel. It is an all-steel concrete structure covering 500 sq. ft. There are 5 floors, all equipped with the Kahn ventilation system. With the two units, which can be later raised to four, the estimated cost of the plant was about $1,000,000. J. T. Hall is superintendent.

Production:

Year	Ore milled, tons	Copper, %	Concentrate, tons	Copper, %	Recovery, %	Copper lb.	Silver oz.
1918.....	585,083	1.928	53,146	14.875	70.232	15,188,619	43,150
1917.....	473,443	1.972	45,681	14.775	72.258	13,139,053	39,403
1916.....	253,782	2.117	26,362	13.937	68.390	7,510,674	20,763

Leaching of all old partly sulphatized dump ore was started early in 1917. During that year, 280,090 lb. of copper, equal to 25% of the original metal, was extracted, while in 1918, another 8.9% was extracted, making 33.9% in two years.

COPPER BASIN BRANCH

A. B. Peach, acting manager, Prescott, Arizona.

Property: the Copper Basin mine at Copper Basin and Snoozer gold mine near Prescott, Arizona. The past two years results may be tabulated as under:

Year	Development	Ore Shipped	Copper
1918.....	1,320 ft.	38,323 tons	1,907,205 lb.
1917.....	1,250 "	17,299 "	934,781 "

The ore was smelted at Clarkdale, Douglas, Humboldt, and Verde.

COPPER QUEEN BRANCH

Operating and works office: Douglas, Cochise Co., Ariz. **Mine office:** Bisbee, Ariz.

Officers: G. H. Dowell, mgr.; W. H. Webster, asst. mgr.; H. H. Stout, supt. of reduction works; P. B. Butler, asst. supt. of works; Arthur Notman, supt. of mines; G. B. Lyman, geologist.

The Copper Queen Consolidated Mining Co., retaining its charter, has changed its name to Phelps Dodge Corporation. Its properties in Bisbee and Douglas, Ariz. are now known as the Copper Queen Branch of that corporation.

The company was operated for many years as a close corporation, but is said to have paid from 1888 to 1907, inclusive, dividends aggregating $30,000,000 or more. Recent dividends: $3,000,000 in 1908; $4,025,00 in 1909; $6,300,000 in 1910; $5,200,000 in 1911; $5,707,351 in 1912; $5,700,000 in 1913; $4,500,000 in 1914; and $7.000,000 in 1915.

Property. comprises the Copper Queen and other mines at Bisbee, a large smelting plant at Douglas, on the Mexican border, 30 miles from the mines. Mineral lands in the Warren, or Bisbee district, comprise 176 patented claims, 2,298 acres.

The Copper Queen, one of the best known copper mines of the world, was opened 1880, on an outcrop of oxidized copper ore in massive limestone, opposite the Copper Queen hotel in Bisbee. The original orebody, now represented by a large cave, averaged 23% copper. The ore was smelted in a 30" water-jacket furnace, with English coke, brought via San Francisco. This orebody was exhausted in 3 or 4 years and the mine experienced many vicissitudes, until additional orebodies were developed, by following seams and stringers of ore leading to further large and rich deposits.

Geology: the ore-bearing formation of the Copper Queen and other mines of the Bisbee district, consists of thickly bedded limestone beds, dipping to the southward and cut by intrusive porphyritic dikes. Until 1902, the principal orebodies were found at the base of the carboniferous limestone beds, which are broken by igneous rocks, that evidently have a strong genetic bearing upon deposition. The ore deposits occur as pockets, lenses, chimneys, bunches, shoots, veins, stringers and seams, the larger bodies being connected, in most cases, by small veins, or mere knife-blade seams. The limestone and its included orebodies have a general gentle dip to the southeast, necessitating deeper shafts as distance is made toward the southeast. Extensive bodies of high-grade ore have been found, since 1902, in the deeper levels driven in the older limestones (Cambrian), and developments prove these underlying orebodies to be persistent to great depth. The oxidized part of the mines shows beautiful caves, lined with calcite crystals and stalactites and wonderfully fine crusts of azurite, malachite and cuprite; some of these caves are of considerable size. Many of the shafts are bottomed in sulphide ores of high-grade, but like the oxide orebodies, they are flat or have a gentle S. E. dip, and a thickness of 50 to 200′ or so. New orebodies are developed yearly and the ultimate lateral limits of payable ore are unknown.

In the Copper Queen mine, the majority of the ore has occurred in a zone encircling the west boundary of the porphyry intrusion of Sacramento hill. It has a width varying from 800 to 1,200′, and a thickness of about 400′. It reaches the surface in the older part of the mine to the N. W., but dips to the S. E., where it is reached at 1,400′ below the Czar collar, in its farthest extension at present developed on Copper Queen ground. There is one major extension from the N. W. end of the zone toward the west along the Czar fault, and others of minor importance.

Individual orebodies are scattered through the zone in an eccentric manner, only matched by their own irregularities of form and size. Their most general characteristics are the softness of the ore and their great horizontal rather than vertical extent. It has been estimated that the average vertical thickness of ore in the Czar and Lowell divisions is between 30 and 35′. It is calculated by assuming it to be uniformly distributed over its horizontally projected area.

In this zone, and for some distance above it, the ground has been subjected to intense alteration and intense but irregular oxidation. It has resulted in an enormous quantity of earthy or clayey material, which may be either ore or waste, which, when wet, is both heavy and tenacious. Below alteration, the ground is fairly hard, and the limestones contain primary ores differing from those heretofore considered typical of the camp, and which have not yet been thoroughly exploited.

Development: the Copper Queen mine has 7 shafts, all connected on the even numbered levels. The entire output is concentrated at and hoisted from the 1,700′ Sacramento shaft. The mines are opened ahead for several years, development averaging about 1 mile monthly of new workings, or at the rate of

1 linear foot of new work for 10 tons of ore extracted, which figure is prov by past experience to maintain practically constant ore reserves, while avoidi excessive advance openings that require useless maintenance cost. The stop are filled throughout and the mines are timbered with square sets, mainly Was ington fir, an average of 30′ in timber, board measure, being required for ea ton of ore won in the oxidized zone.

The underground haulage plant is very extensive, with 21 miles of track covering every second level from the 4th to the 16th, inclusive, ore from t intermediate levels being dropped through chutes, and all ore hauled to t Sacramento shaft for hoisting. The haulage system includes electric locomotiv and side-dumping ore cars. Chutes have been installed throughout the mi for loading the cars, which discharge into large storage bins at the Sacramen shaft, through which all ore is hoisted. The system is fully described by Gera Sherman, supt., in Trans. A. I. M. E., Sept., 1915, p. 1837. In order to co plete the undergrounnd traction system, it was necessary to open many later drifts and crosscuts, which were located in solid ground, wherever possible. the electric tram lines are the arteries of the mine.

Great attention is paid to fire prevention and ventilation, these systems bei improved continually.

The Uncle Sam mine has an old shaft, and a new shaft, sunk in 1908, of 22 depth. This mine is connected with the Czar, Holbrook, and Sacramento shaft and has a large orebody, discovered 1913, that compares favorably with t bonanza deposits of the adjoining Shattuck mine.

The White Tail Deer mine lies across the range on the edge of the mes near Don Luis, being reached by wagon road through a detour of several mile It is being worked, developing a good grade of ore and may become an importa producer.

The 4-compartment Sacramento shaft, 1,700′ deep, concreted, handles t entire output of the mines. There are loading bins on the even-numbered leve from 400 to 1,600′, reached by the electric haulage lines from all other working of the mine. The shaft was sunk in rock for practically its entire depth, insurin as great a degree of immunity from drawing as is possible in this district. Th Sacramento shows some rich ore, discovered 1913, on the 1,500′ level near th Hoatson claim line. Exploratory work, in the porphyry stock of Sacrament Hill, which is the geological keystone of the Bisbee ore deposits, has shown u a large tonnage of concentrating ore.

The hoist at the Sacramento is a powerful Nordberg tandem-compoun engine, having 7′ drums with 5′ face, operated by steam, with 6 auxiliary engines actuated by oil, under 150 lbs. pressure. Hoisting is done in 3-ton skips, and th hoist can raise a skip each minute, giving the shaft a capacity of fully 4,00 tons daily.

The Sacramento shaft has, perhaps, the most elaborate and ingenious syste for mixing and loading ores to be found at any copper mine. This is full described by Sherman in the paper already noted. The ventilation of the whol property with its 6 downcast and one upcast (Lowell) shafts is well describe by Chas. A. Mitke, in Bull. A. I. M. E., Sept., 1915, p. 1941.

The central power plant near the Sacramento shaft, includes a boiler house having four 400-h. p. Stirling water-tube boilers, furnishing steam direct to th hoists at the nearby Sacramento and Gardner shafts, the hoists at the othe shafts being operated by compressed air. Equipment of the engine house include three 500-k. w. turbo-generators, 3 air compressors, of about 100 drills aggre gate capacity, a 70-drill Nordberg air compressor, the largest in the Southwest and a 7,000 cu. ft. Nordberg compressor. Fuel is Texas and California petroleum with large tanks for oil storage. All of the shafts, and the principal mine build ings, are reached by spurs of the El Paso & Southwestern railway.

New Mine: during the past few years, churn drilling has developed in Sacramento hill, a large tonnage of concentrating ore known as the East and West orebodies, containing respectively, over 14,000,000 and 7,660,000 tons. The latter carries 2.2% copper. Removal of overburden commenced in Jan., 1917. There were 290,771 cu. yd. stripped in that year, and 1,099,660 cu. yd. in 1918. In mining the West orebody, 3,407,148 yd. of ore and 10,383,997 yd. of waste

must be moved. The West orebody, because of its nearness to the surface will be mined by steam-shovel. A 90-ton t st mill was built in 1914, the best saving being effected by combined gravity concentration and flotation methods. Tests, on a working scale demonstrated that 1.3% of copper will make ore, and it is probable that 1% material can be worked. Based on the results of this experimental work, a 3,000-ton concentrator will be built on the flat west of Douglas. Excavations were completed in 1918.

Geology: the ore is disseminated and lies in the intrusion of the porphyry between the Pinal schist on the north and the limestone on the south. There are two orebodies, separated by a strip of ore, too low-grade to be worked.

The following articles are available on the subject: Arthur Notman, on drilling, in Trans. A. I. M. E., Vol. 52, Sept., 1915; Courtenay De Kalb, Sacramento Hill disseminated copper deposit, 'Min. and Sci. Press,' April 20, 1918; and R. T. Banks, drilling, 'Eng. and Min. Jour.,' April 19, 1919.

New work in the mines, exclusive of Sacramento hill, was 80,853′ in 1916; 55,518′ in 1917, and 58,360′ in 1918. Reserves were increased, especially in the limestone mines.

Reduction Works

The Reduction Works, Douglas, Ariz., 28 miles from the mine and one-half mile from the Mexican border, treat 3,000 tons daily, handling the output of the Copper Queen mines, that of the Burro Mountain branch and that of the Moctezuma Copper Co., as well as doing a general custom-smelting business. The works occupy a site of 320 acres and are served by a very complete standard-gauge railroad system, reaching every building. The plant was blown in March, 1904, since which time there has been almost continuous enlargement, the works costing fully $4,000,000, smelting about 3,000 tons daily, there being no concentrator to eliminate part of the tonnage from the final furnace charges. The plant is described by J. Moore Samuel, in Bull. A. I. M. E., June, 1916, p. 1079, in a paper on dust losses.

Water for the works is secured from artesian wells, of about 300′ average depth, the water rising nearly to the surface, with 1 well, of about 1,000′ depth, flowing 200 gal. per minute. A large reservoir and cooling tower have been built in connection with the water supply.

The ore-bedding system consists of 5 pits, each 40x800′ in size, and 11′ deep, having an aggregate storage capacity of 90,000 tons. Ore, received from the mine in side-dumping steel cars, is discharged into the pits, which are lined with white tufa rock. The pits are filled with the different grades of ore required to constitute a normal furnace mixture, and the ores mixed by a mechanical plow. Ore is removed, as required by the furnaces, with steam shovels, running on permanent tracks laid upon the floor of the pits.

The blast-furnace building, 150x900′ in size, of steel frame, also covers the converter department. Three 60-ton traveling cranes, 60′ span, run the entire length of the building. There are ten 400-ton blast furnaces, each 44x240″ with forty 4″ tuyeres, and 16′ in height from the tuyeres to the charging floor. The 10 furnaces are set 15′ apart, in a single row, with a 10x20′ settler between each pair, the lower half lined with chrome brick and the upper half with ordinary brick. Ore is charged on either side, alternately, charging being done from trains of twenty 2,500-lb. cars, hauled by 13-ton electric locomotives. Slag flows from the settlers into 18-ton slag cars, hauled by electric locomotives. The slag dump is 1,700′ long, and is kept trim by a special leveling machine, operated by electric power. The blast-furnaces consume 350 to 400 tons of coke daily.

The dust chamber is of steel frame with brick and tile walls, roofed with reinforced concrete supported by steel trusses and has a bottom of tiled hoppers.

Molten matte is taken from the blast furnace to the converters by 60-ton electric traveling cranes, each having two 15-ton auxiliary hoists. The converter department has 7 stands, operated hydraulically, with 10 shells, of the Great Falls type, basic lined. Copper is poured in a Walker casting machine, and product is blister copper of about 99% tenor, with considerable gold and silver values. The converter plant has a flue, taking the gases from the 7 stands to a dust flue 11′ in diameter at the hoods and 13′ at the dust chamber.

The 260′ steel stack of the blast furnace building is 30′ in diameter at base and 25′ at the top.

The calcining and reverberatory plant is 100x850′ in size, of steel fra Ore is brought in over an elevated railway track on steel trestles, 400′ in len and dumped into concrete storage bins, and drawn, from the bins to the roast by belt conveyors. There are three 100′ reverberatory furnaces and sixt 75-ton McDougall calciners. A slag tunnel, 30′ wide, 15′ deep and 276′ lo has electric cars, connecting with the slag tracks. The tunnel is lined with concrete walls, with a 2′ separating wall in the center. The reverberatory f naces are next to the old building, succeeded by the slag tunnel, on top of wh there is a battery of four 400-h. p. water-tube boilers, followed by a dust cha ber; the McDougall roasters occupy the northern end of the building. T reverberatory department has a separate 300′ stack, of 22′ inside diameter, b of special hollow bricks, with walls 42″ thick at the bottom and 12″ at the t requiring 1,250,000 brick and standing on a base of 60′ diameter requiring 1, cu. yd. of concrete. A pulverizing plant, for making powdered coal for reverberatory was finished early in 1919.

The power house, of steel and brick, was enlarged to transmit elect energy 72 miles to El Tigre mine, in northern Mexico. The power plant about 20 units, of various sizes and types, aggregating more than 6,000 h. Equipment includes 4 Nordberg cross-compound blowing engines, each dire connected to a 400-k. w. 250-volt direct-current generator; Nos. 9 and 10 C nersville blowers, set staggering; a cross-compound 2-stage condensing compressor, with piston capacity of 2,000 cu. ft. of free air per minute, at lbs. pressure, for running the pneumatic tamping devices, operating chargi doors of the blast furnaces and pumping water; 3 triplex motor-driven pum delivering water into compression tanks, at 350 lbs. per square inch, with au matic regulation; four 400-k. w. 250-volt direct-current generators, supplyi power for cranes, slag locomotives and electric lights; two 750-k. w. turt generators and a number of minor engines and dynamos. The power plant equipped with a complete set of gauges and meters, keeping record of the dist bution of power to every department and sub-department.

The steel boiler house has six 500-h. p. and four 1,000′-h. p. Stirling wat tube boilers, with a Green fuel economizer, and a Foster superheater w capacity of 90,000 lb. of steam per hour. The stack of the boiler house is brick, 177′ high and 13′ in diameter at the base. Boilers are arranged to bu either coal or petroleum, but latter is used exclusively, consumption of C fornian and Texan petroleum, at the mine and works, amounting to about 50 gal. monthly. Oil for fuel is at present cheaper in first cost, easier and cle to handle, and effects a great saving in the wages of 3 daily shifts of stok formerly required at every boiler plant.

A limestone quarry, at Lee station, 7 miles east of Douglas, has a l crusher and storage bins, the smelter requiring 400 to 500 tons of limestone d for flux. A saw mill is operated, in the forests of the Chiricahua mounta though the bulk of the timber and lumber requirements of the mine and w are met by the importation from the Pacific coast.

Production:

Year	Tons Mined	Lb. Copper	Oz. Silver	Oz. Gold	Lb. L
1918.....	770,524	90,988,156	558,433	16,409	1,234
1917.....	800,585	93,618,409	828,665	19,156	6,870
1916.....	951,978	102,685,722	1,096,136	24,030	9,421
1915.....	783,211	88,551,180	943,368	18,974	9,388
1914.....	**732,829**	**86,066,143**	**1,036,672**	**15,769**	**8,889**
1913.....	867,481	97,181,725	919,138	16,213	5,701
1912.....	786,368	88,280,908	1,027,130	18,023	2,953
1911.....	619,132	74,489,728	1,227,453	16,895	5,658
1910.....	596,193	76,428,908	608,096	12,430	696
1909.....	.....	84,802,147	601,828	8,674	437
1908.....	.....	82,533,145	530,492	8,352	182
1907.....	.....	66,916,972	338,723	4,197	.....
1906.....	.....	79,536,416	332,723	7,573	.....

Smelter production, including custom ores:

Year	Ore treated, tons	Gold, oz	Silver, oz.	Copper, lb.
1918	1,311,742	32,709	2,307,307	192,063,212
1917	1,276,817	32,331	2,042,263	191,581,131
1916	1,304,523	32,832	1,794,854	171,893,880
1915	1,063,329	29,840	1,388,149	125,144,027
1914	835,016	26,259	1,405,301	119,957,017

There were employed 3,671 men in 1916; 3,773 in 1917, and 3,910 in 1918.

MOCTEZUMA COPPER CO

Mine office: Nacozari, Sonora, Mexico. J. S. Williams, Jr., gen. mgr.; H. T. Hamilton, asst. gen. mgr.; C. I. Schultz, gen. supt.

Inc. 1896, in West Virginia. **Cap.** $3,000,000; issued, $2,600,000. Is controlled through entire stock ownership by Phelps Dodge Corporation, and holds direct title to lands through Moctezuma Copper Co., S. A.

Inc. Feb. 4, 1896, in Mexico. **Cap.** 500,000 pesos. **Dividends:** were 77% or $2,262,000, 1902-07; none in 1908; $998,000 in 1909; $468,000 in 1910; $754,000 in 1911; $2,118,569 in 1912; $1,950,000 in 1913; $1,170,000 in 1914.

Property: about 2,500 acres of mineral land in the Moctezuma and Arizpe districts of Sonora, including the Pilares de Nacozari mine 6 mines east of Nacozari. Company also owns the Juarez and Nicolas ranches of about 35,000 acres, which carry considerable valuable timber. Examined in 1911 by J. M. Boutwell.

Geology: the Pilares mine lies in a high and precipitous country near the divide of the Yaqui and Oposura rivers. The ore deposit is an oval shaped brecciated mass of latite having a major axis of 2,000′ and a minor axis of 1,000′, formed by two parallel systems of faults, one coursing nearly N. and S. and the other nearly E. and W. The N. and S. faults dip about 80° to the east. There were two flows of latite; the first while cooling was interrupted by the second causing the partly cooled mass to break up into the bombs and fragments which are barren of mineral and which are cemented together by the second and mineral bearing flow. The latite gives way to andesite and this to monzonite with depth. A "caliche" dike from 4′ to 10′ wide runs through the entire west side of the mine. The ore occurs mainly on the border of the breccia "pipe," but lesser bodies are found inside it as well. The ore carries chalcopyrite with pyrite and some bornite, chalcocite and some covellite, the ore being mostly of concentrating grade, averaged about 3.39% copper as mined, in 1918. There is a "chimney" outcrop with carbonate ore, but croppings are mainly brown, a dull red-stained porphyry, carrying hematite. The leached zone is about 20′ in depth only, with payable ore coming in at depth of about 60′.

Geology and mining methods at the Pilares mine was discussed by W. R. Wade and Alfred Wandtke in Bull. 152 of the A. I. M. & M. E., Aug., 1919. They summarize by saying that the Pilares ore deposit is of the pyrite-chalcopyrite type, and occurs in latite and andesite breccias, perhaps of early Tertiary age. The ores are genetically related to monzonitic intrusives. Enrichment of commercial importance is confined to the upper 200′ of workings, but primary ore of excellent grade continues downward to the deepest workings.

In addition to the Pilares mine, the company owns a number of other properties that have been operated for several years past by lessees, including the Churunibabi, Bella Union, Fortuna, San Francisco, El Vaquero, El Promontorio (about exhausted), La Caridad, and San Pedro. The Bella Union has high-grade ore, including oxides and native copper, shipments assaying up to 39% in copper tenor, with small gold and silver values. The Churunibabi property, yielding $100,000 worth of silver ore to the lessees, from a rich gold-silver-copper orebody struck July, 1913, has been operated by the company for the past few years. During the year the main tunnel was driven 828′ to connect with the Estrella shaft.

Development at Pilares mine include 4 shafts; three 3-compartm main working shafts, the Guadalupe 918′; Pilares 1,200′ and Esperanza 1,3 deep. The Guadalupe shaft is an underground shaft running from the 500′ le to the 1,400′ level. The Pilares and the Esperanza shafts are on the extre ends of the ore body and run from the surface, 100′ level to the 1,300′ level. T new 5-compartment Pilares shaft is 400′ S. W. of the old one, and is down 7 fully equipped with electrically-driven hoist, compressors, etc., similar to t at the Esperanza.

The mile long Porvenir tunnel opens the deposit 600′ below surface; 25- narrow gauge railway cars run from Nacozari into the tunnel direct to mine ore chutes. The tunnel has storage bins in a 25x100′ chamber, to wh ore is milled down from the upper workings, no ore being hoisted, all ore broken being sent in chutes to the tunnel.

Two methods of ore extraction are employed, the room-and-pillar w waste filling as work progresses, and shrinkage stoping with waste filling af all the ore has been extracted.

The mine has some enormous stopes, the 646 stope is 60′ wide by 600′ lo The ground stands very well and the systems of extraction used give minim timber requirements at a cost of only a few cents per tons of ore mined. water is hoisted above the Porvenir tunnel level and very little water is rais from the workings below. The mine is well ventilated and is equipped w electric lights.

New work in the mines totaled 23,252′ in 1916; 33,823′ in 1917, and 33,8 in 1918. The outside properties were operated as usual, but results have be irregular in the Caridad, Churunibabi and Promontorio.

Ore reserves in the Pilares deposit were estimated Jan. 1, 1916, as 3,220,0 tons; for Jan. 1, 1917, a decrease was reported due to inadequacy of hoisti facilities on lower levels. Such exploration as has been done the manageme reported as having been distinctly encouraging and much ore encountere especially during 1918, when reserves were increased.

Equipment: includes electric hoists, two 25-drill air compressors, a two blacksmith shops, one at Pilares and one at Esperanza. There is emergency steam plant at the mine having 2 boilers held in reserve in case accident, but electricity is used throughout.

The power plant, at Nacozari, built in 1908, has 435-h. p. Stirling wat tube boilers, equipped with Green fuel economizers, Foster super-heaters a Rooney stokers (burning New Mexican coal), and a 196′ reinforced concre stack. The plant has three 1,000-k. w. Curtis turbo-generators giving a 6,6 volt current, and an auxiliary 50-k. w. steam turbo-generator set is used as exciter. Current is transmitted at 6,600 volts to the mine and mill and at mine is stepped down to 230 volts for the pumps, while the hoists and ele locomotives use a 250-volt direct current. Two 5-cylinder Nordberg-Ca Diesel engines were to be installed in 1919.

The mine is connected with the mill by a 6-mile 30″ gauge railway. Rol stock includes four 60-ton locomotives and twenty 30-ton Ingoldsby steel s dumping cars.

The 2,000-ton concentrator, designed and built by H. Kenyon Burch, a cost of about $1,000,000, is one of the most complete and efficient in existe The crushing plant receives ore from the mine in 6,000-ton bins, whence i fed by 2 automatic ore feeders, of special design, to grizzlies, with bars set 2 apart, oversize, going to a No. 8 gyratory crusher, and undersize to a b conveyor, meeting material from the crusher, and going by belt conveyor to 4x10″ manganese trommels, with 1½″ perforations. Undersize from the tr mels goes to belt conveyors and oversize from the trommel goes to N gyratory crushers, breaking the material to 1″ cubes, which joins the mat from the trommels and is sent by belt conveyors to 4,000-ton storage bins.

Each 1,000-ton unit of the mill is equipped with 6 coarse and 12 fine jig sets of rolls, Swain classifiers, Callow screens, 44 Wilfley tables and 72 John vanners. From the storage bins the ore is fed by a portable ore feeder to a conveyor, passing over an automatic weighing machine and sampler, deliver it to an 18-mm. trommel. This trommel screens the ore, the coarse pieces going

bull jigs and undersize to 11-mm. trommels; the latter feed oversize to coarse jigs and undersize to 7-mm. trommels. These trommels in turn feed oversize to intermediate jigs and undersize to 4-mm. trommels, whose oversize goes in its turn to 2-mm. trommels; oversize from latter goes to fine jigs. The undersize from the 2-mm. trommels goes to 22-mesh Callow screens and thence to Wilfley tables handling oversize and undersize.

Slimes from the Wilfleys go to the vanner settling tanks and middlings from the Wilfleys go to the Chilean mills by elevators. Tailings from the bull jigs, coarse jigs and intermediate jigs go to either of 3 sets of 42x16" rolls, then by elevator to the mixing-box at the head of the trommels. Tailings from the fine jigs go to dewatering machines, and overflow from dewatering machines goes to vanner settling tanks, dewatered material going to the jig tailings bin and thence to Chilean mills, crushing to pass a 2½-mm. screen and thence to Callow screens of 22-mesh. Product is a concentrate of about 12% copper tenor, about 85% of the assay value being saved.

Re-grinding, flotation, and filtering machines were first installed during 1916, and have been added to each year since, a large pneumatic unit being erected in 1919. Flotation has improved the recovery.

An aerial tramway carries tailings from the concentrator to a dump on the hillside, far above the river level.

Water is pumped from a well sunk at the side of the river by 1 triplex and 3 Worthington pumps, of 500 gal. capacity per minute, to 500,000-gal. tanks at the mill. Wash water from the concentrates is settled and re-used. A large dam 3 miles east of Nacozari, 90' in height, stores water sufficient for 2 years steady operation of the mill.

The company built and owns the town of Nacozari, and a town at the Pilares mine. At Nacozari the company maintains both English and Spanish schools for the children of employees, a well-equipped hospital, free library, and amusement hall.

Production:

Year	Milled, tons	Copper, %	Concen. tons	Rec. %	Copper, lb.	Gold, oz.	Silver, oz.	Moly-denum, lb.
1918.....	762,089	3.392	173,128	85.575	42,875,355	11,103	923,922	7,024
1917.....	750,897	3.179	156,067	81.190	38,186,451	2,677	511,738	35,630
1916.....	715,070	3.273	143,939	80.500	37,709,310	1,310	471,867	6,162
1915.....	.....	.....	.....	.....	22,889,885	599	331,836	.....
1914.....	.....	.....	.....	.....	29,591,658	1,006	435,482	.....
1913.....	.....	.....	.....	.....	36,598,132	.....	.....	.....

Forces normally are 1,300 men at the mine and mill, of which the great majority are Mexicans, with a few Japanese, no American labor being employed at the mine aside from shift-bosses and timbermen. Mining has been done under contract at 7 to 11 pesos per foot, and the larger part of the tramming is done by contract also, the mine proper employing about 200 miners, 300 muckers, 80 carmen and 75 contractors.

The Moctezuma is one of the world's really great copper mines and the management is of the best.

MORENCI BRANCH

(formerly known as Detroit Copper Co.)

Mine and works office: Morenci, Arizona.

Officers: J. P. Hodgson, mgr.; W. M. Saben, asst. mgr.; F. W. McLean, mine supt.; G. E. Hunt, mill supt.; V. P. Hastings, smelter supt.; J. A. McDougall, power supt.; G. M. Robinson, chief engineer.

Property: is extensive, including the Ryerson, Arizona Central, Copper Mountain, Yankee, W. Yankee, Montezuma and Santa Rosa mines, at and near Morenci.

Geology: The mines of this company work varied types of copper deposits, all dependent upon and co-extensive with a big intrusive body of quartz

porphyry and its dikes. The ores are chalcocite, chalcopyrite and pyrite w various oxidized products occurring either in altered limestones, or as fissu veins in the impregnated rocks adjacent to them, or in large masses of alter impregnated, shattered porphyry. The geologic relations are fully treated in monograph by Waldemar Lindgren, Prof. Paper 43, U. S. Geo. Surv.: see al Weed, "Copper Mines of the World," page 287.

Ores are mainly sulphide with slight gold-silver values and high silica a alumina contents. The oxidized and limestone ores are still produced in sm quantities, but 98.8% of the ores mined consists of small particles of chalcoci associated with chalcopyrite and pyrite, in a leached and whitened, decompos porphyry, averaging 2.39% copper. The high-grade ore from fissure vei carries 6 to 18% copper.

Development: is very extensive, with numerous shafts and long cros country connections. The workings have thus far been shallow, 400′ being f many years the greatest depth. In 1912, development on the 600 and 700′ leve of the Yankee mine, north of the Yankee fault, opened 194,939 tons of 2.36 ore and similar deep exploration in the Arizona Central mine upset previo ideas that ores would not go deeper. Total amount of development work 1914 was 26,375′; in 1915, 14,709′; in 1916, 20,513′; while abnormal conditions 1917 and 1918 prevented much being accomplished.

About 90% of the output is now mined by the slicing system, costing abo 21% of the square set and fill cost, which is necessarily still used in some par of the mine. Block caving is still cheaper, uses but little timber, and costs b 54.8% of the square set and fill method, but like the gopher and fill metho which is slightly cheaper, can only be used where favorable conditions prevail.

The New England mine has 2 shafts, deepest 750′, and a 2,000′ tunnel. Th Clifton mine has 7 shafts, of 70 to 315′ depth, with tunnels of 220′, 450′, 700 800′, 1,000′ and 1,700′.

The Copper King mine is as yet but slightly developed, but has been claime to show 40,000 tons of ore. An aerial tram from the Copper King mine w completed in 1909.

Of the 465,807 tons mined in 1918, the Ryerson contributed 43%; the Yanke 20%; the Copper Mountain, 11%, and the Arizona Central, 20%.

Equipment: includes power house, of steel frame on concrete founda tions, with one steam-driven blowing engine, 9,000 cu. ft. per min., one ga driven blowing engine, 6,000 cu. ft. per min., one motor-driven No. 10 Co nersville blower and one No. 9 Connersville blower driven by a 200-h. p. ga engine, two steam-driven air compressors, one of 4,000 cu. ft. capacity, the othe of 1,300 cu. ft., one 600-k. w. turbo generator delivering 2,300 v., 2-phase, 60-cycl current, four 250-k. w. and one 100-k. w. belted generators driven by gas engine delivering 230 v., 2 phase, 60-cycle current, running in parallel with turbo gen erators through transformers.

Recent additions to the power-plant were three 1,000-h. p. Diesel engine direct connected to generators, and one 3,700 cu. ft. Diesel air compressor.

The concentrator, designed by H. Kenyon Burch, has proved remarkabl successful, running 95% of the time. It consists of two 650-ton units, is 166x24 in size, and cost about $1,000,000. Equipment includes Chilian mills, 6 sets o 16x42″ rolls, 28 revolving screens, 80 Frue vanners, 40 Wilfley tables, and Deiste tables, the mill putting about 7 tons into 1.

A re-grinding and flotation plant was started in 1916, being enlarged i successive years. The mill power plant has 3 gas engines of 200-h. p. and 2 o 175-h. p. each, in conjunction with electric motors driven from the smelte power house. During 1918, the gas engine drive was changed to electric.

The concentrator uses about 500 gal. of new water per ton of ore treated, th balance being obtained by reclamation of water from the tailings in a series o concrete tanks with Dorr mechanism. The water is purchased from the Morenc Water Co., which has a pumping plant about 6 miles distant on Eagle river. Thi also supplies the town and practically all of the mines of the district. Tailing are conducted from a slag lined launder along the walls of Chase Creek canyo to a point below bunkers 14,000′ away where it is stored in impounding reservoir in the small cañons which empty into Morenci cañon.

The smelter has one 44x396" blast furnace, and 3 stands of small basic lined converters. Flue dust is mixed with concentrate residue before being re-charged into the furnace. About 70% of the total charge of new metal bearing material in 1918 was concentrates. The smelter has 2,000-ton ore bins, surmounted by a steel railroad trestle.

A 36" gauge railway connects the mines and smelters with the Arizona & New Mexico railroad, at Guthrie. A tunnel through Longfellow hill, completed 1909, gives direct rail connection with the mill.

The company operates an excellent hotel, and maintains a library and club room for its 1,200 employees.

Production:

Year	Tons Milled	% Copper	% Recovery	Tons Smelted	Copper, lb.
1918.....	449,990	1.91	76.22	154,216	17,130,209
1917.....	312,225	2.33	70.78	118,596	13,203,401
1916.....	451,395	2.39	71.25	140,938	17,541,258
1915.....	376,604	2.83	.....	.....	15,333,976

In Sept., 1919, it was announced that $2,500,000 was to be spent in new construction at the Detroit. This included a new 5-compartment shaft, hoist, tramming equipment, 2,000-ton mill, remodeling of the smelter, and extensive development work.

PHELPS DODGE MERCANTILE CO.

W. A. Meyer, gen. mgr., in charge of 644 employees. G. E. Crysler in charge at Tyrone, and C. H. Hyde at Morenci.

Production:

Year	Gross Sales	Merch. on Hand	Net Profit, %
1918.....	$10,408,913	$2,622,161	7.98
1917.....	9,789,639	2,123,820	8.42
1916.....	8,406,636	1,648,355	10.38

STAG CANON FUEL CO.

W. D. Brennan, mgr.; J. B. Morrow, supt. of coke department. Employees, 1693 men.

Production:

Year	Coal mined, tons	Coke made, tons
1918.....	1,339,292	281,916
1917.....	1,406,079	306,455
1916.....	1,439,904	300,571

REPUBLIC IRON & STEEL CO.

Offices. 15 Exchange Place, Jersey City, N. J.; 17 Battery Place, New York; Youngstown, Ohio, and Birmingham, Ala.

Officers: J. A. Topping, chairman; T. J. Bray, pres.; H. L. Rownd and J. W. Deetrick, v. p's.; R. Jones, Jr., sec.; H. M. Hurd, treas.; F. J. Webb, mgr. of the northern, and C. T. Fairbairn, mgr. of southern divisions; L .L. Wilcox, chief engineer.

Cap. $30,000,000 com., $25,000,000 pfd.; $100 par; $27,191,000 com. and $25,000,000 pfd. outstanding. Funded debt outstanding, $16,346,000 ten to thirty-year sinking fund mortgage gold 5s.

Dividends: 1¾% quarterly on pfd. and 1½% on com. stock.

Property: includes the following iron mines in Michigan, Minnesota and Alabama, which yielded a total of 1,693,450 tons in 1916; 1,706,555 tons in 1917, and 1,512,071 tons in 1918.

Mine	Range	Mine	Range
Cambria No. 1	Marquette, Mich.	Pettit	Mesabi, Minn
Cambria No. 2	" "	Schley	" "
Lillie	" "	Victoria	" "
Franklin	" "	Alfretta Group	Birmingham, Ala
Minckler	" "	Houston	" "
Sherwood	" "	Raimund Group	" "
Bray	Mesabi, Minn.	Spaulding	" "
Gordon	" "	Tannehill	" "
Kinney	" "		

Ore reserves are 43,740,121 tons in the northern mines and 68,928,936 tons in the southern group, a total of 112,669,057 tons. Lands in Wisconsin, near Hurley, have been under investigation by drilling and shafts.

UNITED COPPER CO.

Dead. Fully described Vol. XI, Copper Handbook.

The preferred stockholders' protective committee of the United Copper Co. stated Aug., 1915, that it had been unable to obtain any offer from the holders of the company's pledged assets which justifies the committee in continuing its efforts either to formulate a reorganization plan or redeem the pledged assets; that $750,000 would have to be provided to redeem assets, which would require a cash assessment of about $20 per share, which it is believed could not be raised under existing conditions. Committee also stated that it had considered possibility of instituting proceedings to recover wasted assets, but decided that there were no reasonable prospects of obtaining substantial results in such proceedings. Preferred stockholders were notified that stock deposited with the committee would be returned on presentation of certificates of deposit to the Central Trust Co. of New York.

Explanation is yet to be made as to what became of the cash and assets of the United Copper Co. treasury, both before and after the Assets Realization Co. became entangled with it. Reported in April, 1918, that the receivers had abandoned the search for a trace of the $10,500,000 received from sale of its property to the Red Metal M. Co., which was later absorbed by the Anaconda Copper M. Co.

UNITED MINES CO.

Address: C. J. Walker, Boatmen's Bank Bldg., St. Louis, Mo.

Officers: C. J. Walker, pres.; Jesse F. McDonald, 1st v. p.; J. C. C. Waldeck, 2nd v. p.; E. T. Cash, sec.; H. W. Mann, treas., with T. T. Nardin, directors.

Inc. Aug. 23, 1919, in Delaware. **Cap.** 115,000 pfd. shares, $10 par, and 235,000 com. shares of no par value, of which 15,000 and 35,000 respectively, have been issued. No public offering is to be made.

President advises us, company represents "the efforts of a group of men that is mainly interested in the Down Town Mines Co. at Leadville, Colorado, to find something worth-while in the way of metal mines, on which effort considerable work has been done with fair promise of satisfactory results."

U. S. SMELTING, REFINING & MINING CO.

General office: 55 Congress St., Boston, Mass.. Corporate Office: 85 Exchange Place, Portland, Maine. New York office: 120 Broadway.

Officers: C. G. Rice, v. p.; S. J. Jennings, v. p. in charge of exploration and min. investment; D. S. Calland, v. p. and gen. mgr. of operations in Mexico: F. Y. Robertson, v. p. and mgr. of sales; N. W. Rice, 2nd v. p.; F. W. Batchelder, sec.-treas.; John Laurie, comptroller; A. P. Anderson, cons. min. eng.; C. F. Moore, cons. eng.

Directors: S. L. Bartlett, R. J. Edwards, J. J. Phelan, C. G. Rice, E. P. Brown, C. F. Brooker, B. P. Clark, C. A. Hight, S. J. Jennings, R. T. Paine, 2nd, E. P. Bayley, A. W. Preston, D. A. Ritchie, and S. W. Winslow, Jr., R. S. Bradley, J. J. Storrow, H. B. Endicott, E. V. R. Thayer, and D. G. Wing.

Executive committee: B. P. Clark, C. J. Rice, J. J. Storrow, D. C. Wing, and S. W. Winslow, Jr.

Operating officials. C. E. Allen, v. p. and gen. mgr. of Western operations; G. W. Metcalfe, eng.; D. D. Muir, Jr., mgr. of mines, Utah; A. P. Anderson, cons. min. eng.; C. F. Moore, cons. eng. G. W. Cushing, traffic eng.

Inc. Jan. 9, 1906, in Maine. **Cap.** $75,000,000; $50 par, in $37,500,000 of 7% pfd. cum. stock and $37,500,000 com. stock; 486,350 pfd. and 351,115 com. shares issued.

National Shawmut Bank, Boston, and Guaranty Trust Co., New York, registrars; Old Colony Trust Co., Boston, and Bankers Trust Co., New York, transfer agents. Annual meeting in May. Listed on Boston and New York Exchanges. Company had 9,499 pfd., and 2,634 com. stock holders at end of 1918.

Bonded debt: $12.000,000 six per cent convertible gold notes, dated Feb. 1. 1916, due same date in 1926, interest payable Feb. 1 and Aug. 1 of each year. First National Bank, Boston, trustee; First National Bank, Boston, and Guaranty Trust Co., New York, registrars. Principal and interest payable at first mentioned, and Hanover National Bank, New York.

The U. S. Metals Refining Co. was absorbed by the American Metal Co. in December, 1919.

Dividends: rate is 7% on preferred stock, payable quarterly (Jan., April, July, and Oct.), first dividend paid April 15, 1906. Dividends on common stock are given in the table below.

Year	%	Year	%	Year	%
1920	3	1914	3	1915	1½
1919	10½	1913	6	1909	4
1918	10	1912	5	1908	4
1917	10	1911	4	1907	6¼
1916	8½	1910	4	1906	None

Financial Statement:

Year	Net Earnings	Deprec. & Reserve	Previous Surplus	Pfd. Dividend	Com. Dividend	Net Final Surplus
1918	$7,249,533	$2,474,443	$13,004,970	$1,702,225	$1,755,575	$14,322,260
1917	5,769,391	1,571,576	12,957,455	1,702,225	1,755,575	13,004,970
1916	9,737,664	2,839,200	8,253,455	1,702,225	1,492,239	12,957,455
1915	7,579,184	986,859	.....	1,702,225	.....	.....
1914	2,932,519	666,878	.....	1,702,222	.....	.....
1913	4,555,122	969,536	.....	1,702,145	.....	.....
1912	5,497,965	1,265,000	.....	1,702,120	.....	.....
1911	3,961,103	1,120,690	.....	1,702,120	.....	.....
1910	3,551,387	1,067,069	.....	1,701,701	.....	.....
1909	3,956,608	810,248	.....	1,700,963	.....	.....
1908	3,359,222	311,632	.....	1,700,801	.....	.....

Net earnings for 1919 were estimated at $9,410,000.

Comparison of current assets and liabilities of all companies:

ASSETS

Year	Cash	Notes and Accts. Rec.	Metals, Ores Supplies, Etc.	Total
1918	$2,045,948	$3,100,533	$13,329,710	$18,476,191
1917	1,641,126	2,967,837	12,884,424	17,493,387
1916	5,105,678	3,794,475	10,852,098	19,752,251

LIABILITIES

Year	Notes Payable	Accounts, Drafts Payable	General Reserves	Dividends Payable	Total
1918	$1,470,000	$2,091,145	$3,568,746	$864,450	$7,995,341
1917	900,000	3,125,765	3,897,828	864,450	8,788,043
1916	5,000	2,609,648	3,116,301	864,450	6,595,399

Production: ore from all properties, including Mexico, was as under.

Year	Tons	Value of Metal Contents Copper, %	Lead, %	Zinc, %	Silver, %	Gold, %
1918.....	1,220,722	10	10	7	61	12
1917.....	1,129,678	28	10	13	39	10
1916.....	1,022,306	39	8	15	28	10

Year	Zinc, lb.	Copper, lb.	Lead, lb.	Silver, oz.	Gold, oz.
1918.....	18,771,684	20,359,378	96,567,485	15,337,465	137,315
1917.....	53,590,446	29,043,242	107,519,570	13,000,187	109,612
1916.....	64,584,001	28,888,093	103,855,451	11,647,205	129,273
1915.....	34,105,471	26,923,674	87,102,179	12,071,863	196,481
1914.....	.....	17,946,659	64,443,260	9,936,237	124,719
1913.....	.....	20,239,973	58,116,504	13,089,708	148,372
1912.....	.....	21,152,620	56,385,769	12,059,829	140,183
1911.....	.....	22,199,141	49,022,791	10,285,150	118,703
1910.....	.....	28,430,423	51,450,985	10,776,465	113,246
1909.....	.....	36,672,605	41,627,995	9,637,119	128,393
1908.....	.....	32,803,603	27,304,347	8,340,566	128,208

Average prices received:

Year	Copper, cents per lb.	Lead, cents per lb.	Silver, cents per oz.	Zinc, cents per lb.
1918.....	25.273	7.424	97.081	8.289
1917.....	27.201	8.558	81.765	9.353
1916.....	27.297	6.676	65.386	12.327
1915.....	18.183	4.546	49.965	14.964
1914.....	13.404	3.827	55.564	.....
1913.....	15.433	4.396	60.503	.....
1912.....	16.237	4.529	61.291	.....

The United States Smelting, Refining & Mining Co. owns and operates the following:

Properties covering a large number of patented and unpatented claims near Bingham, Utah, J. F. Barnard, supt., Bingham mines. These are in one block, and produce lead, silver, copper, gold, and zinc ores. They are connected by means of the Niagara tunnel with the Garfield-Bingham railway, which permits of the delivery of the ore produced to any of the smelters in Utah. These mines have been operated since 1899 under the present control, and since about 1870 by earlier ownership. In 1918, they produced 177,921 tons of ore of an average net value of $8.292 per ton at the mine, at mining cost of $5.424 per ton. Owing to the fact that the ore bodies occur in limestone, which economically precludes the blocking out of large reserves, only from two to three years of ore are in sight, but the unexplored territory is large and the probability of continuing the finding of valuable orebodies for a long period of time is good.

A lime quarry at Topliff, Utah, which produced 136,836 tons during 1918.

Lead smelter and a lead and zinc concentrating mill at Midvale, Utah. L. D. Anderson, chief engr.; Ambrose Nord, cashier, Salt Lake City. These plants are situated on a area of 235 acres, and are connected with the Denver & Rio Grande and the Oregon Short Line systems. The smelter and mill not only treat the ores produced from the company's own mines, but purchase ores on the open market and by contract in all the inter-mountain States, thus making of this unit a permanent custom lead smelter and concentrator.

The smelter has 7 blast-furnaces and has a capacity of 481,800 tons of charge per year. It is equipped with the most modern type of blast and roasting furnaces and charging apparatus, and a system of baghouses to filter the smelter fumes. The primary object of the baghouses was to prevent the smoke becoming a nuisance, but their installation has permitted the company to recover as by-products arsenic and cadmium on a profitable scale.

The concentrating mill has a capacity of 210,000 tons of ore per year. It produces lead concentrates containing gold and silver, which is reduced in the

adjoining lead smelter, and a zinc-iron middlings product. This latter is separated in the dry mill by means of the Huff electrostatic process into a zinc concentrate and an iron-silver-gold concentrate. The latter is smelted at Midvale; the former is under contract to a zinc smelter. By means of this concentrating plant, complex ores, which formerly could not be profitably handled, are now treated so as to yield a profit both to the mine and smelter.

A number of patent and unpatented claims and 85 acres of agricultural ground for water-rights at Eureka, Utah. The geology of the district has been fully described by the U. S. Geological Survey. The deposit consists essentially of a replacement in limestone, the ore-shoots making along north and south and also northwest and southeast fracture-zones. The ore produced from them can be delivered either to the Denver & Rio Grande or to the Salt Lake Route. The claims have been worked since the year 1887 and have produced a great quantity of high-grade ore. The recent developments have shown an ore of much lower grade, and although the possibilities of finding much ore, especially below water-level, have not been exhausted; these mines are no longer depended upon as a large source of ore supply for the Midvale smelter. During 1918, the Centennial-Eureka produced 29,559 tons of ore of an average net value of $16.97 per ton, at a cost of $8.65 per ton. This was 60% of the quantity for 1917. It has a shaft 2,300 ft. deep, with levels at approximately 100-ft. intervals. It is equipped with hoisting engine and compressor plant sufficient for a production of 120,000 tons per year. All this equipment is kept in first-class condition. A. P. Mayberry, supt. Centennial Eureka mine.

In Shasta county, California, is the company's Mammoth mine, one of the most important in the State, but its end is not far off as reserves are only about 115,000 tons. R. E. Hanley, gen. supt. Mammoth mines.

A copper smelter at Kennett, California. O. J. Egleston, mgr. Mammoth plant. It has five furnaces, three of which are in operation, and has a capacity of 450,000 tons of charge per year. From 1905 to 1919 it treated 3,420,410 tons of ore. The smelter is equipped with a converter plant from which the blister copper is shipped to the refinery of the U. S. Metals Refining Co. at Chrome, N. J. Besides the usual auxiliaries, the smelter is supplied with a large baghouse, the purpose of which is to render the emissions of the smelter harmless to agricultural interests. By reason of this baghouse, it is the only one of the smelters in Shasta county which is permitted to operate, such permission having been obtained by a decree of the Federal Court. The smelter treated the whole output of the operating mines, and is easily reached from any part of the mining territory in Shasta county which the company is exploring. The smelter is also treating custom copper ores originating in northern California, and silicious ore from California, Nevada, and Oregon. There are frequently found in the Mammoth group of mines copper-bearing orebodies that carry a high percentage of zinc. The smelter is equipped with a sorting plant for these ores, which turns out a high-grade zinc product. The smelter is liberally equipped with a power-plant, machine-shop, boiler-shops, round-house, etc., to allow an uninterrupted and economical operation. During 1917, the quantity of ore reduced was 345,990 tons, 164,540 tons coming from the Mammoth mine; and in 1918, a total of 413,082 tons, the Mammoth supplying 77,695 tons.

A milling plant at Needles, San Bernardino county, California. This is a concentrating plant of 125 tons daily capacity, equipped with crushers, jigs, tables, and a flotation plant, the latter for the recovery of zinc from tailings.

A number of patented claims and water-rights at Goldroad, Arizona, held by the Gold Roads Co. D. R. Muir, mgr. Gold Road and Needles properties. The ore is a gold-bearing quartz, occurring in a fissure vein, which strikes easterly and westerly. The claims cover 1¼ miles along the vein. The record of production prior to its purchase by this company in 1912 was a good one, the stoping operations having been carried down to the 500-ft. level. On taking control the U. S. Co. extended development on the strike of the vein and also down to the 900-ft. level. The assay-value of the ore diminished with depth compared with that previously mined, only a small percentage of the ore found on the 800-ft. level being of pay grade, though the vein continues strong and persists.

The mine is worked through two shafts; one reaching 800 and the other 900-ft. level, equipped with cages and skips. The precious metals are recovered by cyanide process in a mill of 300 tons daily capacity, located within a few hundred feet of the mine. The property is fully supplied with power house, air-compressor, shops, warehouse, dwellings and other accessories required by the operation. The motive power at the Gold Road mine is electricity, purchased from a power plant at Kingman, Arizona. Little work was done in 1917 and none in 1918, save that part of the mill was leased.

Zinc mines and mills in Kansas and Oklahoma. The zinc smelter at Checotah, Okla., uses natural gas as fuel, and is equipped to treat both carbonate and sulphide ore containing precious metals.

Niagara Mining Co.

G. W. Heintz, gen. mgr.; C. E. Ellen, mgr.

Inc. in Maine. **Cap.** 1,000,000 shares, $1 par, 650,005 shares issued. Of these, the U. S. S. R. & M. Co. owns 572,605 shares; of the balance, 38,498 are held by other shareholders, and 38,902 are held in the treasury of the Niagara Mining Co.

Property: company owns several patented and unpatented mining claims adjoining the mines of the U. S. S. R. & M. Co. at Bingham, Utah. The property is being worked through the Niagara tunnel, which connects at its portal with the Bingham & Garfield Railroad for delivery of ores to the Salt Lake Valley smelters. The property is now being developed to connect the known orebodies with the Niagara tunnel haulage-system, and is prospecting for new orebodies in hitherto undeveloped areas. The property is fully equipped for mining operations.

Bullion-Beck and Champion Mining Co.

Inc. in Utah. **Cap.**, 100,000 shares, $10 par, 63,787 issued; 54,824 shares being owned by the U. S. S. R. & M. Co. Lessees are doing most of the work. Production in 1917 was 5,700, and in 1918, 2,072 tons.

United States Fuel Co.

S. J. Jennings, pres.; Moroni Heiner, v. p.; R. M. Magraw, gen. supt.; E. R. Gibson, auditor.

A Utah corporation.

Capital, $10,000,000, of which $3,000,000 is pfd., par $1, and $7,000,000 com., par $10; 2,355,690 pfd. and 700,000 com. issued.

Bonds: This company has outstanding $3,636,300 first and refunding 6% bonds, of which $3,424,800 are owned by the U. S. S. R. & M. Co.

The U. S. S. R. & M. Co. owns 1,359,619¼ pfd. shares, and 700,000 com. shares.

The U. S. Fuel Co. has acquired the properties of the Castle Valley Coal Co., Black Hawk Coal Co., Consolidated Fuel Co., Panther Coal Co., and has assumed the joint first mortgage bonds of the Consolidated Fuel Co. and Southern Utah Railroad Co., par value $303,000.

The U. S. Fuel Co. also owns all the outstanding capital of the following companies:

	Shares.
Utah Coal Sales Agency	7,500
Mohrland Mercantile Co	18,000
Southern Utah Railroad Co	749
Castle Valley R. R. Co	10,000
Price Reservoir & Irrigation Co	20,000

The Utah Coal Sales Agency owns all the outstanding capital of the Western Fuel Co—361 shares.

By acquisition of the above properties, the U. S. Fuel Co. owns and controls four coal mines, each equipped with haulage system and separate tipples. The joint output of these mines in 1918 was 1,272,081 tons.

United States Stores Co.

J. H. Horlick, mgr.; R. T. Walker, mgr. of Ore Purchasing Dept. at Salt Lake City.

Is the purchasing department of the U. S. S. R. & M. Co., organized under the laws of the State of Utah. Authorized capital of 500 shares; all issued and owned by the U. S. S. R. & M. Co.

Utah Railway Co.

G. W. Heintz, pres.; G. S. Anderson, v. p. and gen. mgr.

A corporation organized under the laws of the State of Utah.

The funded debt of Utah Railway Co. is $4,500,000 in 5% gold coupon notes, maturing April 1, 1922, all of which are owned by the U. S. S. R. & M. Co.

Cap., 35,000 shares, $100 par; 30,652 issued and owned by the U. S. S. R. & M. Co.

Property: company owns and operates 45.56 miles of track, and has trackage rights over 52 miles of road (double track entire distance) of the Denver & Rio Grande company, between Thistle, Utah, and Utah Railway Junction, Utah, aggregating 98.56 miles of road operated exclusive of other trackage rights, yard tracks, and sidings. All the coal produced by the U. S. Fuel Co. and other mines along the road is hauled by the company which is fully equipped with the latest type of engines and coal cars.

Carbon-Emery Stores Co.

A corporation organized under the laws of the State of Utah. Authorized capital, 30,000 shares, par value $5, of which 27,000 shares are issued and owned by the U. S. S. R. & M. Co.

San Pete Valley Coal Co.

A corporation organized under the laws of the State of Utah. Authorized capital, 2,000 shares, par value $10, of which 1,877 shares are owned by the U. S. S. R. & M. Co.

Richmond-Eureka Mining Co.

G. W. Heintz, gen. mgr.; C. E. Allen, mgr.

Inc. in Maine. Cap., 360,000 shares, $10 par, 309,397½ issued, 182,213 of which are owned by the U. S. S. R. & M. Co.

Property: several patented and unpatented claims situated at Eureka, Nevada. The geology of the district, and of the deposit is fully described in a monograph of the U. S. Geological Survey. Mining began in 1869, and continued with minor interruptions up to 1910. In February of that year the Eureka & Palisade Railway, which connects the mine with the Southern Pacific and also Western Pacific Railway at Palisade, was washed away. When the railway was repaired, the high freight demanded made the ore, all of it low-grade, unprofitable. Regular mining operations have not yet been resumed. A little speiss has been shipped from the dumps to the U. S. S. R. & M. Co.'s plants for experimental treatment.

The mine is equipped with hoists, pumps, and compressors, shafts, and drifts. It has never been prospected below the water-level and there remains a large section of ground above that level also unexplored. Whenever the railway puts in a rate approximating the former one mining can be resumed, and the possibilities of the ground determined.

See this company in Nevada.

Sunnyside Mining & Milling Co.

Inc. in Maine. **Cap.**, 18,000 shares, $100 par, all issued, of which the U. S. S. R. & M. Co. owns 9,001 shares.

Property: Several patented and unpatented claims at Eureka, Colorado, at an elevation of 12,000'. Control was secured in 1917. The ore carries zinc, lead, silver, and gold. Reserves are estimated at 850,000 tons. Workings on 8 levels aggregate 12,000' of openings. A fire in 1919 destroyed part of the surface works, delaying production thereby. The mill is a 500-ton flotation plant.

See this company in Colorado.

United States Smelting, Refining & Mining Exploration Co.

Offices: 55 Congress St., Boston, Mass.; 120 Broadway, New York 920 Newhouse Bldg., Salt Lake City; 1504 Hobart Bldg., San Francisc California.

S. J. Jennings, v. p. in charge of exploration and mining investment; C. E Allen, v. p. and gen. mgr. of Western operations.

A corporation organized under the laws of the State of Maine. Authorize capital of 1,000 shares; $50 par value; 900 of which are issued and owned b the U. S. S. R. & M. Co. The Exploration Co. was formed for the purpose o developing new properties, which, when acquired, would be turned over to th U. S. S. R. & M. Co.

Some of the many properties examined and developed were the Ebner ir Alaska working on a small scale), Fryer Hill basin at Leadville (abandoned afte doing considerable work), Stowell copper claims in California, the Sunnyside in Colorado (put on a 500-ton daily output), Keystone claims in California (ore found by drilling), silver-lead property in Idaho, and options on ground in Mexico.

Compania De Real Del Monte Y Pachuca

S. M. Cancino, pres.; D. S. Calland, director.

A Mexican corporation with authorized capital of 2,554 shares, of which 2,535 shares are owned by the U. S. S. R. & M. Co. It operates a large number of claims in the districts of Pachuca and Real del Monte, State of Hidalgo, Mexico, producing gold and silver, and also owns large agricultural tracts. This company owns two cyanide plants, one of 1,000 tons daily capacity in the Real del Monte district, the other of 1,800 tons for the Pachuca district. About 20% of the total recovered metals are in the form of concentrates, which are shipped to custom smelters; the remainder, in the form of bullion, is exported. A third mill, for treatment of ore from the New vein, which contains large reserves of rich ore, is contemplated.

In Aug., 1919, the Santa Ana property, of 200 acres, in the extreme western part of the Pachuca district, was acquired. This gives a solid block of 300 acres in that area. The eastern section of Santa Ana contains part of the famous Viscaina vein. The mine has been producing silver ore for several years. A large body of rich ore is available. An aerial tram a mile long is being erected to carry to Santa Ana ore to the Loreto mill. See this company in Mexican mines.

United States Smelting, Refining & Mining is ably managed and in the hands of experienced, yet courageous, executive officials, so that an even more prosperous future is assured.

UNITED STATES STEEL CORPORATION

Through its subsidiaries this company controls about 140 iron mines in Alabama, Michigan, Minnesota, and Wisconsin. The most important are described under their respective titles. Recent production:

Year	Tons	Year	Tons	Year	Tons
1918.....	28,332,939	1917.....	31,781,769	1916.....	33,355,169

YUKON GOLD CO.

Controlled by the Yukon-Alaska Trust, Incorporated, 1916, to take over the residuary assets of the dissolved Guggenheim Exploration Co.

Office: 120 Broadway, New York.

Trustees: William Loeb, Jr., C. K. Lipman, Charles Earl, and R. W. Straus.

Officers: Wm. Loeb, Jr., pres.; C. K. Lipman, v. v.-sec.; C. H. Munro, acting cons. engr.-gen. mgr., with Daniel, Isaac, Morris, S. R. Guggenheim, E. L. Newhouse, F. R. Foraker, Charles Earl and O. B. Perry, directors; L. Fredrick, treas.; W. E. Bennett and C. E. Moran, asst. sec.; M. M. Van Keuren, comptroller; O. L. Myers, gen. aud.; F. R. Raiff, traffic mgr.; E. R. Reets, purch. agent; E. E. McCarthy, mgr. at Dawson, H. C. Perring, mgr. at Oroville.

Inc. Feb. 28, 1907, in Maine. **Cap.**, $25,000,000 reduced, Jan., 1915, to $17,500,000; $5 par; all issued; $14,213,125 stock owned by the Yukon Alaska Trust. Guaranty Trust Co., New York, registrar; D. A. Crockett, 120 Broadway, New York, transfer agent. Listed on New York and Boston Curb. Annual meeting 2nd Monday in January, at Augusta, Me.

The Guggenheim Exploration Co. had loaned the Yukon Gold Co. $5,000,000, at 5%, covered by 8 serial notes for $625,000 each, one of which was payable each year for 8 years, from Feb. 1, 1917. When the first note was due, re-payment was extended one year from the date of maturity of the last of the series of 8 notes. In 1917, it was calculated that earnings from the holdings would be insufficient to meet the notes and continue dividends. The second note became due on Feb. 1, 1918, but was extended to 1926. No. 3 note, due Feb. 1, 1919, was paid.

Dividends: 8% (40c. per share), quarterly from Sept., 1909, to Dec., 1911: 6% (30 cents) annually from April, 1912, to Dec. 31, 1917; and 1% (5 cents) in 1918. Payments were suspended in Sept., 1918, on account of abnormal conditions.

Comparative General Balance Sheet

ASSETS

Year	Property & Invest's	Equip.	Def'd Charges	Bullion & Cash	Other Current	Total
1918.....	$2,492,818*	$2,857,471*	$158,542	$1,392,282	$2,550,339	$9,451,453
1917.....	2,878,416*	3,323,752*	434,144	1,279,003	2,207,454	10,551,082
1916.....	12,311,019	8,312,943	501,094	2,046,748	1,735,985	24,907,780
1915.....	11,569,474	7,039,902	548,532	469,729	1,357,015	20,984,652
1914.....	11,524,181	7,036,424	600,066	195,283	1,509,654	20,856,608

*On basis of re-valuation.

LIABILITIES

Year	Capital Stock	Yukon-Alaska Trust	Current	Deprec.	Surplus	Total
1918.....	$17,500,000	$5,000,000	$195,877	$.....	$4,255,576*	$9,451,453
1917.....	17,500,000	5,000,000	244,985	.....	5,306,097	10,551,082
1916.....	17,500,000	5,000,000	189,614	1,567,822	650,344	24,907,780
1915.....	17,500,000	1,500,000	158,078	1,223,740	602,834	20,984,652
1914.....	17,500,000	1,675,000	134,729	987,995	567,884	20,856,608

*On basis of re-valuation.

Comparative Income Account:

Year	Net Operating Income	Royal-ties Paid	Amort-ization	Int. Ch's. Exp's, etc.	Total Deduct's	Surplus
1918.....	$325,455	$61,020	$.....	$218,536	$279,556	$45,898
1917.....	1,738,239	119,217	.....	245,876	365,094	1,373,146
1916.....	2,101,701	362,852	250,647	390,691	994,191	1,107,510
1915.....	2,121,031	542,241	248,037	245,803	1,036,081	1,084,950
1914.....	2,213,126	489,169	534,073	61,577	1,084,819	1,128,307

Property: includes 650 claims in the Klondike, Yukon Territory; 24 claims on Flat and Greenstone creeks, Iditarod district, Alaska; considerable areas on the American, Feather, Trinity, and Yuba rivers, and Butte creek, California; lease on property of the Coeur d' Alene Mining Co., Prichard creek, near Murray, Idaho; and the Long Hike, O. K. and Starlight lode claims, in the Jarbidge district, Elko county, Nev., the last three operated by the Elkoro Mines Co., which see.

The new properties acquired by purchase or lease contain gold estimated to be worth $8,000,000, of which the company's proportion will be $3,500,000.

The Idaho property, early in 1918, was reported to contain 10,600,000 cu. yd. of gravel and $1,530,000 in gold.

Heretofore Yukon Gold has confined its operations to placers, but the lode property in Nevada marks a departure from this policy.

Equipment: at Dawson, Yukon, 7 large dredges, 70 mile ditch, power plant, steam thawing apparatus and hydraulicking plant; on 5 rivers in California, one dredge on each; in Idaho, one 7½ cu. ft. dredge; and at Elkoro mines, Nev., 100-ton cyanide mill.

Production:

	1918			1917		
	Yards	Yield Cts.	Cost Cts.	Yards	Yield Cts.	Cost Cts.
Alaska (1 dredge)..	644,125	83.06	75.72	1,135,177	91.5 to $1.17	48.1 to 53.2
Klondike (5 dredges)	2,767,058	30.87	34.36	4,583,326	37.87	25.81
Klondike (sluicing)..	2,054,390	16.00	8.40	2,143,444	21.47	11.80
California (5 dredges)	4,444,404	7.00	6.00	6,161,941	8.40	3.71
Idaho (1 dredge)....	1,448,306	12.97	7.30	.....	.....	.....
Total quantity..	11,358,283			14,023,788		

	1916			1915		
	Yards	Yield Cts.	Cost Cts.	Yards	Yield Cts.	Cost Cts.
Alaska (2 dredges)..	1,222,428	86.7 to 95.6	80.6 to 39.8	926,956	91.30	38.70
Klondike (dredges)..	5,433,052	41.89	23.32	5,041,075	48.73	26.46
Klondike (sluicing)..	2,245,084	19.40	11.90	3,031,647	13.60	7.00
California (3 dredges)	4,032,476	10.27	3.94	3,818,127	11.46	4.51
Total quantity.	12,933,040			12,817,804		

The boats in Alaska have worked out their ground, and have been dismantled. Company's financial and technical direction is excellent.

ZINC CONCENTRATING CO.

Office: L. N. Godfrey, pres.; 60 Congress St., Boston, Mass.

Company controls the Campbell system of magnetic separation and the Dings magnetic separators used by the Linden Zinc Co. and the Wisconsin Zinc Co.

ALABAMA

ALABAMA COMPANY, THE **ALABAMA**

Office: H. W. Coffin, gen. mgr., Birmingham, Ala.

Inc. 1913 in Del. **Cap.,** $2,000,000 com.; $600,000, 7% cumulative 1st pfd.; $1,500,000, 7% non-cum. 2nd pfd.; par $100. Bonds $2,256,000, all issued.

Dividends: July, 1917, paid back dividends in full on 1st pfd. amounting to 21%. On 2nd pfd. initial 7% paid Dec., 1917. On common 1st dividend. Dec., 1917.

Property: includes 10,164 acres of iron orelands in Etowah, Talladega and Jefferson Counties, Ala.; and in Polk Co., Ga. Also owns 4 blast-furnaces, capacity 300,000 tons; coal mines and coke ovens in Alabama.

Ore: production for the last 4 years was. 135,398, 166,582, 257,958 and 336,135 tons, respectively.

CENTRAL ALABAMA C. & I. CO. **ALABAMA**

Office: Jenifer, Ala.

Reported, 1919, that company would rehabilitate the Jenifer iron furnace plant, erect hot blast stove and machine shop, install complete electrical equipment, add 50 coke ovens at coal mine, and build additional washery at brown ore mines near furnace. The Thomas Furnace Co. will probably operate the plant.

GULF STATES STEEL CO. **ALABAMA**

Offices: Brown-Marx Bldg., Birmingham, Ala.; 55 Cedar St., New York City.

Officers: James Bowron, pres.; N. Sanborn Smith, v. p.; C. A. Moffett, v. p.-gen. mgr.; A. R. Forsyth, v. p.-treas.; W. H. Moore, sec. Wm. H. Coverdale, cons. eng.

Inc. Nov. 1, 1913, in Del. as reorganization of Southern Iron & Steel Co. **Cap.,** common stock authorized $10,639,200; issued $8,139,200; 1st pfd. 7% cum., authorized, $3,000,000, issued $2,000,000; non-cum. 6% pfd., authorized $1,860,800, issued $860,800. Bonds $210,000.

Dividends: Feb., 1916, accumulated dividends of 15 1/6% paid on 1st pfd.; regular quarterly dividend of 1¾% paid since. On 2nd pfd. initial dividend of 1½% paid Aug., 1916, regular quarterly dividends since, also extra of 1½% paid Nov., 1916. On common, initial quarterly dividend paid Jan., 1917, continued regularly with extras. Common received a 25% stock dividend, June, 1918.

Property: owns and operates blast-furnaces, steel plants and rolling mills at Alabama City; red-ore mines 5 miles S. of Birmingham; 401 acres of limestone and 15,277 acres of coal land in Jefferson county; also coal lands near Bessemer, Ala.; by-product coke-ovens, etc.

REPUBLIC IRON & STEEL CO. **ALABAMA**

See same title in U. S. section.

TALLADEGA IRON CO. **ALABAMA**

Property reconstructed by Japanese capital. In May, 1918, the furnace was about ready for operation though it was reported that the U. S. Government had refused export license.

TENNESSEE COAL, IRON & RAILROAD CO. **ALABAMA**

Office: Brown-Marx Bldg., Birmingham, Ala.

Officers: G. C. Cramford, pres.; H. C. Ryding, v. p.-gen. mgr.; L. T. Beecher, sec.-treas.

Inc. 1860 in Tenn. as Tenn. Coal & Ry. Co.; name changed 1881. **Cap.,** com. $50,000,000; issued $32,528,698; and $108,200 8% cum.-pfd., par $100. The U. S. Steel Co. owns all but $66,092 of the common stock.

Property: Owns or controls coal mines and iron ore mines (in Birmingham district) and shipping plant, coke ovens, steel mills, etc., in the Ensley district, Ala. In 1918, the Chichran Shipbuilding Co. near Mobile, and the Fairfield Steel Co. were organized as subsidiary companies.

Production: not published, but is probably about 3,000,000 tons; this State yields 5,000,000 tons annually.

U. S. STEEL CORP'N **ALABAMA**

See same title in U. S. section.

WOODWARD IRON CO. **ALABAMA**

Office. Woodward, Ala.

Officers: A. H. Woodward, pres R. H. Banister, v. p.; D. E. Wilson, treas.; H. E. Smith, sec.

Inc. Nov., 1911, in Del. **Cap.** $10,000,000 com. and $3,000,000 6% cum. pfd.; par $100; all issued.

Property: owns and operates 5 blast furnaces with annual capacity about 450,000 tons of pig iron, by-product coke ovens and coal and iron mines near Birmingham, on one of which the E. J. Longyear Co., is said to be sinking a 14x22′ shaft 1,400′ deep.

ALASKA

Metal production of this Territory during 1918 was valued at approximately $29,000,000, $12,000,000 less than in 1917. The copper product was $17,180,000; gold, $10,000,000 and silver, $870,000. Chromite, tungsten, antimony, etc., totaled $117,000, and tin $90,000. Since 1880 the total copper output has been $106,000,000, and gold $302,000,000. **Mines are arranged alphabetically in this Territory.**

The total output in 1919 was $18,850,000.

Prince William Sound region, in which most of the copper mines occur, includes Ellamar district on eastern shore, and Knight Island on western part of sound. The rocks of the region are mainly metamorphosed sedimentaries, dominantly graywacke, argillite, slate and conglomerate, with very minor amounts of limestones, chert or jasper. They are folded and intruded by large bodies of basic igneous rocks now altered to greenstones, and by still more recent granite stocks.

There are two periods of mineralization, the copper ores being associated with the greenstones while the later gold-bearing quartz lodes are genetically related to the granite. The copper deposits are replacements and impregnations of sheared and shattered zones in the greenstone or adjacent rocks. The ores contain chalcopyrite, chalmersite, pyrrhotite, sphalerite, galena, pyrite, arsenopyrite, gold, silver with associated epidote, quartz, calcite and chloride.

ALASKA-CHITNA EXPLORATION CO.

Reported to have bought the Westover group in southwestern Alaska, from Louis C. Dillma of Seattle, Wash., in 1917.

ALASKA CONSOLIDATED COPPER CO. **ALASKA**

See Alaska Copper Co.

ALASKA CONSOLIDATED MINING & SMELTING CO. **ALASKA**

Mines at Copper Mount, Sulzer P. O., Prince of Wales Island, Alaska.

Officers: Geo. H. Crosby, pres.-gen. mgr., Lonsdale Bldg., Duluth, Minn.; A. M. Sellwood, v. p.; I. M. Lennan, sec., with A. L. Warner and Henry W. Armstrong, directors. Thos. Wright, supt.

Inc. Oct., 1912, in Ariz. **Cap.** $2,500,000; $5 par; $1,500,045 outstanding

Company purchased of the Alaska Copper Co. at sheriff's sale. Property: 23 claims, 18 patented and 5 being patented, with 15-acre mill site, known as the Copper Mountain group, situated on Copper Harbor, Prince of Wales Island, Alaska.

Geology: mine covers a contract metamorphic zone between granite and limestone with a porphyry intrusion along the contact. Orebodies are from 3 to 50′ wide with mineralized zone 900′ wide and quite attractive surface showings. Development: by 4,600′ of tunnels and several shallow shafts.

Equipment: includes smelter, sawmill, tramway and many buildings, put up before sufficient ore had been found to keep smelter in operation. Reports made by W. H. Weed and other engineers on file in company's office. No ore shipped since 1907. Idle.

ALASKA COPPER CORPORATION **ALASKA**

Office: 25 Pine St., New York. **Mine office:** Strelna, Alaska.

Officers: Frederic B. Bard, pres.; Alvan Markle, treas.; Edward Barr, sec. **Directors:** Samuel D. Warriner, Alvan Markle, John W. B. Bausman, W. F. B. Stewart, George R. Bedford, Edwin Barr, Frank P. Lauer, Frederic B. Bard and D. George Dery. Angus McLeod, supt.

Inc. November, 1912, in Delaware. **Cap.**, $10,000,000; $5 par; 1,740,000 shares issued. **Bonds:** Authorized and issued in 1917, joint mortgage bond for $1,000,000 with Alaska Consolidated Copper Co. at par, of which 1,137, 6% $500 10-year Gold Bonds convertible into stock of the Alaska Copper Corporation have been subscribed and paid for to March, 1919. Proceeds expended in and about the enterprise. Guaranty Trust Co., New York, transfer agent; Columbia Trust Co., New York, registrar. Annual meeting, third Tuesday in February.

Company controls by ownership the majority of the capital stock of the Alaska Consolidated Copper Co. and holds an operating lease for 99 years from the latter company.

Property: 35 claims, 700 acres: eleven claims patented and balance in process of patent. Holdings comprise Nuggett group, situated about 18 miles from railroad station of Strelna, on the Copper River and North Western R. R., at an elevation of about 3,500′.

Geology: property is crossed by a series of parallel fault fissure veins, in amyglaloidal greenstone, containing mostly bornite and some chalcopyrite, in

a siliceous limestone gangue. The several parallel veins dip 83° N. W. and strike N. 40° E. One vein system has been followed on the surface along its strike for 3,500', by means of test pits sunk at frequent intervals. Ore said to average 7½% copper per ton. In March, 1918, a carload shipment of hand-picked ore was reported to have averaged 15.61% copper and 4 oz. silver per ton.

Development: by about 5,500' of workings.

Equipment: includes three 30 h. p. of the N-S-O type of fuel oil engines. The air compressors are direct connected, furnishing 500 cu. ft. air per minute, at 100 lbs. pressure.

The general equipment includes small experimental mill with crusher, jigs and Wilfley tables; a Leyner sharpener, oil furnace for heating steel, four Tugger hoists and several pumps. During summer of 1917, a 19-mile motor truck road from the mine to rail at Strelna, was constructed and motor trucks and trailers purchased. Employs 25 men.

In 1918 shipments amounted to 131 tons concentrates and hand picked ore; smelter returns were 77,000 lb. copper and 800 oz. silver.

Property considered meritorious, but further work necessary to determine size and value of orebodies.

ALASKA DOME MINING CO. **ALASKA**

U. G. Myers, representative, Eagle, Alaska; Rufus Buck, mgr. Placer ground on Dome Creek, Eagle district. Report completion of dam, enlarging 6-mile ditch and laying of 2,000' of pipe preparatory to hydraulicking.

ALASKA DOUGLAS GOLD MINING CO. **ALASKA**

Idle. **Office:** 809 Electric Bldg., Portland, Ore.

Officers: F. W. Bradley, pres.; F. A. Hammersmith, sec-treas.

Cap. $100,000; $1 par; all issued.

Property on Douglas Island, Alaska. Assessment work only being done.

ALASKA-EBNER GOLD MINES CO. **ALASKA**

Property, sold under bondholders' foreclosure for $225,000, to A. W. Middleton, former treasurer, acting for a bondholders' protective and re-organization committee. Company's best asset was 100,000 shares Ebner Gold Mines Co. stock. Now being operated by the United States Smelting, Refining & Mining Exploration Co. Litigation described, Mines Handbook, Vol. XII.

ALASKA-ENDICOTT MINING & MILLING CO. **ALASKA**

Address: C. W. Mason, pres.; Juneau, Alaska or 402 Tacoma Bldg., Tacoma, Wash.

Re-opened 1919, and report crosscutting on an 18' vein in tunnel 800' long, with a strong vein continuing in line with tunnel. A mill is proposed for 1920.

ALASKA FREE GOLD MINING CO. **ALASKA**

Originally organized as a stock company, now operated under an 8-year lease from 1912. Wm. Martin, lessee, 206 Collins Bldg., Seattle, Wash.

Property: 22 claims, surveyed for patent, in Fishhook Creek Valley, Willow Creek district, south-central Alaska. It was on this property the first gold quartz of the district was discovered in 1906. Two orebodies have been opened on two different veins, that are sharp, clean fissures in quartz diorite, traceable for several hundred feet on surface. Ore treated in the mill has averaged about $36 per ton. Development: by tunnels, maximum length 500' with some stoping.

Equipment: includes 3 aerial tramways, mill, cyanide plant and compressor. Sixty men employed. Production to date is reported by company as $540,000. Operating costs are high, due to short season of 100 to 150 days each year, and the isolated position of property. District will be made easily accessible by the Gov't railroad from Seward to Fairbanks, construction of which is under way. See U. S. G. S. Bull. 607, page 60. Installation of electric power planned.

ALASKA GOLD BELT MINING CO. **ALASKA**

Address: 170 Broadway, New York. **Mine office:** Juneau, Alaska.

Officers: Sanford Makeever, pres.; A. B. Dodd, v. p.; M. M. Makeever, sec.; J. Makeever, treas.; preceding officers and D. C. Bard, directors; A. B. Dodd, supt.

Inc. 1915, in Alaska. **Cap.**, $1,000.000; $1 par, none outstanding Feb 3, 1916.

Property: 93 lode claims, 13 tunnel claims and 18 wharfage claims total area 2,500 acres, located 4 miles south of Juneau and adjoining property of the Alaska Gastineau on the southeast. They cover the extension of the Juneau gold belt and the ore is supposed to be of the same general character as that of the Alaska Gastineau.

Development work was started in the summer of 1915 on the Lott-Nelson group of 30 claims, located in the upper Sheep Creek basin. Roads were built buildings constructed, and an air compressor put in, preparatory to driving a 3,000′ exploratory and development tunnel in Sheep Creek mountain to cut upper part of orebody. In July, 1916, this tunnel had been driven 2,880′ and $100,000 is said to have been spent thus far on the development work. Did some diamond drilling in an attempt to cut the Gould & Curry vein, supposed to be the main orebody of the property. At last accounts, April, 1916, this drill hole had reached a depth of 1,575′ in a horizontal hole without results. Company planned to drive a 9,000′ tunnel at sea-level to cut the orebody at depth, and to build a mill on the beach south of that of the Alaska-Gastineau Co. No work reported done since September, 1916.

ALASKA GOLD HILL MINING CO. ALASKA

Address: A. E. Rucker, Valdez, Alaska.

Property: a gold mine in the Black district on west side of Valdez bay. In October, 1919, it was reported that a rich shoot had been revealed in a new tunnel.

ALASKA GOLD MINES CO. ALASKA

Office: 25 Broad St., New York. Mine near Juneau, Alaska.

Officers: Chas. Hayden, pres.; D. C. Jackling, v. p.; C. W. Peters, treas.; K. R. Babbitt, sec.; directors, Chas. Hayden, D. C. Jackling, K. R. Babbitt, C. M. MacNeil, Sherwood Aldrich, F. H. Goff, E. A. Clark, B. L. Thane, mgr. director, F. L. Ames, and J. B. Hardon.

Inc. Aug., 1912, in Maine. A holding company, owning $11,756,100 of the $12,000,000 capital stock, and $3,269,000 of the $3,500,000 bonds of the Alaska Gastineau Mining Co. Property is described under title of Alaska Gastineau Mining Co.

Cap. $7,500,000, increased Jan., 1915, to $10,000,000; $10 par, outstanding $7,500,060. Of the unissued stock, $500,000 is reserved for conversion of 10-year, 6% debentures. Transfer agents: Guaranty Trust Co., New York, and National Shawmut Bank, Boston. Registrars: Bankers Trust Co., New York, and First National Bank, Boston. Listed on the New York and Boston Stock Exchanges.

Bonded debt: $2,999,800, consists of $1,500,000 10-year, 6% convertible gold debentures, series A; dated March 1, 1915; due March 1, 1925; int. M. & S. 1, at Guaranty Trust Co., New York, Trustee, and $1,500,000 10-year 6% convertible gold debentures, Series B; dated March 1, 1916, due March 1, 1926; Coupon, $100, $500 and $1,000; principal may be registered. Authorized, $1,500,000. These bonds were sold for purpose of providing funds for increasing the mining and milling operations of the Alaska Gastineau Mng. Co. Convertible at any time into stock of the company at $30 per share. Subject to call as a whole, or in part, at 110 and interest at any time on, or after 3 years from their date. Company agrees that it will not, while any of these debentures are outstanding, mortgage or otherwise encumber any of its assets. Company is not, however, prohibited from issuing other debentures similar to series A and series B, at any time and to any amount, provided that said debentures shall not be given priority over series A, and series B, debentures. Normal income tax deducted from interest.

A comparative consolidated balance sheet of Alaska Gold and Alaska Gastineau shows the following, years ending Dec. 31:

Assets:	1918	1917	1916
Property	$14,370,921	$14,363,371	$14,355,438
Development, construction, plant	8,041,080	8,064,524	7,953,109
Current	692,476	896,082	941,027
Deferred charges to operation	481,420	535,403	746,256
Total assets	$23,585,897	$23,859,380	$23,995,830
Liabilities:			
Alaska Gold Mines Co.:			
Capital stock issued	$7,500,060	$7,500,060	$7,500,060
Debenture bonds A and B	2,999,800	2,999,800	2,999,800
Alaska Gastineau Mining Co.:			
Capital stock held by public	243,900	256,400	556,320
First mortgage bonds	231,000	231,000	231,000
Current	498,677	635,495	918,498
Deferred liabilities (interest accrued, etc.)	322,005	128,145	.....
Reserves for depreciation and insurance	642,605	325,045	.....
Surplus	11,147,850	11,783,435	11,790,152
Total liabilities	$23,585,897	$23,859,380	$23,995,830

Notes payable by Alaska Gold were reduced from $650,000 to $500,000 in 1917 and to $400,000 in 1918. Interest due March 1, 1918, on the A and B debenture bonds was not paid, there being insufficient funds.

Comparative Consolidated Profit and Loss Account, years ending Dec. 31:

	1919*	1918	1917	1916
Revenue	$1,052,035	$1,136,223	$2,009,632	$1,837,291
Expenditure	1,240,916	1,233,168	1,724,474	1,543,908
Profit or loss	—188,881	—96,945	+285,158	+293,383
Sundry income	—1,678	—19,621	—12,071	+37,198
Operating profit or loss	—190,559	—116,565	+270,826	+330,581
Interest paid and accrued	.....	219,685	228,552	217,747
Final profit or loss	—190,559	—336,250	+42,274	+112,833

*9 months.

Shares in Nov., 1919, sold around $2.50, compared with $40 in 1915, and $1 early in 1918. Dividends are a long way off, but those in charge are doing everything possible to increase the profits.

ALASKA GASTINEAU MINING CO.

Operating company for Alaska Gold Mines Co.

Address: Thane, Alaska.

Officers: G. T. Jackson, mgr.; D. J. Argall, mine supt.; Roy Hatch, mill supt.; W. T. Tolch, chief engineer; Wm. Carlberg, railroad supt.; E. M. Gastonguay, chief electrician; H. E. Biggs, auditor.

Inc. Jan. 14, 1911, in New York. **Cap.** authorized and outstanding, $12,000,000; $5 par. Is controlled by the Alaska Gold Mines Co., which owns $11,756,100 of the outstanding stock.

Bonded debt: $3,500,000 (entire issue) first gold 6%; dated Feb. 1, 1911, due Feb. 1, 1931. The Alaska Gold Mines Co. owns $3,269,000 of the issue.

Properties: in the vicinity of Juneau, Alaska, in what is known as the Juneau Gold Belt, comprise a net area of 2,166 acres, consisting of 1,672 acres of lodes, 219 acres of placers, and 275 acres of millsites and home-

steads. The mining claims consist principally of 4 groups, formerly owned and operated independently of each other, locally known as the Alaska Perseverance, Ground Hog, Silver Bow Basin, and Sheep Creek groups. They cover the so-called Gold Creek lode system of ore deposits, across a low spur of mountains from Gold creek to Sheep creek and extending into the basin of each stream, total length of lode system so covered being in excess of 2 miles. The company owns a 310-acre mill site near the mouth of Sheep creek, on the Gastineau channel. In addition to the above the company owns and controls lands, reservoir sites, power plant sites and rights-of-way on Salmon creek, emptying into Gastineau channel, in connection with its principal water power development; and also on Annex creek and Carlson creek, streams emptying into the Taku inlet about 10 miles east of the mill, and on Granite creek, Gold creek and Lurvey creek. The property of the Alaska Juneau Gold Mng. Co. adjoins the Alaska Gastineau on the west.

Geology: The mineralized zone dips 70° E., in the main has a slate or a schist hanging wall and greenstone foot-wall. It is cut in a number of places by metagabbro dikes, intrusive into the vein. Gold-bearing quartz is irregularly distributed through the zone in the form of veinlets, stringers, and masses. The height of vein measured on the dip above Sheep creek tunnel and for the length of zone developed on No. 10 level is almost 2,000' with a length of 5,000'. Thickness of the main vein, as used for estimates of tonnage, is 70'. A solid block of ore this size would contain more than 50,000,000 tons. This vein is known as the Perseverance block. It served as a basis for the purchase of the property. Another orebody known as vein No. 2, has been opened up for several hundred feet, with an average width of over 100'. It is about midway of the length of the Alexander crosscut. On Jan. 1, 1915, the estimated tonnage was 21,000,000 tons of fully-developed ore, whose average assay was estimated at $1.75 per ton, but which actual operations have shown to be about $1.05 as milled. Costs were calculated at 75c and tailing loss at 25c per ton. A third orebody, the Ground Hog or Footwall orebody, has been developed in a few places, principally on the Sheep Creek tunnel-level, where it was opened for 1,500' in driving the tunnel. At this point its width and value are as large as those of the Perseverance vein, lying immediately north. The ore zone, known as No. 1, and lying between the Footwall vein and No. 2 vein, contains two, and possibly three, distinct veins, ranging in width up to 200' or more.

The several orebodies opened thus far in the Perseverance block, are composed of schist, slate, and metagabbro and slate, with the highest grade ore found to date, occurring in the schist; it has averaged in excess of $2 per ton; No. 2 east stope on the 5th level averages $2.70 per ton. This orebody has a strong rake to the east appearing further away from the central shaft and workings on successively deeper levels, until on No. 10 level it is first found east of No. 2 shaft. The slate orebody is the lowest grade so far developed; west of No. 1 shaft the vein widens out to twice and three times the width of the original development of 70'; this widening of the ore zone has resulted in a decrease in assay value. East of No. 1 shaft and below No. 5 level the slate orebody is narrower and higher grade, $1.50 to $2.50 per ton. West of No. 1 shaft and below No. 9 level the orebody is made up of meta-gabbro and slate, the meta-gabbro dike replacing the foot-wall and making up a larger percentage of the orebody. This section so far as sampled and opened, is higher grade than the slate orebody west of the shaft, but lower grade than the schist orebody; it will furnish ore of an average grade.

Development: by Perseverance, or No. 1 shaft, 1,544' deep; No. 2 shaft extending from the 5th to the 10th level, with an oreway from the 10th to 13th level at this point; the Sheep Creek tunnel, or No. 13 level; and the Alexander or No. 10 level. The 8' by 10' Sheep Creek tunnel with length of 9,178' from the bottom of the Perseverance shaft to the portal near

Sheep creek, was started Nov., 1912, and finished April 1, 1914. The tunnel was driven both for the purpose of developing the property longitudinally and at depth, and to provide a transportation outlet for delivery of ores to the new mill. It is driven parallel to and in the foot-wall of the principal or Perseverance vein. At certain points, irregularities of the orebody threw portions of the vein into the direct course of the tunnel; at such places the ore was found to be of good value. The Alexander crosscut, 10th level, 700' above the Sheep creek tunnel and 1,300' from the surface on the dip of the vein, runs from the Perseverance mine camp to No. 1 shaft, which is vertical and connects No. 13 level with the top of No. 5 level. It is used only for men and supplies, has a reinforced concrete shafthouse and is equipped on the 13th level, with an air-driven hoist, which operates two cages. Between the 10th and 5th levels the mine is opened by levels spaced 200' apart. The ore is dropped from the different levels through oreways to the 13th, or main haulage-level, Sheep creek tunnel. No. 1 oreway extends from No. 5 level to No. 13 level, parallels the vein and is almost wholly in the foot-wall. On No. 9 level there is a timber bulkhead which is used to break the fall of ore. It is hinged and can be pulled out of the way when not required. Oreway No. 2 extends from the 9th to the 13th level. It is expected to put these oreways in at 2,000' intervals.

Two methods of mining are used, shrinkage stopping in the gabbro where the back is so hard it must be drilled and blasted, and a caving system in the slate. Full size stopes are 400' long with 40' pillars between. A 2-compartment raise is carried through the middle of each pillar, half of it being used as a manway, the other half as a skipway through which supplies are delivered from the level below by means of an air hoist. Stopes are started from the tops of chutes run along the footwall, a slice being taken across the lode at right angles to the dip. In order to start movement in the lode a cut is driven along the length of the stope and in the foot-wall. No attempt is made at sorting, the mining being done on a large scale and everything extracted put through the mill.

Blasting in the Perseverance mine is described in 'Eng. & Min. Journal' of May 19, 1918, by R. L. Healy; No. 3 stope east, 6th level, had been mined to the 5th level. The upper stope, No. 2 east, 5th level, had been worked out and emptied, except for the compact ore built up on the floor of the stope between the chute raises. The purpose of the blast was to knock out and shatter the floor pillar (level bottom) allowing the ore to drop into the stope below. Tunnels and short crosscuts (225 ft.) were driven in which to place the explosive (5,850 lb.) There was 30,000 tons of ore broken at a cost of 10c per ton.

Mining: the Perseverance ore is discussed Bull. 153, Sept., 1919, of the A. I. M. & M. E. The cost of driving drifts is $13.55 per foot in slate, $15.12 in gabbro, and $15.59 in schist. These drifts are 7x8x9 ft., with 24x24 in. ditch on footwall side. Raising runways costs $10.54, $16.13, and $13.06 per foot in these respective rocks. Stoping costs from 13.567 to 28.476 cents per ton, and 7.46 cents for bulldozing large rocks. The average cost of underground work and delivering ore to the mill was 47.859 cents per ton, representing 6,523,873 tons in 4 years.

Haulage on the different levels is done in 4-ton cars of the Granby type, by means of 6-ton Baldwin storage-battery locomotives, thus eliminating the trolley-wire. The locomotives are operated for 16 hours, then charged for 8 hours. On the main haulage-level four 12-ton cars can be loaded at the same time. Haulage to the mill is done over a narrow-gauge railroad by electric locomotives of the trolley type. The railroad to the mill runs through Sheep Creek tunnel for 10,000', then along the north side of Sheep creek for 6,000' to the coarse crushing plant. When the mine and mill are running at full capacity this railroad can handle from 10,000 to 12,000 tons of ore daily.

Machinery at the mine includes a main geared hoist, driven by compressed air, 5 compressors of 9,000 cu. ft. per minute, total capacity, 48

motors for all purposes using 2,852-h. p.; water-Leyner and jackhammer drills, and completely equipped repair shops.

Recent work: extensions for 1918 are not published in the company's report; they were 4,897 ft. during the first quarter, but for the year must have been less than 15,472 ft. of 1917 and 24,562 ft. in 1916. Diamond-drilling in the two last mentioned years were 12,754 and 15,675 ft., respectively. Total workings are over 20 miles. No new orebodies of importance were encountered and development operations proved a great disappointment. The recovered value per ton has been remarkable in its percentage but the amount has been much less than expected. There is but slight promise of an improvement in average grade in the Perseverance block until the ore now broken is milled and new mining methods can be used. Samples during 1916—by moil and diamond-drilling numbered 20,880.

Coarse, free gold rendered checks difficult to agree. It has been found that (1) sampling of the slate zone would not check with actual mill returns because it is difficult to define the limits of the orebody that will cave in mining, also on account of peculiarities in this deposit; (2) sampling of the orebody consisting of either schist or metagabbro was more satisfactory and uniformly averaged with actual milling results, due to the more even texture of the rock, better cores and moil samples and definite boundaries to the orebodies that could be maintaind in mining; (3) on account of its greater width and irregularity the slate zone in the west section of the mine averaged uniformly lower grade than had been calculated; (4) the higher grade sections as developed lay east of the shaft where the schist orebodies had been encountered and opened; and (5) the slate zone west of the shaft showed a decrease in values beginning with No. 9 level and extending up to No. 6, where better values continued to the surface.

At beginning of 1915 the minimum estimate of fully developed, partly developed, and probable ore, was from 75,000,000 to 100,000,000 tons having a recoverable value of $1.50 per ton. Allen H. Rogers reported in 1916 that tonnage developed and partly developed, amounting to 5,500,000 tons would average about $1.45 gross, and that after the newer areas are developed and contribute their proportion of milling ore, the mine should be able to supply the maximum capacity (10,000 tons) with ore that would yield a profit of 45 to 50c per ton.

During 1917, the principal work was on the block of ground between No. 1 and 2 shafts on No. 6, 7, 8, 9, 10 and 13 levels. The object was further exploration of the schist ore-zone, which had originally shown good ore as on No. 5 and 10 levels from which a large quantity of good ore had been milled. Other work was east of No. 2 shaft, between No. 10 and 13 levels west of No. 1 shaft, and on No. 2 vein west of the Alexander crosscut. No new orebodies were found, east of No. 2 shaft, but the work of 1916 in the schist orebody was confirmed. In the block between No. 1 and 2 shafts, from No. 5 to No. 13 level, it was estimated that there was available 9,000,000 tons of $1.06 ore. Of this, 2,357,588 tons were broken, 2,398,242 tons prepared for stoping, and the remainder prospected, but not prepared.

During 1918, the principal work consisted in preparing stopes on No. 11 level. Above No. 9, all mining of the orebody in the west section of the mine, and the east section for 1,000 ft. east of No. 1 shaft was practically finished. In order to recover ore in the shaft pillar, containing 1,500,000 tons of $1.15 ore, No. 1 shaft was abandoned above No. 9 level. The broken ore in the mine at the end of 1918 was 2,000,000 tons. The quantity in reserve, between No. 2 shaft and the west end of the mine above No. 13 level, is 6,323,117 tons, worth $1.02 per ton.

The mill was designed to treat 1,500 tons daily in each of its 4 sections. Since starting operations Feb. 15, 1915, it has been demonstrated that the mill will handle from 10,000 to 12,000 tons of ore per day, necessitating a larger mine output. The mill is essentially a concentrator, accompanied by a separate small plant for retreatment of concentrates produced. It differs greatly from the conventional type of amalgamating gold mill, in

that the main milling plant produces nothing but concentrates, at a ratio of about 60 to 1. A novelty has been introduced by crushing with rolls instead of stamps. In the retreatment plant the coarser gold containing some silver is separated from the concentrates and reduced to gold and silver bullion; this separation produces a small tonnage of lead concentrates containing gold and silver that is shipped to Pacific coast smelters. The residual portions of original concentrates, consisting chiefly of iron and zinc sulphides, are finely ground and amalgamated for gold and silver, resultant iron-zinc tailing being discarded. In 1918, a hearth furnace was erected to reduce the high-grade concentrate, which carries most of the coarse gold.

The mill is built upon a very steep slope, the bottom floor is 192′ above Gastineau channel, the crushing plant 685′ above the water. Supplies to the mill are handled over an inclined tramway, while supplies for the crushing plant or the mine are handled over a longer tramway to a loading station on the ore railroad. The course of the ore through the coarse crushing plant is as follows: From the mine cars to the rotary dump, capable of handling four 10-ton cars at once, to grizzly; oversize to two 36" by 42" rolls set to 5"; over caterpillar feeders to stationary inclined screens with 1½" square openings; oversize to two No. 8 gyratories set to 2": to ore pocket beneath the crushing plant. This pocket is cut in solid rock, is 30′ by 50′ in cross-section and 225′ in height, 110′ of which is the ore-pocket proper. Remaining 115′ is a raise connecting the ore-pocket with the crushing plant. The bin has a capacity of 10,000 tons of ore. At the bottom of the bin 8 feeders supply ore to a 42" belt-conveyer, 608′ long, that runs through a tunnel to the coarse ore-bins in the mill. From the bins the ore goes to stationary inclined screens, 1½" square openings; oversize to 72"x24" rolls set to ⅞"; undersize to 54"x24" rolls set to ½". Rolls are run on choke-feed and crush dry, and are of heavy design, having the large pulley in the form of an 8,000-lb. flywheel. Bearings are water-cooled. Roll shells are 6" thick and are shrunk onto the roll-cores. Five-ton skips, working in balance, raise the roll product 115′ to a series of 10-mesh impact screens; undersize goes to concentrator; oversize is returned to the 54" rolls. Each of the 4 sections contains 15 impact screens, and there are two 54" rolls for every 12 screens. The two 72" rolls serve the entire 4 sections of the mill. Seven sets of skips are used; one set for each 72" roll, and one set for each of the 5 pairs of 54" rolls. Exhaust fans carry away the excessive dust caused by dry crushing.

The concentrating department has a primary set of 10 double-deck Garfield tables and 10 Wilfley tables per section. Products are tailings and a concentrate that assays nearly 50% lead, which is shipped. Tailing goes to a 4-spigot Janney classifier; product of first 3 spigots to tube-mills. Tube-mill product goes to a secondary set of 10 double-deck Garfield tables, followed by 10 Wilfley tables using as wash water the 4th spigot product of the classifier. Each primary Garfield table can handle 300 tons per day. A 15-h. p. motor drives 10 tables.

Hydro-electric power is used. The chief sources of supply at present are the Salmon Creek plants, 2 miles northwest of Juneau, and the Annex-Carlson Creek plant furnishing 4,000-h. p., these furnish a minimum of 6,000-h. p. Ultimate capacity of the Annex Creek project will be 12,000-h. p. The Salmon creek project necessitated the building of a concrete dam 165′ high and 700′ long on its crest. Base of dam is 1,000′ above sea-level. In order to get maximum benefit from the water available 2 power plants were built. No. 2 is a mile below the dam and operates under a head of 400′. Power plant No. 1 is on the shore of Gastineau channel, near the mouth of Salmon creek. Water discharged from upper plant is conveyed by a 10,000′ flume to No. 1 plant and there used under a head of 500.′. Power plants No. 1 and No. 2 are each equipped with two 1,500-k. w. generating units with total capacity of 6,000-k. w. or 8,000-h. p. Office buildings, machine-shops sawmill, six 50-men bunk-houses, mess-house, and dock

been built on the beach below the reduction plant. Operating costs ar very low, averaging $0.00174 per k. w. hr. during the last 4 years.

Production: the first ore was run through the mill Feb. 15, 1915. To wards the end of the year a daily capacity of 6,000 tons was reached, bu the grade of ore falling for a time, this tonnage was reduced to 4,000 ton daily.

Year	Tons Milled	Gross Value	Tails	Extrac- tion %	Value Recov- ered	Oper. Exp. less Misc. Inc.	Profi or Loss
1919*.....	2,251,654	$0.820	$0.180	77.30	$0.640	$0.800	—$0.16
1918.....	1,285,445	1.090	0.210	81.10	0.880	0.970	—0.09
1917.....	2,240,346	1.110	0.210	81.32	0.900	0.780	+0.12
1916.....	1,892,788	1.193	0.222	81.33	0.970	0.796	+0.17
1915.....	1,115,294	1.156	0.219	81.06	0.937	0.688	+0.24

* 12 months tonnage, but 6 months for averages.

ALASKA HERCULES MINING CO. **ALASKA**

Mail returned March, 1918, stamped "Out of Business."

Address: J. A. Hannon, pres., Cordova, Alaska.

Property: 15 claims on Shoups Bay, near Valdez, acquired 1917 from the Sea Coast Mining Co., and said to show 6 gold quartz veins in graywacke and argillite. Developed by tunnels, 400′ of drifting on the vein. **Equip- ment:** included a 10-stamp mill, with 2 tables, hydro-electric power plant 1,800′ aerial tram, air compressor, etc. Mill and power plant sites are near the landing, while the mine workings are at elevations from 1,750′ to 2,600′. See U. S. G. S. Bulletin 622, p. 178 and Bull. 662, p. 191.

ALASKA HOMESTAKE MINING CO. **ALASKA**

Address: Crary Bldg., Seattle, Wash.

Officers: Edw. Eckern, pres.-mgr.; S. A. Pepper, v. p.; Edmund Smith, sec., with L. L. Bair, directors.

Inc. May, 1916, in Washington. **Cap.** $1,000,000; $1 par; 800,000 shares outstanding.

Property: 2 claims, about 40 acres, at Port Wells, Prince William Sound, said to show shoots of gold-silver-lead ore, 12″-36″ wide, in a contact deposit in granite, averaging $50 per ton. Developed to depth of 250′ by tunnel, in 300′. Jan., 1919. About 7,000 tons of ore reported blocked out.

Equipment: includes gas hoist, 20-ton concentrating plant and compressor. About $25,000 expended in development work to date. Mill started Jan., 1919, was stated to be producing concentrates worth $10,000 per month. Values practically all in free gold.

ALASKA INDUSTRIAL CO. **ALASKA**

Office: 115 Broadway, New York. Mine office: Sulzer, Prince of Wales Island, Alaska.

Officers. Col. A. S. Bacon, pres.; S. I. Frankenstein, v. p.; Samuel F. Grossman, sec.; S. B. Thomas, treas.; Charles A. Sulzer, lessee.

Inc. in Washington. **Cap.** $1,000,000; $1 par. Annual meeting, second Saturday in January.

Property: The Jumbo group of 35 claims, patented, area 700 acres, also 60 acres in mill sites and miscellaneous properties. Main holdings are near the head of Hetta inlet, 2 miles from the beach and 1,500 to 2,000′ above tidewater.

The Jumbo mine has a mineralized contact metamorphic zone up to 1,000′ in width, with granite foot and limestone hanging, ore fading into the lime. Property shows 7 lenses and irregular masses, ore being mainly chalcopyrite, with some bornite and a little tetrahedrite in a gangue of mag- netite, garnet, epidote and other contact minerals, together with occasional molybdenite. Ore averages 4 to 5% copper, with $3 gold and silver per ton. Average recovery said to be 100 lb. copper per ton of rock.

Development: mainly by tunnel, with 4 shallow shafts and numerous open cuts. The tunnels are in series, lowest 500′ vertically below the

highest, all connected by winzes, and the mine has over 3 miles of workings; greatest depth of workings is 100'. The ore stands well, requiring little timbering, even in stopes up to 50' in width.

Equipment: includes 200-h. p. electric hoist and duplex air compressor, electrically driven. Buildings include a 35x40' warehouse, 30x35' power-house, smiths, store, office, dwellings, bunkhouses and various smaller buildings.

The property carries an available water power, rated at 5,000 h. p., and this has been partially developed by a 36" Pelton wheel, taking water from Beaver creek and actuating a 6-k. w. generator, and a 16" Pelton wheel taking water under a 330' head from Jumbo creek, through a 10" pipe line of 3,000' length, this actuating a 55-k. w. 3-phase 2,300-volt 60-cycle generator, current being stepped down to 220 volts for lighting and power. Mine is equipped with electric fans, blowers and Temple-Ingersoll electric drills.

A 9,000' Riblet aerial tram has 14 wooden towers with 22 half-ton buckets, operated by gravity with a 600' auxiliary tram. Capacity of tram line is 10 tons per hour. The main tram has small bins at the mine and 4,000-ton storage bins at tidewater, where there is a 200' wharf.

Production: begun 1907, now aggregates 137,000 tons. All profits have gone back into the property for development and permanent improvements. Shipping about 1,000 tons monthly to the Tacoma smelter.

Property considered valuable and management good.

ALASKA JUNEAU GOLD MNG. CO. **ALASKA**

Office: Crocker Bldg., San Francisco, Cal. **Mine office:** Juneau, Alaska.

Officers: F. W. Bradley, pres.; Wellington Gregg, Jr., and A. B. Davis, v. p.; G. D. Abbott, sec.-treas.; J. S. Wallace, asst. sec.; directors, Eugene Meyer, Jr., Seeley W. Mudd, F. W. Bradley, Wellington Gregg, Jr., A. B. Davis, C. A. Norris, and F. A. Hammersmith; P. R. Bradley, gen. supt.; John Richards, mine supt.

Inc. Feb. 17, 1897, in West Va. **Cap.** $150,000, consisting of 1,500,000 shares, increased April, 1915, to $15,000,000; $10 par; outstanding, 1,400,000 shares.

Bonds authorized: $3,500,000, 7%, dated March 15, 1919, payable same date in 1929, unless redeemed at option of company prior to maturity at 110% of face value thereof with accrued interest. Denominations are $1,000 and $500. On April 30, 1919, $989,000 were outstanding. Sinking fund to be provided for purchase of outstanding bonds. This issue is for paying indebtedness and re-modeling of the mill.

Registrar, Metropolitan Trust Co., New York; transfer agent, Central Union Trust Co., New York. Listed on the New York Stock Exchange. Annual meeting first Tuesday after first Monday in April.

General Balance Sheet: years ending Dec. 31—

Assets—

Year	Property	Devel.	Const. & Equip.	Cash	Other Current	P. & L. Surplus	Total
1918	$9,617,790	$1,552,925	$2,945,856	$6,628	$878,487	—$563,625	$15,565,311
1917	9,612,246	1,201,304	2,813,254	22,561	1,038,752	+563,625	15,251,742
1916	9,645,489	994,240	2,180,760	361,289	330,318	563,625	14,075,723

Liabilities—

Year	Capital Stock	Notes Payable	Accounts Payable	Deprec. Reserve	Total
1918	$14,000,000	$1,427,500	$131,235	$6,576	$15,565,311
1917	14,000,000	1,100,000	149,172	2,570	15,251,742
1916	14,000,000	.....	75,723	.....	14,075,723

Profit and loss—

Year	Total Income	Operating Expense	Interest General, Etc.	Loss
1918	$460,322	$621,901	$163,921	$325,500
1917	490,049	624,255	86,367	220,573
1916	149,744	230,474	68,367	147,456

On April 1, 1919, the company's indebtedness, less cash assets totaled $1,580,000, which includes $943,000 of bonds sold of the new $3,500,000 issue.

Property: the mineral area of the company covers a tract of land adjoining the property of the Alaska Gastineau Mng. Co. on the west and that of the Ebner Gold Mng. Co. on the east, one mile inland from Gastineau channel. In addition the company owns a large tract of land stretching along the east side of the channel south of Juneau. This area, used as the mill site, is connected with the large mineral area by two narrow strips of land, one along Gold creek and the other farther south through which a long transportation tunnel connected the mine and mill.

Geology: The mining lands include the first quartz claims located on the wide vein called 'the Juneau gold belt,' and are supposed to be in the center of the mineralization of the belt. The property owned by the Alaska Juneau covers the outcrop of the vein or mineralized zone, for over a mile in length. The lode has a width between walls of 900′ and dips 70° east. The orebody is composed of slate with gold bearing quartz, irregularly distributed through it in the form of veinlets, stringers and masses. Meta-gabbro dikes, intrusive into the vein, carry gold bearing quartz similarly distributed. The quartz distribution is not regular, but where the gold content of the entire vein is too low to pay, sorting can be resorted to and profitable grade of mill feed obtained. Associated with the gold in the quartz is pyrite, pyrrhotite, galena and a little sphalerite. The foot wall is greenstone, the hanging wall schist.

The vein was mined in a surficial way for a great many years. Deep development was first planned in 1899, started in 1909, but not actively pushed until 1910, when a main working crosscut, 8′x10′, called the Gold Creek tunnel, was commenced at an elevation of 425′ above sea-level, starting from a point immediately behind the town of Juneau. At 6,540′ from the portal, where the surface could be reached in the shortest possible distance, an 800′ inclined raise in the hanging-wall was put through to surface. In driving the tunnel that portion of the vein lying west of the Silver Bow fault was crosscut diagonally for 650′, disclosing orebodies of average assay values slightly less than $2 per ton. The true width of the vein where cut is 500′ with average assay value close to $2 per ton. Although this is better than shown by any surface developments, it was believed this width and assay value would persist for considerable distances logitudinally and vertically. This belief was based on the result obtained from a 30 stamp mill working 5 months each year, from 1896 to 1914, on ore mined by open-pit work along the outcrop of the vein. During this time, 295,800 tons were milled, yielding $2.20 free gold per ton, obtained by milling 63% of ore mined. The rejected vein matter was gold bearing, but of lower grade. No attempt was made to save the gold in the sulphides, which would have added about 20c per ton.

Ore extracted from the Gold Creek tunnel and the intermediate level opened from the incline raise at an elevation of 495′ above the tunnel was milled in the new 40-stamp mill on Gastineau channel. A total of 50,000 tons milled up to Dec. 1, 1914, averaged $1.36 per ton, the low value being due to the dilution of ore with waste attendant upon the opening of the two levels preparatory to stoping. In Dec., 1914, there was milled 9,650 tons of average assay value of $1.74 per ton; in Jan., 1915, there was milled 12,000 tons of average grade of $2.00 per ton.

Confidence in the persistence of the vein and its value is also derived from records of the 100-stamp Perseverance mill, now part of the Alaska Gold Mines Co., and the results obtained by a small mill operating on the Ebner property.

The mine development work as outlined was designed to give a daily tonnage of not less than 8,000 tons, making available for caving and extracting 7,500,000 tons of ore in one section of the vein. All tunnels are double-tracked and so equipped that 16,000 tons of ore daily can be transported from the mine to the mill.

Selective mining was originally contemplated and wholesale mining may have to be abandoned, if the mine is to become a dividend payer. Mining methods are concisely described by F. W. Parsons in the Engineering and Mining Journal of Aug. 4, 1917.

To the end of 1918, mine development had cost $1,552,945, opening 81,564' of workings.

Briefly, the milling plant included: two revolving tipples, 2,000-ton coarse-ore bin, four 60" apron-feeders, four 8x5' grizzlies, with 8" openings, two 36x48 jaw-crushers, four 4x8' grizzlies with 3" openings, four No. 9 Gates gyratory crushers, four 30" conveyors, 4 distributing boxes, two 36" shuttle conveyors, twenty-four 30" apron feeders, twelve 8x6' ball mills, 12 revolving screens, 12 V-shaped tanks, 12 mechanical distributors, 48 roughing tables, 24 classifiers, 12 shovel wheels, twelve 6x12' tube-mills, 24 settling tanks, 24 mechanical distributors, 96 finishing tables, and 12 Wilfley tables. There is a retreatment department containing two 5x5' ball-pebble mills, pumps, classifiers and tables. Power-plant contains four 825-h. p. Stirling water-tube boilers, with economizers, and forced draft apparatus, one 9-stage Curtis 6,000-k. w. turbo-generator, condensers, and auxiliaries. Electric installations at the property were described in the "Salt Lake Mining Review" of Nov. 30, 1919, by F. S. Rice.

The railway between mine and mill cost $167,144. This plant is to be altered considerably at a cost of $500,000. To the end of 1918, construction and equipment had cost $2,945,856.

Results since March, 1917; at the new mill trouble started, in the ball-mills. In May, the daily capacity was only 1,200 tons, and 3,274 in December, the highest being 3,833 in November, less than half that expected. The cost of milling was 40c per ton during the last 4 months of 1917, and all costs 70c. The recovery from 82c ore was 75%, so that a loss of 8c per ton was recorded. F. W. Bradley, president of the company, issued the following statement to the shareholders, with the annual report for 1917:

The new mill has been in combined process of completion and operation since March 31, 1917, and the best it has so far been made to accomplish is less than one-half of its promised capacity, at an operating cost per ton of over twice the expected cost. By installing machinery for an additional stage of crushing, the capacity of the mill can be increased, and by making other costly additions to and changes in the mill it would be possible to reduce the present high operating costs; but the real problem has been to keep as much waste as possible out of the fine-grinding end of the mill-work. It is estimated that two-thirds of the feed to the mill has been straight waste, and that the cost of fine grinding it is greater than the cost of fine-grinding ore.

The new mill was designed with the plan in view of both 'wholesale' mining and 'wholesale' milling; but as the layout of the pre-mining work has resulted in a caved mixture of an undue proportion of waste with ore, the wholesale plan of milling what has turned out to be (as far as the original pre-mining caving system is concerned) an uncontrolled mixture of waste and ore has had to be abandoned as unprofitable. Therefore in order to operate at a profit, the mine and mill operations are being re-adjusted to the 'sorting' plan of working which was interrupted nearly three years ago when the 'wholesale' plan was decided upon.

The payable values in the vein are carried in quartz stringers that, so far as developed in the Alaska Juneau property, have averaged about $6 in gold per ton, in addition to their lead and silver values, and are susceptible of being partly sorted out from their enclosing vein-matter. This is not only because of the marked difference in color between the quartz and vein-matter, but because the quartz is much more friable than the vein-matter and thus lends itself to a partial mechanical separation, both when mined and when subjected to coarse crushing in the mill. Monthly crush-

ings of several thousand tons each during the 16 years' operation of the o 30-stamp mill have given free-gold yields varying from a minimum of 35 for low-grade vein-matter up to a maximum of $6.21 for sorted-out quart In addition to its recoverable gold, the ore also carries recoverable le and silver values. Many milling-tests in the old 30-stamp mill on o sorted from the surface workings in the vein, and also milling tests in t pilot mill on ore sorted from the deepest workings in the vein have giv recoveries of over $5 free gold per ton from all the ore so sorted. Duri the first six months of 1915, 23,286 tons of mixed sorted quartz and ve matter made an average mill-feed for the pilot mill of $3.22 gold assa value per ton. The sorted ore thus milled was obtained by mining thr tons of vein-matter, of which two tons were left in the stopes as wast filling and the remaining ton of about equal portions of sorted quartz a vein-matter was sent out of the mine as mill-feed. Because the pre-minin system as carried out has left no control over the quantity of waste mix with ore, the mill-feed for the new mill during 1917 averaged a gold assa value of 87.5c., or 3.74c. less than the gold assay-value of the mill-feed the pilot mill for the year 1916. This lack of control has resulted in sen ing such a large proportion of waste with ore to the mill that of the ro over 12 inches in size fed to the mill, probably 90% has been straig waste, as distinguished from low-grade vein-matter.

To overcome this waste dilution and thus place the property on a profi earning basis, an installation is being made, as outlined in the accompanyin report of the general superintendent, to mechanically reject as muc coarse waste as possible between the Blake and gyratory crushers. Also new stope is being opened on another section of the vein where physic conditions promise a dilution of less waste with the ore and consequently higher grade of feed for the mill. Up to March 10, 1918, this new sto had been cut out in vein-matter for an area of 25,482 sq. ft., with an avera gold assay-value for that area of $1.56 per ton.

In June, 1918, the company decided to start the old pilot stamp-mill, a the new plant could not be run economically on a 1,000-ton basis. Th process was to crush coarsely, stamp the ore, convey it from stamps t tube-mills in the new plant, side-stepping the ball-mills.

During 1918, new work in the mine amounted to 5,501', mostly on N 3 and 4 levels, preparing No. 410 stope. The assay-value of all develo ment and preparatory mining work 'muck' samples (6921) taken betwe January, 1913 and December, 1918, averaged $1.041 per ton. Including 4 moiled samples taken since 1912 the average becomes $1.075.

An endeavor was made to force the mill to its rated capacity durin January and February, 1918, but the best daily average was 3,832 ton less than half of that expected. As wholesale mining and treatment wa unprofitable at that time, sorting of the ore was done in March, April, an May; but because the 400 stope produced a lower grade and sorting wa on so small a scale, there was no resultant economic advantage, therefo this work was stopped. The daily average during these three months wa 1,828 tons of 70.5-cent ore. During the next five months, when better o was available, milling was reduced to the quantity of this material tha could be mined with the labor available. The average daily run was 74 tons of $1.414 ore. The 50-stamp mill was incorporated into the flow-shee doing the work of the ball-mills. The stamps produced a ¼-inch produc which went to the tube-mills. Many improvements were made during thi period. In the last three months of the year, when the 410 stope wa yielding more ore, 1,094 tons of $1.08 ore was treated daily. On Decembe 4 the mill resumed work with three shifts. Alterations to the plant are t cost $500,000; these are expected to bring the daily capacity to 8,000 ton

During 1918 there was spent $104,675 on the new mill, $30,508 on th power plant, and $10,806 on the stamp-mill.

Production: from the old and new mills—

Year	Tons	Value	Recovery, %	Costs
1918	574,285	$0.875	....	$1.1329
1917	.....	.....	....	.....
1916	180,113	0.9124	71.4	2.7363
1915	179,892	1.4797	80.0	2.8530
1914	60,026	1.4326	80.9	.....

The Alaska Juneau, like Alaska Gold has proven that gold ore cannot be mined by the large scale methods, used by the Porphyry Coppers.

ALASKA METALS CO. **ALASKA**

Idle. **Mine office:** Bruce, Prince of Wales Island, Alaska. Harry Corbin, supt., at last accounts. Property on the west coast of Prince of Wales Island, formerly known as the Corbin mine, and the Copper Mountain mine. No recent returns secured. Slightly developed.

ALASKA MEXICAN GOLD MINING COMPANY. (See Alaska Treadwell Gold Mining Co.)

ALASKA MINES CORPORATION **ALASKA**

Address: Box 1853, Seattle, Wash.

Officers: Jas. Gayley, pres., 81 Broadway, New York; T. S. Cram, v. p.; W. S. Reed, sec.-treas., with August Heckscher, M. W. Newton, Louis Eisenlohr and E. E. Powell, directors. John H. Miles, mgr.

Inc. June, 1916, in Virginia. **Cap.** $10,000,000; $1 par; $3,743,818 outstanding. Transfer office Empire Trust Co., New York. Stock listed on New York and Boston Curbs.

Property: about 2,200 acres of mineral land at Nome, owned outright and partly controlled by option to purchase. Diamond drill operations reported to have proved the existence of a large yardage of gold-bearing gravel.

Equipment: includes electric power plant, machine and repair shop, and two dredges. Property was examined in 1919 by the Hammon Engineering Co., of San Francisco. No production figures are obtainable.

ALASKA PITTSBURGH GOLD MINING CO. **ALASKA**

Office: 702 Arrott Bldg., Pittsburgh, Pa. **Mine office** Valdez, Alaska.

Officers: B. C. Wiltse, pres.; A. L. Miller v. p.; O. A. MacVay, sec; Wilber Galbraith, treas., with V. H. Chlebus and W. E. Flick, directors.

Inc. in Delaware. **Cap.** $1,000,000; $1 par. 425,000 shares outstanding. Annual meeting, first Tuesday in March.

Property:. 8 claims, 160 acres, known as the Dailey-Bennett mine, on Bettles Bay, Prince William Sound, Alaska. Ore, carrying gold and silver, occurs in a porphyry dike, cutting through slate. Course is northerly, with dip of 20°. The orebody has been opened up for about 5,000' at surface, showing galena, sphalerite and arsenopyrite, also free gold. Mill tests reported to average $13.59 p. t. Developed by 400' tunnel. Ore reserves estimated by management at 18,000 tons. Probably idle.

ALASKA STANDARD COPPER MINING CO. **ALASKA**

Office: suite 921; 115 Broadway, New York City. M. L. Hewitt, pres.; John L. Steele, mgr. Mail returned unopened.

Inc. in South Dakota. **Cap.** $2,000,000; $1 par; 700,000 shares issued. Security Transfer & Registrar Co., N. Y., transfer agents and registrar. Company held a 3½-year lease, with option to purchase at $500,000, on the Standard mine of the Standard Copper Mines Co., at Landlock Bay, Prince William Sound, about 30 miles from Valdez.

Property: 7 patented claims and a mill-site, 150 acres, said to carry a 6' vein of copper-gold-silver ore.

Development: by 3 tunnels to depth of 430', reported to have proved 300,000 tons of 4% ore and 10,127 tons of 8% ore. Fourteen men employed at last accounts. Is a Marcus L. Hewitt promotion. One thousand shares were sold at auction in New York on July 16, 1919, for $23 the lot.

ALASKA TIDEWATER COPPER CO. **ALASKA**

Office: 602 Alaska Bldg., Seattle, Wash

Officers. W. E. Hall, pres.; F. G. Swann, v. p.; R. C. Hill, sec.-treas. with W. W. Sweet and Roy Whitcomb, directors; R. W. Sweet, Craig, Alaska supt.

Inc. 1916, in Washington. **Cap.,** $1,000,000; $1 par; 532,184 shares out standing.

Property: 8 claims, 5 owned and 3 held under lease in the Ketchikan mining district, Prince of Wales Island. Ore carries a quartz vein, traversing diorite and limestone, having a pay shoot of chalcopyrite ore 3-7′ wide, said to carry gold, silver, copper and iron values, with average assays of 7.5% copper.

Development: by 700′ tunnel, 120′ vertical shaft and drifts. Equipment includes an aerial tramway and compressor plant. Production in 1916 amounted to 134,949 lbs. copper, averaging 7.17%. Shipments were made to the Tacoma smelter. Management reports property idle since 1917, but was planning sale of more stock and resumption of work during 1919.

ALASKA MEXICAN GOLD MINING COMPANY, ALASKA TREADWELL GOLD MINING COMPANY ALASKA UNITED GOLD MINING COMPANY. } ALASKA

The affairs of these three Douglas Island companies are so interlocked that to be logical, they must be discussed together, particularly so since April 21, 1917, when the Treadwell, 700, and Mexican mines were flooded by the sea leaving only the Ready Bullion mine intact. This disaster is described in the account of the Alaska Treadwell mine. Financial particulars of the three companies are given under the respective titles, but mine development will be considered as a whole. The report of F. W. Bradley, president of the three companies, made October 23, 1918, says:

"Future developments in the Ready Bullion mine will determine the fate of the others. It is 3,600′ east of the flooded workings, with a direct connection with them on its 1,350′ level, but was saved from flooding by a strong concrete bulkhead. Unlike the other mines of the group, the Ready Bullion workings extend beyond the shore-line and are under the deep water of Gastineau channel. In order to remove all risks it was decided to fill with waste the cavities left in the mine as the broken ore and caved pillars were drawn and hoisted for the mill. In order to secure waste for this purpose, an Alaska Juneau type of caving stope was cut above the 450′ level, 600′ inland from the shore line. It cost $120,000 to prepare for this waste filling, and filling will continue at a cost of 15c per ton of waste. The shaft was sunk and a cross-cut started for the 2,800′ level. Development continues at 2,600′, the stopable area being 29,025 sq. ft., averaging $2.59 per ton. This compares fairly well with the 14 levels above it. Ore reserves in the Ready Bullion total 2,300,000 tons to the 2,800′ level. Of these 1,400,000 tons will be recovered, giving 5 years' supply to the mill, or 3 years with the Mexican mill. If the 2,800′ level finds an orebody of profitable size and value, the shaft will be deepened to 3,000 and 3,400′. If this last level should also open ore, it will be driven westerly along the ore-channel to prospect any continuation in depth of the Treadwell-700-Mexican lodes. If these were of sufficient value, the high tides of Gastineau channel would be dammed off from the break on surface, and the workings pumped out. This may be in 5 to 10 years' time. The combination shaft is in solid ground, and could be used for future operations in the Treadwell-700-Mexican orebodies."

The Ready Bullion mine is now working at a profit, that for September, 1918, being $7,298. From Jan. 1, 1917, to Sept. 30, 1918, the output was $724,680 from 328,990 tons. The cost was $826,819, including $54,692 for shaft sinking, shaft-house, and head-frame; also $126,429 spent in safeguarding the mine against saltwater leaks.

In an effort to secure new mining property tributary to Douglas island many prospects were examined. Finally a molydenum deposit was taken up at Shakan, Prince of Wales island, 180 miles by water from Treadwell. Reserves were estimated at 100,000 tons of 1.58% and 6,270 tons of 2.28% MoS_2 ore. The 2-ton Heroult electric furnace at Treadwell is to be used in making ferro-molybdenum from the Shakan ore.

The three hydro-electric plants on Douglas island have been tied-in with the steam plant of the Alaskan Juneau company on the mainland opposite. The revenue from this source was $62,687 in 1917 and $15,494 for first half of 1918.

Dismantling and marketing saleable equipment continues, the quantity sold to June 30, 1918, being $294,398, with $209,950 awaiting sale. All three companies benefit from this salvaging. The mercantile department of the Treadwell makes a good profit, supplies on the above date being valued at $538,039.

The following table gives the results of the interlocked operations of the three companies during 1917 and the first half of 1918:

	1917 (full)			1918 (half)		
	Mexican	Treadwell	United	Mexican	Treadwell	United
Receipts	$212,924	$2,370,800	$771,554	$35,033	$441,719	$190,499
Expenditures	149,680	1,999,179	861,789	37,934	418,006	284,622
Profits	63,243	371,621	.....	.....	23,712	.....
Loss	.....	.....	90,235	2,900	.....	94,123

Alaska Mexican Gold Mining Co.

Address: Mills Bldg., San Francisco, Calif. **Mine office:** Douglas Island, Alaska. Under same management as the Alaska Treadwell, which see.

Inc. April, 1892, in Minnesota. **Cap.** $1,000,000 in 200.000 shares, $5 par; 120,000 of which went to pay for the Alaska Mexican Gold Mine, and 60,000 were issued to the public by the Exploration Co., Ltd., of London. Annual meeting in May. Registration & Security Co., of San Francisco, registrars.

Comparative General Balance Sheet:

Assets—

Year	Property & Plant	Cash	Reserve Fund	Bullion Suspense	Accounts Rec., etc.	Ore Subject to Depletion	Total
1918 (June 30)	$606,459	$56,884	$93,909	.....	$188,873	$986,923	$1,933,049
1916	733,235	47,775	$93,909	.....	143,798	.....	2,046,896
1915	674,195	5,175	93,909	15,314	146,332	.....	934,926
1914	785,692	6,955	93,909	20,532	12,298	.....	919,386

Liabilities—

Year	Capital Stock	Accounts Pay., etc.	P. & L. Account	Ore Surplus	Total
1918 (June 30)	$900,000	$10,233	$35,893	$986,923	$1,933,049
1916	900,000	12,079	74,426	.....	2,046,896
1915	900,000	24,736	10,190	.....	934,926
1914	900,000	8,572	10,814	.....	919,386

Comparative Income Account (for later years see joint statement):

	Total Income	Operating Constr'n, etc.	Net Profit	Divid's	Deprec.	Balance
1916	$330,654	$266,417	$64,236	.....	.....	$74,426
1915	401,761	302,284	99,477	$90,000	$10,101	10,190*
1914	513,318	343,298	170,020	144,000	25,451	10,814*
1913	496,007	324,210	171,797	180,000	21,552	10,213*

* Including balance from previous year.

Property: Located on the east side of Douglas Island, between the 700' claim of the Alaska United on the west and the Ready Bullion mine of that company on the east. For a general description see Alaska Treadwell Gold Mining Co.

Development: includes the 1,570' Mexican shaft, devoted to general use, while all ore is hoisted through the 2,817' Central shaft, on the 700' claim of the Alaska United, adjoining on the west. The orebody has been opened by levels from the 110' level to the 2,300' level; distance between levels is 110'.

During 1916 development work done by the A. M. Co. amounted to 776′ on i own property, 10′ on the adjoining 700′ claim of the A. U. Co., and 3,714′ do jointly with the A. T. and the A. U. Cos.

Samples totaling 1,592, taken on five levels, averaged $1.63 per ton. Fro the 1,100′ downward ore has assayed as follows: $3.60, $3.02, $2.63, $1.23, 6 $1.23 and 79c per ton, the last being at 2,100′.

On July 27, 1916, surface evidences of a hanging-wall subsidence near t Treadwell—700 Ft. Claim boundary became apparent, and to protect the Trea well, 700 Ft., and Mexican mines, heavy drawing of reserves of caved and brok ore was stopped. The Mexican mill only worked 279 days. From Aug. 1916, the 240-stamp mill and half of the 300-stamp mill of the Treadwell w stopped. Salt water began to flow into the mine, and due precautions we taken. In April, 1917, the Mexican, Treadwell, and 700 Ft. mines were floode and shut down indefinitely. For details see the Alaska Treadwell.

Ore reserves: Estimated Dec. 31, 1916, 157,000 tons ore in sight, averag grade $1.80 per ton; against 1,188,866 tons of $1.87 ore in 1915.

The company has a 120-stamp mill that, in 1916, operated 34% of the tim with steam power and 66% of the time with water power. Duty per stamp p day was 5.24 tons, 1 lb. of chrome shoe crushed 2.31 tons ore, and 1 lb. of Trea well die crushed 5.15 tons ore. Mill sands are used for filling stopes.

A cyanide plant is owned and operated jointly by the Alaska Mexica Alaska Treadwell and Alaska United G. M. Cos., the A. M. Co. owning 20 of the plant. Power plants are in conjunction with those of the Alaska Trea well, which see.

Average number men employed daily in 1916 was 122, with average wag paid each $3.61. Miners received $3.50 per day.

Production and profits since 1909 are as follows:

			Concentrates		Total	Oper.	Oper.	
	Tons Crushed	Yield Free Gold	Tons Treated	Yield	Yield p. Ton	Costs p. Ton	Profits p. Ton	Di Pai
1917†.....	.....	.....	.....	.....	....	....	....	...
1916.....	175,476	$119,163*	4,398	$155,860	$1.57	$1.51	$0.06	...
1915.....	216,428	190,980	4,769	188,816	1.75	1.29	0.46	10
1914.....	233,457	238,756	3,340	270,267	2.18	1.45	0.73	16
1913.....	227,112	225,369	4,795	264,327	2.15	1.39	0.76	20
1912.....	233,299	307,951	4,956	371,169	2.91	1.58	1.33	25
1911.....	227,081	323,965	5,150	353,442	2.98	1.84	1.14	14
1910.....	218,960	390,198	4,166	375,523	3.50	1.76	1.74	38

† Mine flooded since April.

* Including $27,855 from copper plates.

Costs per ton for 1916 were: Mining, 91c; milling, 39c; cyaniding same a Alaska Treadwell. Mining costs include charges for 1,050′ of development a $21.38 per ft., and stoping 69,285 tons at $1.04 per ton. Milling costs includ crushing, 5.7c; tramming, 1.7c; stamping, 23c; concentrating, 8.7c.

As the Mexican may not produce any more ore, its total output may b given from 1894 to 1917: 4,445,807 tons, averaging $2.61 per ton at cost of $1.67 Out of profits, $4,161,657, dividends absorbed $3,507,381, or $19.47 per $5 share

Alaska Treadwell Gold Mining Co.

Address. Mills Bldg., San Francisco, Cal. Mine office: Douglas Island Alaska. **Officers:** F. W. Bradley, pres.; A. B. Davis, v. p.; F. A. Hammer smith, sec.-treas. Preceding officers: E. W. Hopkins. H. S. King, directors; P R. Bradley, cons. eng.; R. G. Wayland, gen. supt.

Inc. June 1, 1890, to take over the property of the Paris mine on Douglas Island, where operations had been conducted since 1882. Pur chase price was $5,000,000 in fully paid shares. **Cap.** $5,000,000; **shares** $2 **par.** Metropolitan Trust Co., New York, registrar and transfer agent

Comparative General Balance Sheet:

Assets—

	Property & Plant	Cash	Other Current	Supplies	Other Assets*	Total
1918 (June 30)	$3,531,054	$275,695	$1,347,162	$538,039	$7,886,262	$13,578,212
1916.....	3,942,947	245,023	956,034	789,012	8,439,607	14,372,623
1915.....	3,775,173	365,365	603,961	565,337	308,618	5,618,454
1914.....	3,685,306	295,587	558,053	599,471	309,965	5,448,382

*Ore subject to depletion.

Liabilities—

	Capital Stock	Accounts Pay, Etc.	Draft Account	P. & L. Account	Ore Surplus	Total
1918 (June 30)	$5,000,000	$280,365	$4,239	$411,575	$7,886,262	$13,578,212
1916.....	5,000,000	474,224	9,885	498,209	.....	14,372,623
1915.....	5,000,000	524,926	3,438	90,090	.....	5,618,454
1914.....	5,000,000	394,520	5,182	48,680	.....	5,448,382

Comparative Income Account (for later figures, see joint account):

	Earnings Gross	Net	Other Construc. Income & Repair		Divid's	Deprec.	Balance
1916.	$1,604,737	$658,119	$90,090	.....	$250,000	.....	$498,208
1915.	1,828,723	706,610	177,399	$24,822	650,000	$167,777	41,410
1914.	2,367,562	1,314,933	67,813	31,343	1,100,000	250,953	450
1913.	2,358,423	1,286,498	62,592	38,599	1,000,000	487,261	176,770†

†Deficit.

Dividends to Jan., 1917, aggregate $78.93 per share.

Property: The Treadwell group of mines, consisting of the Alaska Treadwell, the Alaska Mexican and the Alaska United, which operates the 700′ mine and the Ready Bullion, are under one management and are located on the east side of Douglas Island near the shore of Gastineau Channel. The A. T. property is farthest west. Geological conditions are the same in the mines of the 3 companies. Hanging wall of Treadwell is 1,000′ distant from present shore line, while that of the Ready Bullion lies for the most part under tidal water. Though several orebodies have been found, the mines are all situated on the same lode and ore is practically of identical origin throughout. In the Alaska Treadwell, 700′, and Alaska Mexican mines, the lode has been developed continuously for 3,500′. Between the Mexican and Ready Bullion mines is an undeveloped interval of 2,500. Width of orebodies is from 300′ to 400′.

Geology: the orebodies consist mainly of mineralized albite-diorite occurring in the form of intrusive dikes in black slate, whose structure they closely follow. They strike N. W.-S. E. and dip 50 degrees toward the N. E. The slates are metamorphosed shale. The ore-bearing dikes belong to a series of intrusives that appear interruptedly along the strike for a distance of about 3 miles in a zone 3,000′ wide. Next to the shore of Gastineau Channel the border is defined by a heavy bed of greenstone that forms the hanging wall of both the orebodies and the intrusion zone. Many of the dikes of albite-diorite at a distance from the hanging wall have been greatly altered and impregnated with pyrite and no workable orebodies have yet been found in them. The ore consists mainly of rock impregnated with sulphides, principally pyrite, and in part shattered and filled by veins of calcite and quartz, which also contain sulphides. The ore-bearing dikes are considerably mineralized throughout, and often the whole mass can be mined. The characteristics of the deposit are believed to indicate that it was formed by ascending waters, with little, or no subsequent secondary concentration. If this is correct there is little doubt that the ore will continue to a much greater depth than has been reached, and the limit of mining will probably depend finally upon increased costs, attendant upon operating at great depth.

The production, condition of the property, its history, development, equipment, etc., are fully described in Vol. XIII of this work. The mine has been flooded since April, 1917, and is practically a total loss.

Alaska United Gold Mining Co.

Address: Mills Bldg., San Francisco, Calif. Mine office: Douglas Island, Alaska. Under same management as the Alaska Treadwell.

Inc. Aug. 6, 1895. **Cap.** $1,000,000, shares $5 par, issued $901,000.

Comparative General Balance Sheet:

Assets—

	Property & Plant	Cash	Reserve Fund	Bullion Suspense	Accounts Rec., Etc.	Ore Subject to Depletion	Total
1918 (June 30)	$880,773	$9,129	$106,327	$.....	$289,022	$2,141,206	$3,426,64
1916.....	910,120	7,991	201,810	4,296	28,921	2,654,222	3,807,36
1915.....	726,180	10,192	201,810	50,245	3,900	.....	992,32
1914.....	634,000	4,663	201,810	51,924	34,171	.....	926,57

Liabilities—

Year	Capital Stock	Accounts Pay., Etc.	P. & L. Account	Ore Surplus	Total
1918 (June 30)	$901,000	$384,442	$.....	$2,141,206	$3,426,64
1916.....	901,000	$243,236	8,902	2,654,222	3,807,36
1915.....	901,000	55,312	36,015	.....	992,32
1914.....	901,000	10,411	15,160	.....	926,57

Comparative Income Account (see later figures see joint account).

	Total Income	Operating Constr'n, Etc.	Net Profit	Divid's	Deprec.	Balance
1916..	$1,111,697	$1,094,749	$26,947	$54,060	.....	$8,902
1915..	1,072,412	705,162	367,250	252,280	$94,115	20,855
1914..	975,329	727,391	247,938	162,180	81,153	4,605
1913..	1,054,018	668,953	385,065	414,460	30,050	59,445(d)

(d) Deficit.

Dividends to Jan., 1917, aggregate $11.35 per share.

Property: Located on the east side of Douglas Island, includes the 700 mine, lying between the Alaska Treadwell and the Alaska Mexican properties and the Ready Bullion mine east of the property adjoining the Mexican.

As the mine is flooded and property apparently lost, further description is not needed. See Vol. XIII of Mines Handbook for full description of property.

Recent production: (1) Ready Bullion mine, (2) 700-ft. Claim mine.

	Tons Crushed	Yield Free Gold	Concentrates Tons Treated	Concentrates Yield	Total Yield p. Ton	Oper. Costs p. Ton	Oper. Profits p. Ton	Div.% (a)
			(1)					
1917-18.... (21 months)	328,990	.....	.....	$724,686	....	....	....	..
1916.....	286,078	$237,715	6,630	338,534	$2.11	$1.52	$0.59	6%
1915.....	252,154	272,274	5,621	249,638	2.07	1.31	0.76	28%
1914.....	233,100	282,036	5,700	252,370	2.29	1.47	0.82	18%
1913.....	222,992	268,444	5,651	242,947	2.29	1.45	0.84	46%
1912.....	216,454	317,970	6,128	300,188	2.85	1.50	1.35	36%
1911 (b)...	223,663	278,034	5,461	241,248	2.32	1.71	0.61	9%

(2)

1917†.....	.....	.....	.....	.....	....	....	....
1916.....	262,850	$180,603	5,342	$260,375	$1.73	$2.37	$0.64 (c)
1915.....	281,265	263,319	5,934	256,943	1.85	1.31	0.54
1914.....	225,214	230,509	4,409	200,874	1.91	1.62	0.29
1913.....	225,435	284,097	4,495	248,055	2.36	1.44	0.92
1912.....	234,339	282,180	4,704	294,951	2.46	1.38	1.08
1911(b)...	224,968	284,430	4,477	244,193	2.35	1.56	0.79

† Mine flooded since April.

(a) Total for both mines. (b) Dec. 16, 1910-Dec. 31, 1911.

(c) Loss, due to heavy development charge.

Costs per ton for Ready Bullion mine in 1916 were: Mining, $1.00; milling, 34.4c; cyaniding, same as Alaska Treadwell. Mining costs include charge for 2,366' of development work at $12.66 per ft., and stoping 377,547 tons at 44.7c. per ton. Milling costs include crushing, 2.6c.; tramway, 2.2c.; stamping, 22.6c.; concentrating, 7c. Costs per ton for 700-Foot Claim in 1916 were: mining, $1.81; milling, 39.4c.; cyaniding, same as Alaska Treadwell. Mining costs include charges for 7,771' of development work at $20.40 per ft., stoping 284,566 tons at 81.7c. per ton. Milling costs include crushing, 5.8c.; tramming, 1.8c.; stamping, 24.2c.; concentrating, 7.6c.

Alaska United is the only mine now being operated on Douglas Island. On April 21, the 700-Foot Claim, Treadwell, and Mexican mines were lost by flooding. The Ready Bullion mine is some distance away from these mines and escaped. From 1898 to 1917 the 700-Foot Claim yielded 2,400,868 tons of $2.05 ore, at a cost of $1.66 per ton, giving a profit of $946,259. The Ready Bullion produced 3,967,135 tons of $2.08 ore at a cost of $1.56 per ton, and total profit of $2,049,406. Of combined profits, $2,995,664, $2,045,270 was paid in dividends.

ALASKA UNITED COPPER EXPLORATION CO. **ALASKA**

Office: 551 Coleman Block, Seattle, Wash. **Mine office:** Dan Creek, Copper River district, Alaska.

Officers: L. C. Dillman, pres.-gen. mgr.; Jas. A. Munday, v. p.; E. V. Dillman, sec.; W. A. Mears, treas, with A. Ingraham, W. Hughes, Frank L. Huston, Jas. J. O'Keane and Thos. M. Dunn, trustees; C. C. Jones, cons. engr.

Inc. Nov. 14, 1906, in Washington. **Cap.**, $12,500,000. $1 par. Debentures, $150,000 6% bonds. Annual meeting, first Monday in January.

Property: 23 claims, 460 acres, comprising the Finch, Dillman and Porcupine groups, five miles from the Copper River railroad, on branches of the Chitina and Nizina rivers, in the Copper River district, Alaska.

Exploratory work has been done on the various groups by small tunnels and numerous trenches and open cuts, showing copper ore (bornite and chalcocite), said to average 35%.

The company is primarily a holding company, prospecting and developing properties in its possession for sale to other parties.

Company controls the Alaska Westover Copper Co., which see.

ALASKA WESTOVER COPPER CO. **ALASKA**

Office: 551 Coleman Block, Seattle, Wash. Mine, 18 miles from Copper River railroad in the Chitina district.

Officers: L. C. Dillman, pres., W. A. Mears, sec.-treas., with F. B. Whiting, F. J. Perine, F. B. Chandler, trustees.

Property: the Westover group on Boulder creek, title to which was transferred from the Alaska United Copper Explor'n Co., 23 claims, about 460 acres, covering a contact between limestone and greenstone. The contact lies horizontally and the ore outcrop is from 6 to 14' thick and 43' long in a perpendicular bluff at 4,990' elevation.

Development: 1,000' of tunnels. One tunnel started at the south end is reported to have shown 4 to 20' of ore for 45' in a S. E. direction, and a crosscut on the ore body shows 2' of glance claimed to assay 50% copper. It widens to 14' for about 36'; is then cut off by a fault, but continues about 12' to the north. Bornite, chalcocite and chalcopyrite have replaced limestone along irregularly distributed fissures.

ALASKA ZINC & COPPER CO. **ALASKA**

Office: Green Bldg., Seattle, Wash.

Officers. M. O. Goodner, pres.-treas.; A. Goodner, v. p.-sec.

Inc. Jan. 3, 1917 in Washington. **Cap.** $1,000,000. $1 par; 800,000 issued; 650,000 in escrow for two years with H. C. Loup & Co., New York. U. S. Corporation Co., agent. Listed on New York Curb.

Property: a prospect, showing zinc, copper, gold and silver ores in claims on Prince William Sound, Alaska.

ALICE MINING CO. **ALASKA**

Address: Valdez, Alaska.

Property: consists of the Alice mine, situated at sea level on west side of Shoup bay, 1½ miles N. W. of the Cliff mine. The vein, found in 1910, is a well-defined fissure, strike N. 60° W., dip 70° S., width from a few inches to 2½'. Ore minerals include gold, pyrite, chalcopyrite, arsenopyrite, and sphalerite. The country rock is composed of graywackes, slates and green schists.

Development: by 247' tunnel, a two-compartment shaft, 170' deep, and 100' of drifting at the bottom of the shaft.

Equipment: includes 100 h. p. boiler, 3-drill air compressor, 50-light dynamo, 5 h. p. steam engine, steam hoist, pumps, blacksmith shop, mess house and bunk house.

Small shipments were made in 1913 and 1916. Assessment work only done in 1915 and 1916, but nothing reported since. See U. S. G. S. Bull. 622 and 662.

ANCHORAGE GOLD MINES CO. **ALASKA.**

Officers: Byron Bartholf, pres.; Sidney Anderson, v. p.; E. N. Culbertson, treas.; A. G. Thompson, sec.

Cap. $100,000, shares $1 par.

Property: prospects in Archangel creek, Willow creek district. (developing).

AUK BAY MINING & DEVELOPMENT CO. **ALASKA**

Address: P. J. Wiley, mgr., Juneau, Alaska; Henry Brie, sec.-treas.

Property: 19 claims, 380 acres, at Auk Bay, 12 miles N. of Juneau, Harris mining district, said to show a contact vein in diorite, containing gold and silver values. Has a small testing mill of 12 tons daily capacity. Property idle on account of high cost of supplies and materials.

BANGOR CREEK DREDGING CO. **ALASKA**

Address. Union Construction Co., 604 Mission Street, San Francisco; or Nome, Alaska.

Property: placer ground near Nome, carrying gold bearing gravel.

Equipment: includes a dredge with 3½ cu. ft. buckets, run by semi-Diesel engines.

BEATSON COPPER CO. **ALASKA**

Entire property, assets and liabilities acquired by the Kennecott Copper Corporation, and company dissolved Oct. 4, 1915.

BEAVER MOUNTAIN MINING CO. **ALASKA**

Idle. **Mine office:** Sulzer, Prince of Wales Island, Alaska. Henry Miller, pres.; George Comer, mgr., at last accounts. Lands: on the southern side of Beaver mountain, Hetta inlet. Development: by tunnels, showing ore carrying copper, nickel and cobalt. Operations confined to annual assessment work.

CACHE CREEK DREDGING CO. **ALASKA**

Address: Seattle, Wsah., or Thos. D. Harris, Marigold, California.

Inc. Feb., 1914, in Washington. **Cap.** $150,000, $1 par.

Property: a lease on placer ground of the Cache Creek Mining Co., on Cache Creek, Yentna mining district. A 7' bucket dredge has operated with good results, reported showing as high as 75c. per yard.

Company also owns a coal mine 2 miles from dredging property.

CAMERON-JOHNSON GOLD MINING CO. **ALASKA**

Reorganized in 1916 as Valdez Gold Co., which see.

CHICHAGOFF MINING CO. **ALASKA**

Chichagoff Island, Alaska. Controlled by Hugh C. Wallace and W. R. Rust of Tacoma, Wash. James L. Freeburn, supt.

Property: the Chichagoff mine, 60 miles from Sitka, 170 miles from Juneau, carries high-grade, free milling quartz.

Equipment: 30-stamp mill with tube mill section and daily capacity of 210 tons of ore. A flotation unit was recently installed. Company has hydro-electric plant with dam at Rust Lake. 150 men employed. See U. S. G. S. Bull. 504, p. 22.

CHITINA KUSKULANA COPPER CO. **ALASKA**

Louis Kleyle, mgr.

Property: War Eagle group, near the North Midas, Kuskulana, Copper River district. Ore is chalcopyrite.

Development: by tunnels on War Eagle and Calcite claims.

Equipment: 120 h. p. boiler, 100 h. p. steam engine, electric generator and air compressor.

COLUMBIA RED METAL MINING CO. **ALASKA**

Office: 1109 First Ave., Seattle, Wash.

Officers: Wm. Uder, pres.-treas.; A. D. Thompson, v. p.; O. Roberts, sec., with W. E. Smith, C. C. Elwood, gen. mgr., C. H. Voll and R. J. McChesney, directors.

Inc. 1917 in Wash. **Cap.** $3,500,000; $1 par; divided into 1,500,000 shares common, all issued and paid to owners for property, and 2,000,000 preferred, outstanding 222,650 shares.

The secretary reported July 1, 1919, that 272,000 shares had been sold at 5, 10, 15 and 20c., and a 30c. price was to take effect July 15th. Company has no debts and with funds due on stock contracted for and under option, sufficient funds will be available for present requirements.

Property: 9 claims, on Glacier bay, Prince William sound, 8 miles from tidewater, Valdez district. Management reports a vein averaging 16′ in width, showing chalcopyrite, in greenstone, varying from concentrating ore to 24% smelting ore, with some gold and silver.

Development: by tunnels. Reserves are estimated at 50,000 tons.

Equipment: includes sawmill of 12,000′ capacity, cable, supplies, cabins, tents and 20-ton tug-boat. A tractor and trailers are required. Ten men employed.

Company issued a statement made by five stockholders just returned from the property, that they "found the ground as good, if not better, than represented. We found three big ledges which contain immense quantities of shipping ore . . . ."

CONSOLIDATED ALASKA CO. **ALASKA**

Idle. Is a successor of Alaska Bonanza Mng., Trading and Trans. Co., reorganized 1900. Owned property at Nome, Alaska.

CRYSTAL GOLD MINING CO. **ALASKA**

Owners, Bernard Heins, and partners, Snettisham, Alaska.

Property: 6 claims near Snettisham, containing gold quartz veins in diorite, course S. E., dip 40°. Ore shoots are 4½′ wide, 60-70′ long. Ore averages about $8.50 per ton as sulphides.

Development: by shaft and 400′ tunnel; underground workings, total 4,000′.

Equipment: includes 5 stamp mill and 2 Frue vanners.

Stated to have produced about $67,000 to date.

CUBE MINING CO. **ALASKA**

Jeff Devinney and M. F. Hendrickson, Valdez, have a bond on the Three-in-One claims, Port Valdez district, one mile W. of Gold Creek. The country rock is schistose graywacke, and argillite, cut by quartz vein running N. 30° W., with dip 50° to 80° W. It averages 2′ wide and contains chalcopyrite, sphalerite, galena, and arsenopyrite, with gold values.

Development: by 800′ tunnel on vein, 11′ wide, with raises, giving depth of over 1,000′.

Equipment: 3 semi-Diesel engines, Hardinge conical mill, amalgamation and concentration plant. Employs about 15 men.

CYMRU COPPER CO. **ALASKA**

Idle. Mail returned unclaimed in 1919, from former office, 117½ South Tenth St., Tacoma, Wash. Mine near Baldwin, Prince of Wales Island, Alaska. J. M. Miller, Jr., pres.; F. P. Hicks, v. p.; Frank D. Nash, sec.-treas.

Inc. 1905, in Washington. **Cap.** $50,000, $1 par.

Property. 6 claims, 100 acres, on Moira sound, shows 3 lenticular orebodies, reported by company as of 40′ aggregate width, assaying 6 to 10% copper, 4 to 6 oz. silver and $2 gold per ton, mainly from chalcopyrite ores. Mine has a 100′ shaft and a 187′ tunnel, with hoist and a 6-drill air compressor. A 4,000′ surface tram conveys ore to a 1,000-ton ore bin.

Shipments in 1906 were 3,000 tons of copper ore, returning 4½% copper and $1.25 in gold and silver. Idle since 1907, owing to litigation among the stockholders; last reported under bond to a stock company organized by Geo. V. Bland, of Ketchikan, Alaska.

DICKEY, W. A. COPPER CO. **ALASKA**

Taken over by Ladysmith Smelting Co., which see.

EAGLE RIVER MINING CO. **ALASKA**

Address: care B. L. Thane, Crother Bldg., San Francisco, Calif. G. T. Jackson, mgr, Amalga, Alaska.

Property: the Eagle River, a group of gold quartz claims 4 miles from Echo Harbor and 25 miles from Juneau, Alaska, has been consolidated with the Yankee Basin adjoining and on the same belt as the Cottrell group. Ore occurs in 8 small shoots in black slate zone, broken by an elaborate faulting system and reported to average $20 per ton.

Development: by tunnel, 2,000′ long, that tapped ore at a depth of 700′. In 1915, 2,000′ of diamond drilling in 7 holes was done. Property worked since 1903, producing upwards of $500,000, according to reports. Only annual assessment work has been performed of late due to abnormal conditions.

ELLAMAR MINING CO. **ALASKA**

Office: 211 American Bank Bldg., Seattle, Wash. **Mine office:** L. L. Middlekamp, supt., Ellamar, Prince William Sound, Alaska.

Officers: F. M. Jordan, pres.-treas.; C. S. Packer, sec., with W. R. Rust and Chas. de Steigure, directors.

Inc. 1900, in Washington. **Cap.,** $10,000,000; $100 par. Reorganized in 1916 with $2,500,000 capitalization; shares $5 par. Controlled by F. M. Jordan, Seattle.

Property: 14 claims, patented, known as the Ellamar mine, at Ellamar, on Virgin Bay, 20 miles S. W. of Valdez.

Ore: occurs in a lens 80x200′ and lies wholly within the slate, pinching out 30′ below the 500′ level. Ore is mainly chalcopyrite associated with pyrite, pyrrhotite, and sphalerite in a gangue of slate, graywacke, and quartz, assaying from 3 to 25% copper, 3 oz. silver, and up to $50 gold. Mine was the first copper producer in Alaska, beginning shipments in 1901. A cofferdam has been built to permit mining orebody outcropping on the beach, below sea-level, and from 1910 to 1913 mining was confined to that part of orebody between surface and 200′ level. Geology fully described, p. 90, U. S. G. S. Bull. 605, 1915. During 1916, the water level had been lowered to the 500′ level. Ore is mined by underhand stoping.

Development: by 600′ three-compartment vertical shaft, with levels at 100′ intervals, and 3 miles of workings, said to block out about 250,000 tons of ore for stoping.

Equipment: includes 300 h. p. steam plant, with 3 boilers 1,200 cu. ft. Nordberg compressor, a 12x25″ Nordberg engine, and 60 h. p. hoist. In 1914 a 200-ton per hour aerial tram and new loading dock were completed. The tram conveys ore from mine bunkers a distance of 2,200′ across shallow water to the loading dock, having 25′ of water at low tide. Buildings include a machine-shop, smithy, laboratory, mess-house, and 12 other buildings.

Costs are said to be about $3 per ton, for ore loaded on vessels, with about $3 transportation charges to the Tacoma smelter.

Production:

Year	Tons	Copper, %	Gold, oz.	Silver, oz.
1918	27,184	2.03	0.14	0.52
1917	54,759	1.74	0.17	0.70
1916	46,000	2.83	0.15	0.60
1915	36,000	2.18	0.17	0.61
1914	31,000	....	....	....
1913	25,000	....	....	....
1912	22,000	2.50	0.30	0.90
1911	16,000	6.00	0.24	0.80

By June, 1919, monthly output was 2,000 tons; 40 men employed.

FAIRBANKS GOLD MINING CO. **ALASKA**

Property, placer ground on Fairbanks creek, Fairbanks district. During 1918, reported to have ordered dredge.

FAIRHAVEN POWER & MINING CO. **ALASKA**

Address: H. L. Mead, care John Hays Hammond, 120 Broadway, New York City.

In Sept., 1919, it was reported that a syndicate had been formed to underwrite 200,000 shares. Company has a placer property in Alaska, endorsed by the above engineer.

FIDALGO-ALASKA COPPER CO. **ALASKA**

Address: Ellamar, Alaska. Thos. Donahue, pres.; L. A. Levensaler, mgr.; E. D. Reiter, supt.

Property: 24 claims, about 15 miles from Ellamar and one-half mile east of Irish cove, on the southern side of Fidalgo bay, an inlet of Prince William sound.

Development: includes a 650′ main tunnel following a well-defined fracture zone, in slate, carrying 2 lenticular ore-shoots, said to be 5x50′ in cross-section, cut at 200′ and 300′ from portal, with many small stringers. Report good ore in outcrops about 300′ W. of the old workings.

Ore: mainly chalcopyrite, said to give average assays of about 10% copper, occurs as cementing material of fractures, irregular stringers, disseminated grains and as lenticular replacements of country rock, the fracture zones being very erratic in size and extent.

Equipment: includes 1,000′ aerial tram, ore bins and wharf, besides several mine buildings. During 1916 installed a 36″ Pelton wheel operating under 400′ head, driving single-stage air-compressor. Company employing 16 men at last reports and management plans further development. Shipped several hundred tons of ore during 1916. Geology described on page 118, U. S. G. S. Bull. 605.

FISH CREEK MINING CO. **ALASKA**

Office: 558 Empire Bldg., Seattle, Wash.

Officers: W. R. Tonkin, v. p.-treas., Seattle; W. J. Palmer, sec., New York city, with J. Arthur Hall, directors.

Inc. 1918, in Washington. **Cap.**, 600,000 shares; par 25c; 300,000 shares in treasury.

Property: 17 claims with two mill-sites about 7½ miles from tidewater, on same mineralized zone 1½ miles south of the Premier mine, and on U. S. side of the International boundary.

Ore: contains silver sulphides accompanied by a little galena and chalcopyrite, occurring in 4 well-defined veins.

Development: by several tunnels aggregating 1,000′, with greatest depth of 250′.

Production: several small shipments of ore mined in development work, sent to Tacoma smelter, varied from 78 oz. silver per ton, with 10% lead, $10

gold and 1½% copper, up to 200 oz. silver, $20 gold, 16% lead and 2½ copper.

Is a very promising prospect.

FORTY MILE POWER AND DREDGING CO. **ALASK**

Office: Chas. L. Peabody, v. p., 10 Wall Street, New York City.

Officers: John A. Stedman, pres.; Chas. L. Peabody, v. p.; E. R. Ho lenbeck, sec.-treas. Satterly, Canfield & Stone, 49 Wall St., attorneys. Walla G. Clark, 149 Broadway, cons. engineer. E. R. Cooper, mgr.

Inc. 1918 in Del. **Cap.** $5,000,000, $1 par; about 3,500,000 issued.

Property: report controlling 119 miles of gold placer ground on Fort mile river in Alaska and Yukon Territory, from which $152,000 was recovere in 149 days by dredging, also state having sunk 5,000 test pits, proving a block 1,500,000 cu. yds. averaging 60c. with other extensive areas of pay gravel. Bot dredging and hydraulicking used.

FREE GOLD PIGOT BAY MINING CO. **ALASK**

Address: W. R. Millard or C. B. Smith, Valdez, Alaska.

Inc. Aug., 1919. **Cap.** $350,000, $1 par.

Property: on Pigot bay, Prince William Sound, Alaska.

GALENA BAY MINING CO. **ALASK**

Offices: 540 Orchestra Bldg., Chicago, Ill., and L. C. Smith Bldg., Seat tle, Wash. **Mine office:** Valdez, Prince William Sound, Alaska.

Officers: J. B. Carter, pres.; Albert Barge, sec.; J. S. Jurey, asst. sec L. J. Rusk, treas.; Chas. Simenstad, supt.

Inc. 1906, in Washington. **Cap.** $500.000, $1 par, 486,001 outstandin Trustees: J. B. Carter, Arthur W. Cutten, E. C. Badenoch, R. E. Tearse, B. Proctor, L. J. Rusk, C. A. Hayes and John S. Jurey. **Annual meeting.** secon Tuesday in October.

Property: controls the Nikolai Mining Co. The company's holding proper, acquired in 1907. are all on Galena Bay, about 30 miles from Valdez, an include the Sunnyside, Copper Crown, Starvation, Sheep Run, Vesuvius, and 1 other claims, all patented.

Development: by 2,200′ adit on the Starvation, 400′ on the Sunny side, with only surface work and diamond drilling on the Copper Crown an Sheep Run Claims. Ore occurs in lenses of chalcopyrite, pyrrhotite, quartz an calcite, 4-5′ long and up to 14″ in width. On the Copper Crown a 4′ vein o solid sulphide ore was opened up in a N. E. shear zone, assaying $3-$4 gold pe ton. Geology fully described, p. 100, U. S. G. S. Bulletin 605. Only necessar assessment work done since 1912.

GOLD BULLION MINING CO. **ALASKA**

Operated by Willow Creek Mines, which see.

Address: M. D. Leehey, Alaska Bldg., Seattle, Wash.; A. J. Budd mgr.; N. D. Bothwell, supt., Wasilla, Alaska.

Property: 8 claims the Willow creek mines on the S. E. wall of Craigi Creek valley, 4 miles above mouth of creek, in Willow Creek district, south central Alaska.

Ore: gold quartz in vein from 2′ to 14′ wide.

Development: by several tunnels. Vein is said to be proven for a length of 3,500′.

Equipment: includes 2 aerial tramways, the longest 3,253′, with a rise o 850′; 12-stamp mill and small cyanide plant. Plan installation of Dorr con tinuous decantation plant. Water power is used. Aerial tram 1 mile long con nects mine and mill.

Operating costs in the Willow Creek district are high, due to short seaso of 100 to 150 days each year, and the isolated location of property. District will be made accessible by the Government railroad from Seward to Fairbanks now being built. See U. S. Geol. Survey Bull. 607, pp. 66, 71.

GOLD CORD MINING CO. **ALASKA**

Address: 602 S. Kingsley Drive, Los Angeles, Calif., and Willow Creek, Alaska.

Control purchased during 1918 by Frank Barthoff, of Billings, Mont., John Smith, pres., Los Angeles, Calif., and J. B. Swan, of Henrietta, Okla. William Martin of Anchorage, operating under a short term lease.

Ore: gold values in vein said to be 10′ to 14′ wide. Mill test on 40 tons reported to have yielded $70.46 per ton and tailings assaying $12 were reduced to 80 cents in the cyanide plant.

GOLD KING MINING CO. **ALASKA**

Probably dead. Described, Vol. XII.

GRANITE GOLD MINING CO. **ALASKA**

Valdez, Alaska. **Officers:** B. F. Millard, pres.-treas.; W. R. Millard, 1st v. p.; O. S. Larsen, 2nd v. p.; Miss Shanstrom, sec., with Jafet Lindeberg, directors.

Inc. 1913, in Alaska, upon purchase from original locators for $50,000. **Cap.** $500,000, $1 par; outstanding, 430,000 shares. Annual meeting, first Tuesday in October. **Transfer office:** Alaska Bldg., Seattle, Wash.

Company claims to have spent $330,000 to March, 1916, on the property, and to have had a total production of $277,000. Surplus March 1, 1916, $21,000. Initial dividend, 2 cts. per share, paid April 10, 1916, and 2 cts. paid in May.

Property: 3 claims, 60 acres, unpatented, on the west side of Port Wells, on the coast between Hobo Bay and Harrison Lagoon. Two veins course N. 40° W., dip 58° N. Country rock consists of interbedded slates, graywackes and argillites cut by large masses of granite. Present development is said to show a third vein on the 210′ level. Metallic ore minerals are gold, and the sulphides of iron, zinc, lead and antimony. Ore said to run from $6 to $50 with average of $12 per ton. See U. S. G. S. Bull. 622, pp. 136-138.

Development: 200′ incline shaft and tunnels, with 4 levels opened up from 300′ to 700′ in length. Total underground workings, over 5,000′, all worked through 800′ tunnel at mill level. Three stopes in ore, April, 1919.

Equipment: former machinery sold with exception of 10-stamp Hendy mill, crushers and concentrators, as company plans installing 160 h. p. hydro-electric plant to furnish power.

Production: 1916, averaged 60 to 70 tons per day, yielding about $20,000 gross per month.

Reported, May, 1917, that mill had closed down on account high cost of material; intends to resume when costs become lower. A mistake seems to have been made in estimating ore reserves, and further development was being done to open ore. The last 7 months' production was reported to have been $70,000.

GREAT BRITAIN GROUP **ALASKA**

Owned by a Vancouver and Victoria syndicate. Property: at Whalebone Cove, on the western shore of South Valdez Island, Alaska, comprises 4 claims, showing bornite, tetrahedrite and chalcocite ore, occurring in the contact between limestone and altered lime.

Development: by 3 tunnels, showing 4 to 12% copper ore. Ore blocked out estimated at 1,800 tons by F. J. Crossland. Shipments of 700 to 800 tons have been made to the Tacoma smelter, said to average 3% copper. A 500-ton bunker was being erected on the beach for loading shipments on vessels. No recent information. Probably idle.

GREAT NORTHERN DEVELOPMENT CO. **ALASKA**

Operating office: Valdez, Alaska. **Mine and works office.** Philips, Alaska. Also controls the Regal Mines Co., which see.

Officers: Jas. Phillips, Jr., pres.; E. F. Gray, v. p.; Walter M. Briggs, sec.-treas.; Edwin F. Gray, gen mgr., with J. C. Fairchild, H. F. Knoblauch and H. L. Gaskill, directors.

Inc. 1906, in Maine. **Cap.** $1,000,000, $10 par; issued, 70,100. Is a holding company. Annual meeting, first Tuesday in November, Petley, Morse & Co., auditors, 43 Exchange Place, New York.

Property: a solid tract of about 165 claims, about 3,000 acres in process of patenting, on the south bank of the Kotsina river, below the mouth of Roaring

Creek, near the Copper River Railroad, and about 60 miles from the Bonan mine of the Kennecott Co. Ore is greenstone containing chalcopyrite in sm amount.

Development: work totals 8,000', and is said to have opened up a lar tonnage of low grade ore.

HEMPLE COPPER MINING CO. **ALASK**

Valdez, Alaska. **Mine office:** Landlock, Alaska. **Officers:** S. A. Her ple, pres., treas. and gen. mgr.; S. I. Hemple, sec., with Arthur Lang and I. J. D venney, directors.

Inc. March, 1910, in Alaska. **Cap.** $1,000,000, $1 par.

Property: 6 claims, 4 patented, 120 acres, with a 2-acre mill site, all tir ber, near the Standard and Three Man mines, at Landlock Bay. Shows gree stone, slate and quartzite, carrying 3 veins with 5 or 6 shoots, said to be 24' wide places and traceable for 3000', carrying chalcopyrite, giving average assays of to 6% copper. Mine is opened by tunnels of 50', 300', 575' and 800', with abo 3,000 of workings. On 350' level, vein showed width of 24' in 3 crosscu The vein has also been opened at depth of 800'. There is no power plant, b property has 6 buildings and gasoline engine. Working two shifts, 1919, in t expectation of opening up the orebody on the 700' level.

HOUGHTON-ALASKA EXPLORATION CO. **ALASK**

Company dissolved and property sold. Fully described in Vol. XII.

HUBBARD-ELLIOTT COPPER CO. **ALASK**

Offices: 35 N. Dearborn St., Chicago, Ill.; 10 Wall St., New York; 6 New York Blk., Seattle, Wash; Elliott Creek, Chitina district, Alaska.

Officers. H. P. Elliott, pres.; R. Reichardt, 1st v. p.; T. J. Dolan, 2 v. p.; A. J. Elliott, sec.; J. T. Evans, treas.; L. G. Hinckle, supt.

Inc. Jan., 1911, in Washington. **Cap.** $3,500.000, $1 par; 1,500,0 shares issued in exchange, share for share, for stock in the old Hubbard-Ellio Copper Mines Development Co. of Alaska; 2,000,000 shares treasury stock.

Property: 35 patented claims, 5 mill sites with U. S. government titl and 84 unpatented claims, over 2,500 acres, covering 6 miles in Elliott Creek valle Acquired an 8-12 interest in the adjoining U. G. I. group of 8 claims, 1917. Ellio creek is an affluent of the Kotsina river, about 15 miles above junction of t Kotsina with the Copper river.

Geology: Copper ore occurs in fissure veins and associated replac ment orebodies in greenstone, with limestone beds above it. The prominent ou crops are practically all on the north side of Elliott creek, near the contact, whic runs N. 75° W. and dips 80° N. All outcrops are in the greenstone underlying t limestone beds except on the Leland and Lawton claims, which are in a wel defined porphyry dike. Above the limestone is found a heavy capping of co glomerates.

The principal ore minerals are bornite, glance and chalcopyrite. The tot absence of surface oxidation due to glacial action is notable, and sulphides occ in a calcite matrix in the veins and with a greenstone matrix.

Development: by tunnels.

Equipment: includes compressor, drills, etc. Hydro-electric pow plant and concentrating mill.

A stockholders' meeting to be held at Seattle on February 2, 1920, will a on an agreement with the "Hubbard-Elliott Development Syndicate." This pr posed syndicate is to have a capital of $500,000 in 5 series of shares at $100,0 par for each, to exploit and develop the property. When operations reach t productive stage, the Syndicate will either continue or will organize a new co pany to be called the Elliott Creek Copper Co., in Delaware, with a capital not less than $8.500,000, nor more than $10,000,000. In 1920, $100,000 is need for transportation, equipment and development.

INDEPENDENCE GOLD MINING CO. **ALASK**

Seward, Alaska. **Property:** 5 claims and a mill site, in process patent, in Fishhook Creek Valley, on the east slope of Granite Mountain, Willo Creek mining district. Mine located in 1907, and formerly owned and ope ated by the Alaska Gold Quartz Mining Co., show 2 veins. The Granite Mtn.,

main vein, from 2"-4' thick, occurs in quartz diorite, showing native gold, pyrite and chalcopyrite; strike N. 14° to 20° W., with dip 2 to 20° S. W. Developed by open cuts, stopes and several tunnels, longest 386' follows vein for 265', and at the face has an incline 480' deep on the vein. The Independence, or upper vein, 620' vertically above and running parallel to the Granite Mtn., has strike N. 12° W., with average dip of 42° W., averages 12" thick and is only slightly developed.

Equipment: includes 3-stamp mill, with one Nissen stamp and concentrator, 2 aerial trams connecting mine and mill. Production in the past has been mainly from the Granite Mtn. workings. Probably idle since 1917.

JOSEVIG-KENNECOTT COPPER CO. **ALASKA**

Address: W. H. Seagrave, mgr., L. C. Smith Bldg., Seattle, Wash.

Officers: D. K. McDonald, pres.; J. B. MacDougall, v. p., with M. E. Hay, W. L. Gazzam and J. W. Roberts, directors.

Inc. in Washington. **Cap.** $2,500,000, $1 par.

Property: 19 lode claims, 1 placer claim, 7 miles from Kennecott, Alaska. Glowing reports were made regarding this property by the promoters, which appear to have been a misrepresentation of fact. One statement is said to have claimed that the mine was superior to the Kennecott Copper Corporation. More conservative estimates made by the consulting engineer give a very small tonnage of ore, averaging about 3¼% copper. Due to location, transportation difficulties, small amount and grade of ore, etc., the future of this property is very uncertain. No work being done now on account of litigation and internal dissension between the promoters and the board of directors. Investors brought suit against the promoters for misrepresentation, and in April, 1918, were offered a settlement of 37½ cents a share for stock sold by subscription between Nov. 26 and Dec. 13, 1916. Stricken from New York Curb May, 1918. On October 3, 1919, G. F. Rowe, D. McDonald, G. E. Snyder, W. B. Hancock, J. P. Gearon and Christian Josevig, all of Seattle, were indicted by the Federal Grand Jury on charges of having used the mails to defraud and of conspiracy. These men are alleged to have sold worthless shares, receiving $400,000 therefrom.

JUALIN ALASKA MINES CO. **ALASKA**

Company is a subsidiary of the Alguncian Development Co. Jean Vanophem, pres., 16 Rue de Turin, Brussels, Belgium; C. G. Titus, mgr., Juneau, Alaska.

Property: 30 claims on the north shore of Berners Bay, in the Juneau region, developed by 360' main shaft, crosscuts and drifts. A drainage-tunnel to be 7,800' long when completed has been driven 2,000'.

Ore reported to be 90% free milling.

Equipment: includes 5½-mile tram, connecting the mine with the wharf, 450-h. p. compressor and hydro-electric plant and 4 semi-Diesel engines of 150-h. p. each. Plans are under way for increasing the mill capacity from 40 to 150 tons daily.

Production, under former owners said to total 50,000 tons of $11.20 per ton gold ore. Property was closed in Aug., 1914, but reopened in May, 1915. To May, 1917, the output was 22,366 tons of $11.10 ore. Reported production in 1918 of $90,000 from ore extracted in driving the tunnel and treated in the 10-stamp mill.

KENAI-ALASKA GOLD CO. **ALASKA**

Jas. Hayden, mgr., Seward, Alaska. **Property:** on Great Falls Lake, adjoining the Skeen-Lechner, shows a 2' vein, cut on the 260' level, which is said to carry ore mining better than $25 per ton.

Developed: by 1,700' of tunnels and stopes.

Equipment: includes 5-stamp mill, and 8,000' aerial tram connecting mine and mill.

KENNECOTT COPPER CORPORATION **ALASKA**

Office: 120 Broadway, New York.

Officers: W. C. Potter, chairman; Stephen Birch, pres.; W. P. Hamilton, v. p.; C. T. Ulrich, sec., with S. J. Clarke, H. O. Havemeyer, Seward Prosser, E. A. and H. F. Guggenheim, directors; E. T. Stannard, gen. mgr.; E. S. Pegram, treas.; J. N. Steele, gen. counsel; E. R. Reefs, purch. agent. J. C. Lane, met. supt.

Inc. April 29, 1915, in New York. **Cap.** $6,000,000; increased May, 191 to $15,000,000, in 3,000,000 shares; 2,787,059 5-13 outstanding Jan. 1, 1919. Ther were 20,000 shareholders early in 1920.

Bonds: authorized (June 1, 1915), $10,000,000 6 per cent. 10-year con vertible sinking fund gold bonds. In April, 1917, all outstanding bonds of thi issue had been converted into stock.

On Mar. 21, 1917, company issued $16,000,000 of two-year, 6% notes, t finance purchase of more Utah Copper shares. Of this amount, $7,150,000 ha been retired by Dec. 31, 1917, and $12,000,000 a year later, leaving $4,000,000 out standing. This amount was due Mar. 21, 1919.

On Mar. 1, 1919, a new issue of $12,000,000 one-year 6½% notes was author ized, in order to finance further development, to enable the company to carr its accumulation of copper, over 50,000,000 lb. at that date, and to retire th $4,000,000 notes due.

On January 25, 1920, company sold $15,000,000 of 7%, 10-year, convertibl notes, secured by 500,000 shares of Utah Copper Co., now $75 each.

D. A. Crockett, 149 Broadway, transfer agent; Bankers' Trust Co., New York registrar. Annual meeting first Tuesday in May. Stock listed on New Yor Stock Exchange.

In 1918, Kennecott secured control of the Mother Lode Coalition Mines Co., whose property adjoins it.

Statement of Assets and Liabilities Dec. 31, 1916.

Assets.

	1916	1917	1918
Property Accounts:			
Mining property, net book values	$17,578,355	$27,002,050	$20,744,877
Less depreciation	392,248	745,694	1,136,927
	$17,186,107	$26,256,356	$19,607,950
Construction and equipment	1,463,407	2,371,249	2,632,077
	$18,649,514	$28,627,605	$22,240,027
Investments:			
616,504 (182,000 added in 1917) Utah Copper shares	$33,160,787	$51,994,081	$50,606,947
2,565,691 (1,041 added in 1917) Braden shares	39,456,154	39,472,813	39,475,890
500 Katalla shares	57,459	57,459	.....
$23,000,000 par C. R. & N. W. Ry. bonds	9,801,417	8,653,608	8,078,108
48,174 C. R. & N. W. Ry. shares	1	1	1
23,854 1-8 Alaska S. S. shares	2,385,412	2,385,412	2,385,412
500 (490 added in 1918) Alaska Dev. and Min. Co. shares	5,021	5,021	62,480
	$84,860,251	$102,568,395	$100,608,839
Current and Working Assets:			
Metals on hand	$9,648,513	$1,619,441	$2,421,485
Ore and concentrates	137,089	112,292	128,739
Materials on hand	438,397	766,030	935,600
Accounts collectible	1,893,105	3,342,400	2,389,185
Deferred accounts	30,073	56,482	67,064
Marketable Securities	2,077,000	1,359,236	2,336,591
Cash	4,117,934	4,024,914	2,695,534
Total current assets	$18,235,111	$11,280,796	$10,974,198
Grand total	$122,730,877	$142,476,795	$133,823,064

Liabilities.

Stock (without nominal or par value):			
Authorized	3,000,000	3,000,000	3,000,000
Unissued	213,320 12/13	212,971 12/13	212,940 8/13
Outstanding	2,786,679 1/13	2,787,028 1/13	2,787,051 5/13
	1916	1917	1918
Stated capital	$15,000,000	$15,000,000	$15,000,000
Capital surp. (from conv. bds. and ex. of stk)	86,687,146	86,703,085	86,706,162
Prop. surplus (from mines acquired, less cap. distributed)	.....	21,421,922	15,847,833
Total	$101,687,146	$123,125,007	$117,553,995
Notes payable	.....	8,850,000	4,000,000
Current Liabilities:			
Accounts payable	165,830	187,197	224,909
Accrued taxes and deferred accounts	624,108	730,562	603,133
Treatment, refining and delivery charges (not yet due)	924,154	590,660	1,045,172
Total current liabilities	$1,711,092	$1,508,419	$1,873,214
Development reserves	437,411	396,927	396,496
Undivided profits	18,915,228	8,596,444	9,999,360
Grand total	$122,750,877	$142,476,797	$133,823,065

Income Account—Year Ended December 31.

	1916	1917	1918
Operating Revenue:			
Copper	$28,042,396	$15,372,765	$14,418,357
Silver	710,462	653,340	662,569
Total	$28,752,858	$16,026,105	$15,080,926
Operating expense	6,292,338	4,208,909	5,649,635
Net operating profit	$22,460,520	$11,817,196	$9,431,292
Misc. income at mines	79,917	9,016	loss 41,156
Net income for period	$22,540,437	$11,826.212	$9,390,136
Operating Expenses Detail:			
	1916	1917	1918
Mine and mill	$1,595,452	$1,317,500	$2,162,033
Freight to smelter	2,695,573	1,574,771	1,646,938
Smelting and refining	1,506,522	864,657	1,110,910
Selling commission	287,065	158,635	143,313
Marine insurance	159,451	97,044	72,798
General expense	48,275	196,302	140,966
Delivery on refined copper	.....	.....	372,676
Total as above	$6.292.338	$4.208,909	$5.649,635
Other Income:			
Utah Copper Co. dividends	$4,854,048	$7,147,801	$4,777,906
Alaska Steamship Co. dividends	941,858	190,833	238,541
Interest, discount, etc	216,266	118.634	265,689
	$6,012,172	$7,457,268	$5,282,136
Total income	$28,552,608	$19.283.481	$14,672,272

[illegible] interest on bonds, adm'n...	667,985	1,318,579	898,[illegible]
Net income	$27,884,623	$17,964,902	$13,773,[illegible]
Undivided Profits			
[illegible] forward.....	$6,573,797	$18,915,227	$8,569,44
[illegible] for year.....	27,884,623	17,964,902	13,773,96
	$34,458,420	$36,880,129	$22,370,40
[illegible] depletion charge.....	.....	11,552,539	.....
Net income	$34,458,420	$25,327,590	$22,370,40
Depreciation of plant.....	222,909	353,446	541,23
Dividends	15,320,283	10,311,665	5,574,08
Depletion	.....	6,066,036	6,255,72
Balance forward.....	$18,915,226	$8,596,444	$9,999,36

The net revenue in 1919 was $6,293,000.

Dividends: initial on Mar. 31, 1916; $5.50 in 1916; $5.70 in 1917; $4 in 1918, and $2 in 1919. The grand total is $46,936,613.

Property: Alaskan holdings include the Kennecott and Beatson mines also 17 patented claims, 216 acres, at Latouche, and 11 lode claims bought in 1916 During 1918, 39 new claims were located.

The **Kennecott** group, 3 miles from Kennecott, on the C. R. & N. W R. R., includes the Bonanza and Jumbo mines, with 23 additional patented lod claims and 14 patented placer mines, 2.314 acres.

The **Bonanza** mine had one of the most remarkable ore bodies ever found by a prospector. A great mass of high-grade ore, much of which carried over 60% copper, outcropped on the crest of precipitous mountain overlooking the Kennecott river, a tributary of the Chitina, which flows into Copper river

There were no large masses of oxides or carbonates present, as glaciation and active erosion prevented the formation of an oxidized capping. The ore outcrops were massive chalcocite averaging about 50% copper and 0.2 oz silver to each per cent. copper.

Geology: the claims show Nicholai greenstone, consisting of a number of basaltic flows of lava, a hard close grained rock considerably altered and in places amygdaloidal, overlaid by massive beds of Chitistone limestone of Triassic age, with bedding planes parallel to the flow planes of the lava, the limestone being of a bluish color, weathered to gray at the surface. There also are diabase and andesite intrusions and dikes.

Ore occurs in irregular replacement masses more or less parallel to vertical planes of a fault zone, ore following to some extent, minor fault planes, as well as the bedding planes of the limestone making stockwerks and irregular masses in the crushed limestone. The outcrop is 20 to 40′ wide, and over 400′ in length the southern half showing 2 nearly parallel bands of chalcocite, 4 to 10′ in width, separated by about 10′ of limestone. At the northern end of the outcrop the chalcocite bands give place to stringers and interlacing seams of ore which thin out northward and fade into barren limestone.

In addition to the Bonanza outcrop there was a large amount of ore in the talus, or slide rock, broken off from the outcrop. This mass of broken ore and rock was about 300′ wide, extending for about 500′ or more down the slope from the outcrop, varying from 3 to 20′ in depth. A number of test-pits, sunk to the outcrop, showed an average of 4′ depth, with an average assay of 13% copper this included both boulders of chalcocite up to 200 lbs. in weight and barren limestone. [illegible] the slide by a system of cuts. Two grades of ore [illegible] copper, respectively.

[illegible] and mining were published in "Min. and Sci. [illegible]

[illegible]ls.

Underground openings at all the company's mines during 1916 were extended 15,340'; 10,770 ft. at Kennecott in 1917, and 11,790 ft. in 1918.

The most important recent developments includes the discovery of orebodies on the 600-ft. level of the Bonanza mine, and on the 900-ft. level of the Jumbo mine, both about 400 ft. northwest of the main fissuring. In 1918-19 a new two-compartment shaft was completed to 800 ft. at the Bonanza, and at the Jumbo a two-compartment incline was sunk to 500 ft. Orebodies on the 500' lowest level are larger and higher grade than on the upper levels.

The Bonanza mine is connected with the mill at the lower camp by a Bleichert aerial tram, in 2 sections, the upper of 7,000' and the lower of 8,000', with a drop of 4,000'. The tram line has 40 towers, longest span 1,500', with ore bins at both terminals, and has an estimated daily capacity of 600 tons. A 5,000-ft. aerial tram has been erected to connect the Jumbo mine with the Glacier mine, so that ore from the latter will be available for the mill. The lower camp has the mine buildings, power plant, and mill.

Equipment: includes steam plant and air compressor. Buildings include a bunk house, mess-house, assay office and 10,000' sawmill.

The 700-ton concentrator is equipped with Blake and Symons crushers, Hancock jigs, bull jigs, rolls, Wilfley and Deister tables, and 600-ton ammonia leaching plant. (Described by L. Eddy in "Eng. & Min. Journ.," June 28, 1919.)

Guggenheim interests constructed the Copper River & Northwestern railway, at a cost of about $20,000,000, this line of 195 miles length starting at Cordova, on the sea, and ending at the lower camp. Results have been as follows:

Year	Revenue	Profit
1918	$1,846,585	$581,329
1917	2,496,670	1,210,304
1916	2,911,207	1,768,671

The Alaska Steamship Co. is also controlled by Kennecott. It carries ore to the smelter at Tacoma and returns with supplies for the mines. Recent results are as under:

Year	Revenue	Profit	Dividends	Surplus
1918	$3,733,938	$429,190	$450,000	$176,530
1917	4,018,667	979,524	360,000	513,239
1916	3,816,087	1,366,666	1,740,000	130,216

The **Beatson** mine comprises 17 patented claims, 268 acres, about 3 miles from the northern end of Latouche island, within one-half mine of tidewater, where there is a good natural harbor. Mine was located, July 4, 1897, by the late Andrew K. Beatson, and began shipping, 1903. Country rock is slate; ore is chalcopyrite, pyrite and pyrrhotite, occurring in brecciated portions of the country rock. The orebody is a large lens; total length developed is about 800' with an average width of 100'. Ore assays up to 30% and as shipped returns 7.23% copper and 2 oz. silver per ton.

Development: includes over 20,000' of underground workings. The ore is mined in an open pit and dropped through to the main tunnel level. Mine and mill are connected by an aerial tram. A 700-ton concentrator, employing oil flotation and completed Feb., 1915, was enlarged in 1918 to treat 1,500 tons a day. Buildings include rooming, mess and change houses, office, store and a hospital.

Situation, geology, ore, mining and milling methods and leaching of copper tailings with ammonia, were briefly described by H. M. Lawrence in the "Eng. & Min. Journal," Nov. 3, 1917. A 300-ton plant was erected 1917, and one of 800-ton capacity is under construction. Four 30' diam. leaching tanks with dome tops, hold 500 tons of tailing per charge in a depth of 15'.

The following figures show past production, costs and profits of the two [illegible] companies prior to their acquisition by the Kennecott Corporation:

Kennecott Mines Co.:	Net Lbs. Copper	Cost per Lb. (a)	Profit
1916	101,410,000	5.10c.	$20,525,3
1915 (5 months)	14,240,412	4.00c.	1,522,7
1914	13,988,273	5.78c.	1,104,6
1913	14,621,834	5.48c.	1,424,6
1912	22,366,478	4.43c.	2,633,5
1911 (9 months)	21,007,096	4.19c.	1,656,2
Beatson Copper Co.:			
1916	6,872,000	5.10c.	$1,390,8
1915 (9 months)	1,970,947	11.41c.	122,5
1914	5,286,667	8.75c.	241,8
1913	5,178,629	8.36c.	353,2
1912	3,254,858	9.74c.	221,1
1911 (9 months)	3,078,444	7.44c.	163,9

(a) Includes selling.

Production:

Year	Bonanza and Jumbo Ore, Tons	Bonanza and Jumbo Copper, %	Beatson Ore, Tons	Beatson Copper,
1916	48,855	67.90	184,411	2.30
	19,271	15.60	6,608	7.23
	229,717	8.49		
1917	265,579	13.78	273,523	2.44
1918	262,377	10.59	397,851	2.02

Summary of Operations

	1916 Kennecott	1916 Latouche	1917 Kennecott	1917 Latouche	1918 Kennecott	1918 Latouc
Ore, etc., to smelter, tons	48,855 19,271 703	6,608	89,799	49,141	71,888	52.4
Copper, per cent.	67.9 15.6 9.9	7.23	38.57	11.48	36.09	12.
Ore milled, tons	229,717	177,803	206,252	253,805	218,819	395.5
Copper, per cent.	8.49	2.12	8.92	2.06	7.82	2.
Concentrate, tons	29,949	20,701	29,559	29,423	27,174	49.9
Copper, per cent.	53.6	14.20	53.52	14.20	53.00	12.
Recovery, per cent.	82.27	78.91	85.98	80.28	84.19	80.
Tailing leached by ammonia, tons	62,450	.....	98,074	.....	132,804	.....
Copper, per cent.	1.48	.....	0.90	.....	0.94	.....
Recovery, per cent.	.....	.....	.....	.....	73.5	.....
Copper, pounds	.....	108,872,785	.....	78,211,429	.....	60,994,7
Average price, cents	.....	25.88	.....	27.02	.....	24.
Silver, ounces	.....	1,101,783	.....	988,578	.....	684,7
Average price, cents	.....	64.48	.....	95.85	.....	95.
Cost of copper sold, cents per pound	.....	5.1	.....	7.4	.....	9.
Metallurgical efficiency (copper in ore and products shipped) per cent	.....	.....	94.65	84.53	93 33	89.

Output for 1919 was 40,700,000 lb.
Rich ore and concentrates are sent to Tacoma, Wash., for reduction and refining.

Copper production was at its highest by mid-1916, when the yield wa 10,750,000 lb. in July. From then on, there was a steady drop to 5,500,000 i Sept., 1918. After that, the published output includes Braden with Kennecot thus concealing individual outputs. Despite the depletion of its very rich ore Kennecott has a profitable future in the treatment of low grade ores. (Th Braden and Utah companies are described under their respective titles.)

KENSINGTON MINING CO. ALASKA

Address: Juneau, Alaska.

The Kensington has been idle for years.

KNIGHTS ISLAND ALASKA COPPER CO. **ALASKA**

Address: J. J. Dieringer, Valdez, Alaska.

Property: on eastern arm of Drier Bay, Knights Island district.

Geology: a sheared zone, 20′ to 50′ wide, crosses greenstone, with a strike N. 15° E. shows slight mineralization with chalcopyrite, sphalerite and pyrrhotite for several hundred feet.

Development: by a 650′ crosscut tunnel, with three short drifts and some shallow surface pits.

LADYSMITH SMELTING CO. **ALASKA**

(Formerly the W. A. Dickey Copper Co.)

Office: 31 Nassau St., New York. **Mine office:** Ellamar, Alaska. W. A. Dickey, pres.-gen. mgr.; Duncan Edwards, v. p.-treas.; H. C. Bryan, sec.

Cap., $50,000. Is a close corporation.

Property: 2 miles from tide water at Irish Cove, Prince William Sound, is developed by tunnels and over 1,000′ of workings. Ore contains chalcopyrite in lenses along shear zones, in greenstone, with gold and silver; lenses of gold ore have been developed to a depth of 300′. Shipping ore said to average 12% copper. Last shipment to Tacoma smelter was made April, 1916. Now idle, awaiting improved shipping conditions.

Company bought the Mason-Gleason group, on Fidalgo Bay, for $15,000. The latter group shows high-grade ore, but nearest shipping point is Irish Cove, 3 miles distant.

LAKINA KENNECOTT MINING CO. **ALASKA**

(Formerly owned by the Lakina Copper Co.)

Address: E. A. Patrick, v. p., Eagle Bldg., Spokane, Wash.

Directors: E. A. Patrick, J. J. Kinnan, E. J. Hurley, E. E. Younge, T. A. Brady, V. C. Hill, J. S. Ross, and T. E. Coleman.

Cap. $2,000,000; $1 par; 770,000 outstanding; 750,000 owned by Lakina Copper Co. of Idaho.

Reported sold under a six-year bond for $500,000; 25% of all ore shipped to apply on purchase.

Property: 30 claims and a millsite on headwaters of Lakina river, Chittina district, S. E. Alaska, about 12 miles from the holdings of the Kennecott Copper Corporation.

Geology: a well-defined shear-zone in greenstone, running N. 10° W, dip 70° W. has evidences of leaching and is traceable up the mountain for a distance of over 1,000′ vertically. The ore is bornite, although chalcocite occurs along fracture planes with a calcite gangue. Some native copper is also found. See U. S. G. S. Bull, 662, page 161.

Development: by 235′ tunnel driven near the mouth of Mill creek, elev. 2,100′, and by numerous open-cuts.

LAKINAW TAGISH AND MOIRA MINES CO. **ALASKA**

Address: Carcross, Y. T. and Cymru mine, Moira Sound, via Ketchikan, Alaska. Holds bond on Cymru mine (which see) and on Portland (or Westlake King) group. Company is working the Yukon properties, formerly held and operated by the Conrad Consolidated Mines, now dead.

At the Cymru a 100′ shaft has been sunk and the mine equipped with 3-drill compressor and gasoline hoist. A mile long tram with gasoline motor connects mine and shipping wharf.

The Portland Group, near Mineral Lake, is 1½ miles from the Cymru. It shows a 4′ vein carrying silver-zinc-lead and copper values, zinc being predominant.

Development: by 130′ shaft. The ore is transported by 1,000′ aerial tram to Mineral Lake, from there by scows to the Cymru. No recent returns.

LANDLOCK BAY COPPER MINING CO. **ALASKA**

Office: Valdez, Alaska. **Mine office:** Landlock, Alaska. Dr. W. A. Rystrom, pres.-mgr.

Inc. 1907. **Cap.** $1,000,000; $1 par; 750,000 issued.

Property: 7 claims, 140 acres, on a small peninsula, with tide water on both sides, has 2 tunnels on the western side, besides a shallow shaft, 500′ of

drifts, a winze and raises, showing chalcopyrite, sphalerite and pyrrhotite o assaying 7½% copper. Only assessment work done during 1916. Geology ful described, p. 97, Bull. 605, U. S. G. S.—1915.

LATOUCHE COPPER MINING CO. **ALASK**

Address: Latouche, Latouche Island, Alaska. George Barrach, mgr.

Property: 7 claims, about one-half mile N. of the Beatson-Bonan mine of the Kennecott Copper Co., at the northern end of Latouche Island. Tl vein has been traced about 750', by trenches and pits, and is developed by a 75 tunnel, showing chalcopyrite, associated with pyrite and pyrrhotite, having sma gold and silver values. There is an 1,175' ground tram to a shipping wharf.

Was under development by W. A. Dickey, 1917. Shipment of 300 tons sorted ore, August, 1917, reported made to the Tacoma smelter.

LATOUCHE ISLAND COPPER MINING CO., LTD. **ALASK**

Office: 330 Burke Bldg., Seattle, Wash. **Mine office:** Latouche, Latouch Island, Alaska.

Officers: Jas. A. Murphy, pres.; L. G. Wheeler, v. p.; A. E. Fraser, 2n v. p.; C. P. McCormick, sec.; A. L. Cohen, treas., Tenning Carlson and H. Jacobs, directors.

Inc. in Washington. **Cap.** $5,000,000; $5 par.

Property: 42 claims, with about 4 miles of tidewater frontage, on th N. E. shore of Latouche Island, 60 miles S. of Valdez. The mine has 3 pra tically parallel N.-S. shear-zone veins in graywacke of 5 to 15' estimated averag width, with dip of 65°, proven by trenches for about 3 miles.

Ore carries bornite and chalcopyrite, with quartz gangue, averaging abo 4% copper, with some gold-silver values. It closely resembles that of the Beatso mine, and is said to be amenable to flotation.

Development: by shallow shaft and 4 short tunnels.

Equipment: includes small hydro-electric plant with water wheel an an air compressor.

Little progress has been made during the past few years, but considerab development is planned for 1920.

LONDON AND CAPE CO. **ALASK**

Property: 14 patented claims near Trail creek, Chitina district, S. E Alaska. Copper stains found along fracture planes in quartz diorite in 24 tunnel. Property reported idle for several years.

LUCKY STRIKE MINE **ALASK**

John Hirshey, owner, Hope, Alaska.

Property: on the Kenai peninsula.

Ore: free gold, occurs in quartz fissure vein, averaging $75. per to Amalgamation recovers 60%.

Development: by 400 of tunneling.

A 400-lb. prospectors' stamp-mill is used.

MABEL MINING, MILLING & POWER CO. **ALASK**

Fully described Vol. XIII. Succeeded by New Mabel M. M. & Power Co which see.

MAYFLOWER MINE **ALASK**

Address: G. F. Johnson and J. McConnell, Strelna, Alaska.

Property: 3 claims, 60 acres, 2 miles above foot of Kuskulana glacie and 18 miles by wagon-road from Strelna on Copper River railroad, shows quartz vein in greenstone, cut by a prominent fault. Main copper exposure 1,000' above the glacier, on east side of a deep gulch. Copper minerals a bornite and glance.

Development: by 75' tunnel, open cut 200 feet, 3% copper and 18 o silver ore. A prospect. See U. S. G. S. Bull. 662, p. 159.

McKINLEY PLACERS **ALASK**

(See Valdez Creek Placer Mines Co.)

MINERAL CREEK DEVELOPMENT CO. **ALASK**

Property: Hercules and McKinnon claims on Mineral creek, Port Va ge district, Prince William Sound. Country rock is graywacke. Numerou short tunnels with drifts have opened up a vein about 20' wide carrying gol

galena, sphalerite, pyrite. Strike N. 80° W., dip 70° N. A small mill has been built to treat the ore. Season is short, from March to October.

MOHAWK MINING CO. **ALASKA**

Reported driving tunnel 200′ long, 1,000′ below upper tunnel.

MOTHER LODE COALITION MINES CO. **ALASKA**

Offices: 120 Broadway, New York, and Kennecott, Alaska.

Officers: Charles Earle, chairman of board of directors; John K. MacGowan, pres.; Judd Stewart, v. p.; C. T. Ulrich, sec., and F. W. Hills, treas.

Inc. Apr. 17, 1919, in Delaware. **Cap.** 2,500,000 shares of no par value, of which Kennecott Copper Corporation interests receive 1,275,000, equal to 51% and Mother Lode Copper Mines Co., 1,225,000, or 49%. The directors consists of 4 and 3, respectively, from these companies. Shares exchanged on basis of 1 ($10 par value) of Mother Lode Copper Mines for 1.63 in the Coalition Co. The Coalition Co. paid off the Mother Lode Copper Mines Co.'s $500,000 bonds, and provides working capital not exceeding $1,000,000, to develop the property on a large scale. The Coalition Co. has a contract with the Kennecott Copper Corporation for the treatment of its ores, and is to have the benefit of the same milling, smelting, refining, freight and selling charges enjoyed by the Kennecott Copper Corporation.

The property owned by the Mother Lode Copper Mines Co. was deeded May 28, 1919, to Mother Lode Coalition Mines.

Property: 83 lode and placer claims, about 1,640 acres, including the Smith-Haglund Sall group, adjoins the Bonanza Mine of the Kennecott Copper Corporation, in the Copper River district.

The Houghton-Alaska Exploration Co.'s property to the east and adjoining the Jumbo mine of the Kennecott Corporation was acquired in Nov., 1916. It consists of 12 lode and 1 Association placer mining claims.

Geology: conditions at this property, according to Herman Keller, are similar to those at Bonanza mines. The base of the mountain is formed of amygdaloidal basalt, highly altered and called the Nicolai greenstone. This is covered by thick beds of Chitina limestone, dipping north. The ore-shoots occur in the limestone, and exploration has shown that contrary to general belief, the ore does not occur along the greenstone contact, but in a favorable bed 90′ above it, and then only in connection with the Bonanza fault, or shear-zone. This shear-zone, 20 to 24′ wide, cuts both greenstone and limestone and the ore is found in chimneys, and as irregular bunchy masses along the zone and as impregnations in the limestone walls. The ore consists of nearly pure glance with minor and unimportant amounts of covellite and very little malachite, etc. Principal copper mineral is chalcocite. Like the Bonanza ore, it carries gold and silver.

Development: Nov. 24, 1918, consisted of 12,789 ft. of tunnels, shafts, crosscuts, raises, etc. A 1,400-ft. tunnel has been driven to connect the Mother Lode and Kennecott workings. Electric locomotives are used on this level to haul ore to the Kennecott tramway.

Property has been fully and favorably reported on by Herman A. Keller, Arthur W. Jenks, and Alan M. Bateman, and is a prospect of merit. Under the new arrangement profits and costs should be satisfactory.

MOTHER LODE COPPER MINES CO. OF ALASKA **ALASKA**

Merged into the Mother Lode Coalition Mines Company, which see.

MOUNT ANDREW IRON & COPPER CO. **ALASKA**

Former Office: Empire Bldg., Seattle, Wash. W. J. Rogers, supt., Ketchikan, Alaska, at last accounts.

Property: held under lease from the Mount Andrew Mining Co., on Kasaan Peninsula, Prince of Wales Island, Alaska.

Geology: ore carries chalcopyrite disseminated in magnetite, with hornblende gangue, and is practically unaltered at surface, masses of sulphide ore even showing glacial striations. Ore averages about 3.75% copper and $1 to $1.60 per ton in combined gold and silver values. The orebody has been stripped

for about 2 acres and is developed by tunnels of 300′ and 700′, with a 70′ bl shaft from the tunnel, and 10 small glory-holes, opened upwards to surface fi the tunnels.

A 4,600′ aerial tram of 40 tons hourly capacity leads from a 50-ton load bin at the mine to a shipping bunker 500′ from tide water.

Equipment: includes two 50 h. p. boilers,with 5-drill and 7-drill air co pressors. Buildings include office, boarding house, bunk-house and smithy.

In Sept., 1917, reported shipping 1,000 tons high-grade copper ore per mo to the Tacoma smelter.

NEW MABEL MNG., MLG. & POWER CO. **ALASI**

Office: Loveland, Colo.

Officers: Carlton E. Clark, pres.; J. J. Henderson, v. p.; L. R. Rink sec.; J. R. Handy, treas., with F. G. Barthold and Mary B. Sutherland, direct

Inc. 1917, in Colorado. **Cap.** $100.000; par $1; in treasury, 25,000 shar Annual meeting, Sept. 1.

Property: 4 claims, 82 acres in Willow Creek mining district, forme owned by Mabel M. M. & Power Co., described Vol. XIII.

Ore: occurs in vein in granite, dipping 45 degrees, and said to yield in gold per ton. Developed by 132′ tunnel. Continuing development work, 19

Production: $12,000 in 1916, and $10,000 from May 28 to June 26, 19 Seasons are short, with probably not over 120 days available for surface wo

NIBLACK COPPER CO. **ALASI**

Niblack anchorage, Prince of Wales Island, Alaska. A. A. Wakefield, age Property formerly worked by the Niblack Copper Development Co. afterwar the Niblack Copper Co., is reported to have reverted to the Geo. M. Wakefi Mineral Land Co. Fully described in Vol. VIII, Copper Handbook. No wo done on the property since 1912 and 1913 save annual representation. Nibla Copper Co. is said to still have a corporate existence.

NIKOLAI BUTTE COPPER MINING CO. **ALASK**

Officers: Harry F. Goetz, pres.; Fred E. Grimmer, v. p.; H. Twomey, sec., Old Natl. Bank Bldg., Spokane, Wash.; Gus F. Eilers, treas., w A. P. Witherspoon, directors. C. A. Bode, gen. mgr., McCarthy, Alaska. E. Wann, cons. eng.

Inc. Dec. 15, 1916, in Washington. **Cap.** $2,500,000; par $1; 1,500.0 issued. Annual meeting, July 25, in Spokane, Wash.

Property: 20 claims on Dan creek, Chitina district, about 15 miles S of Kennecott Copper Corp. High grade copper ores carrying bornite, ch cocite and chalcopyrite said to occur at contact of greenstone and limestone.

Development: in February, 1917, commenced a tunnel to open up body stated to be 18′ wide, averaging 35% copper. No recent return.

NORTH MIDAS COPPER CO. **ALASK**

Office: 50 Congress St., Boston, Mass. **Mine Office:** Strelna, Alaska.

Officers: Willis D. Rich, pres.; F. A. Ball, v. p., James F. Crane, se treas., with A. S. Nye, W. L. Hall, J. E. Kelley, and G. M. Wheeler, directo

Inc. 1915 in Maine. **Cap.,** $1,500.000: $1 par; 1,250,000 outstanding; funded debt. Stock listed on Boston Curb. Annual meeting first Tuesday June. Old South Trust Co., Boston, transfer agents.

Property: copper, gold and silver claims, including 16 lode and 7 plac claims with mill site, near the Kuskulana river, in the Chitina district, Copp River region. Twelve mile wagon road connects with the railroad at Strelna the Copper River and Northwestern R. R., 146 miles from the terminus Cordova. Silver-gold occurs in 5′ vein in porphyry, dip 45°, said to average $ gold per ton. The copper claims have not developed much ore. Principal mi eral is chalcopyrite; gold and silver occur with iron pyrite.

Development: by 5 tunnels and incline shaft, aggregating 2,300′. No. tunnel cut a series of alternating limestone beds and porphyritic intrusion Cupriferous pyrite in small quantity appears in the tunnel face. Above thi another tunnel has exposed copper pyrite. A tunnel N. E. of the others h

been driven 555' and an open cut below it shows quartz 1 to 4' thick, said to assay $35 per ton in gold and silver. Ore reserves reported at 200,000 tons, averaging $30.00.

Equipment includes compressor, 4500' aerial tram, 10-ton cyanide plant, water power, etc. Twenty men employed.

NORTHLAND COPPER-GOLD GROUP **ALASKA**

Letters returned from last address, 518 Hinckley Bldg., Seattle, Wash., in 1917. See Vol. XIII.

PANDORA GROUP **ALASKA**

Address: Ellamar, Alaska. Geo. Valentine, Chas. Wallace, James McPherson, owners.

Property: 6 unpatented claims, on Bay of Isles, Knights Island, Prince William sound, showing small lenses of chalcopyrite ore in a sheared zone 2' to 20' wide in greenstone, said to assay 3% copper. Developed by 90' shaft with 400' of workings. Developing only, owing to lack of funds.

PARDEE-MEIER COMPANY **ALASKA**

Address: Fairbanks, Alaska.

Property: 14 claims on Steel creek, 14 miles from Fairbanks. Several narrow veins showing scheelite, a tungsten mineral and molybdenite with copper, lead, gold, silver and antimony.

Development: by open cuts and short tunnels. Strike of lode system N. 28° W., dip 30° E.

Reported idle since Feb., 1918.

PATTEN CO-OPERATING CO. **ALASKA**

Address: Valdez, Alaska. W. E. Patten, mgr.

Cap., $100,000; $100 par.

Property: 23 claims, 475 acres, in Valdez mining district. Ore occurs as contact deposit in shale and bornite, carrying gold, silver and nickel values.

Development: by 400' of underground workings.

Equipment: includes compressor, steam power, pump, tramway. Management plans installing electric power and erecting a 150-ton smelter.

PEABODY ALASKA COPPER CORPORATION **ALASKA**

Office Chas. L. Peabody, Room 707, 10 Wall St., New York City.

Property: 33 claims known as the Addison-Powell group, on Sulphide Gulch, Valdez district, 4 miles from Lowe River, near Granby Cons. M. S. & P. Company's property. Said to have shear zone 1,000' wide of green schist impregnated with chalcopyrite.

Development: by short tunnels and prospect pits.

Reported optioned to an English syndicate; if sold, the corporation will be dissolved.

PEABODY DEVELOPMENT CO. **ALASKA**

Office: Chas. L. Peabody, 10 Wall St., New York City.

Inc. 1913 in Del. **Cap.,** $700,000: par $1; fully paid.

Property: several unpatented claims on Passage Canal, Valdez district, stated to contain a gold quartz vein 3' wide, in slate and graywacke.

Development: 113' tunnel and crosscuts.

Reported in litigation.

PETERSON MINE **ALASKA**

Address: P. O. Box 198, Juneau, Alaska, or Amalga, Alaska.

Owners: Mrs. J. G. Peterson, Miss I. M. Peterson, Miss M. W. Peterson.

Property: 12 unpatented claims, 40 miles N. W. of Juneau, in the Harris mining district. Gold associated with arsenopyrite occurs in streaks in a 20' vein in gabbro. Ore averages $6 gold per ton.

Development: 60' vertical shaft with tunnels 127' and 360' long.

Equipment: 4 mile tramway, small 3-stamp mill, Wilfley concentrator, etc. Concentrates reported to assay $86 per ton. Examined by H. S. Brockunier.

PIONEER MINING CO. **ALASKA**

See Pioneer Mining & Ditch Co.

PIONEER MINING AND DITCH CO. **ALASKA**

Formerly Pioneer Mining Co.

Office: 509 Balboa Bldg., San Francisco, Cal., and Nome, Alaska.

Officers: Jafet Lindeberg, pres.-mgr.; E. O. Lindblom, v.p.; J. E. Ch berg, sec.; G. W. Campbell, treas., with W. H. Metson and J. L. Hagel directors.

Inc. Dec. 27, 1901, in Washington. **Cap.**, $2,500,000; $1 par; all issued.

Profit for year ended Dec. 1, 1916, was $242,904, of which $100,000 was pa as No. 17 dividend. Surplus at end of year was $240,153. No recent returns.

Dividends: 8% in 1902; 11% in 1906; 12% in 1907; 3% in 1908; 9% 1909; 6% in 1910; 3% in 1911; 2% in 1915, and 4% in Jan., 1917; a total 58% or $2,900,000.

Property: placer areas in the Nome district, Alaska, worked by h draulicking since 1899. They are fully equipped and plant stands in accounts worth $57,428. Company controls the Miocene Ditch and United Ditch compani

RAE-WALLACE MINING CO. **ALASK**

Address: Don S. Rae, mgr., Anchorage, Alaska. Mine in the Willo Creek district, Alaska, reported under development, Sept., 1917.

RAMSEY-RUTHERFORD GOLD MINING CO. **ALASK**

Valdez, Alaska. Inc. in Sept., 1913.

Property: 10 miles N. E. of Valdez at an elevation of 3,500'; trail to t mine goes over Valdez glacier, making transportation difficult.

Ore: free milling gold quartz in fissure veins in graywacke.

Equipment: includes several gasoline engines, air compressor and a stamp mill, which cannot be operated during the winter. In 1916 compa employed 20 men on development work and stoping on the 100', 150', 225' a 300' levels, and was reported to have considerable ore blocked out. Mill clos from January to May on account of weather. See U. S. G. S. Bull, 642, p. 190.

READY BULLION MINE **ALASK**

Address: Hollis, Prince of Wales Island, Alaska, formerly called t Puyallup mine.

Ore: free milling, occurs in quartz vein, averaging width 6" to 7" a in places 3' wide, having well defined walls, inclosed in quartz-diorite.

Development: by three tunnels about 300' feet long and 1160' tunn driven along vein, stoped for length of 1,000', to an average height of 150' to 25

Equipment: includes Pelton wheel, compressor, electric-light plant, stamp mill. See U. S. G. S. Bulls. 642 and 662, pp. 79 and 65.

Produced both bullion and concentrate.

READY BULLION MINE **ALASK**

See Alaska Treadwell Gold Mining Co.

REGAL MINES CO. **ALASK**

Subsidiary of the Great Northern Development Co., which see.

Office: 77 Franklin St., Boston, Mass. **Mine Office:** Kennecott, Alask

Officers: Walter M. Briggs, pres.; H. I. Gaskill, sec.-treas.; Jame Phillips, Jr., C. Hartman Kuhn, Chas. S. Farnum, Mulford Martin, E. F. Gra W. M. Briggs, J. M. Satterfield, directors; E. F. Gray, gen. mgr.

Inc. 1912 in Maine. **Cap.** $250,000; $5 par; issued $28,011. Annual mee ing, November 2.

Property: 17 claims, unpatented, 340 acres, near Kennecott, Copp River district. Developed by 115' shaft sunk on a contact between limeston and greenstone and showing copper glance ore. Assessment work only in rece years.

REYNOLDS-ALASKA DEVELOPING CO. **ALASK**

Office: 1182 Broadway, New York. **Mine office:** Latouche, Latouch Island, Alaska.

Officers: Marvin F. Butler, pres.; H. M. Coffin, v.p.; J. Frank Birdse sec.-treas.; preceding, with A. E. Austin, Hon. J. G. Brady, F. A. Reynolds, W C. Gilbert, John Yule, O. C. McGilvara, Geo. K. Hinds and G. B. Wrigma directors. F. A. Hancock, Latouche, supt.

Inc. 1903 in Washington. **Cap.** $3,000,000; $1 par; in $1,000,000 cumula tive 6% preferred stock and $2,000,000 common stock. Authorized March

1908, a $500,000 twenty-year 6% gold bond issue; issued, $125,000. Annual meeting, first Tuesday in April.

Property: 102 claims, about 2,000 acres, in Valdez district, Prince William Sound. Company was in receiver's hands until June, 1910, when discharged by court order. Former management fully described in Vol. X, Copper Handbook.

The Boulder Bay group of 31 claims, 620 acres, is on the mainland at eastern side of Prince William Sound. Claims shows a contact deposit between greenstone and slate, carrying chalcopyrite said to assay up to 11% copper and $3 gold per ton, but averaging 2 to 4% copper. Developed by 2 tunnels. Equipment includes a 60 h. p. boiler and a 5-drill air compressor.

The Iron Mountain group of 62 claims includes the Duchess and Duke properties, on Horseshoe Bay, Latouche Island. The footwall in both properties is black slate; graywacke forms the hanging wall. The ore consists of chalcopyrite with pyrite and pyrrhotite. The Duke mine has a 4′ vein of ore, formerly claimed to average 7% copper, slightly developed by a shaft now filled with water.

The Duchess mine, last worked in 1911, when 400′ of drifting was done on the lower tunnel, is developed by 2 tunnels, the upper a 375′ drift tunnel, and the lower having 500′ of drifts on the orebody, which has an average width of 25′. This group shows massive sulphide ore, estimated by the management to average about 3% copper. Assessment work only has been done since 1911.

In 1916 the Duke shaft was unwatered and sunk to depth of 110′ and the orebody reported to show a maximum width of 27′ along a length of 140′ of undeveloped ore. Drifts are 300′ below the lower Duchess tunnel. Ore is of similar character and value to that in the Duchess. Estimated ore opened above this tunnel is said to be over 600,000 tons, averaging 2% copper, $2 gold, 40% iron and 43% sulphur; maximum width of orebody in last completed crosscut was 124′, with average width of 25′ for a developed length of 500′.

Equipment: includes a 200 h. p. hydro-electric installation, with a flume and steel pipe leading from Big Falls Creek to a Pelton wheel, direct-connected to two 40 k. w. generators; a 50 h. p. hoist and 2 air compressors, of 5 drills aggregate capacity, with 6 air drills and 10 electric drills. See U. S. G. S. Bull. 662, pp. 206-208.

RICH HILL MINE **ALASKA**

Owner and Operator. Henry Andrews, Kasaan, Alaska.

Property: 5 claims containing a fissure vein in lime and granite, developed by 54′ shaft and 130′ tunnel. Ore is chalcopyrite with some gold and silver. Gross production 1918, $14,036; expenses, $6,548.

RUSH & BROWN MINE **ALASKA**

Address: Kasaan, Prince of Wales Island, Alaska. U. S. Rush, owner and operator.

Property: 9 claims, 180 acres and two 5-acre millsites, near the head of Kasaan Bay, 8 miles N. W. of Kasaan. The claims show greenstone intruded by granodiorite and carry three orebodies, 2 in E. W. shear zones in the greenstone, the third orebody along the greenstone-diorite contact. The latter carries magnetite-chalcopyrite ore in a body of unknown extent, but opened for 200′ in length, width of 63′ and to a depth of 120′.

One shear zone contains the sulphide body. The ore occurs as massive chalcopyrite in stringers, bunches and lenses, and also as a commercial impregnation of the greenstone and chloritic schists. The massive chalcopyrite, without waste, assays 20% to 30% copper, with $12 to $18 gold. The lenticular shoots of the clean ore run with the shear zone, and are as much as 7′ thick. Pyrite, quartz and calcite are practically absent. The sulphide body, in which this ore occurs has an average width of 14′, varying from 8′ to 20′ between walls, with dip of 55°.

On the footwall side, and at a distance of 30′ from the hanging wall, a parallel vein, evidently in the same shear zone, has been exposed for 45′ on the 200′ level.

Development: includes 177′ vertical shaft connecting by drift with incline shaft to 440′ depth, with drifts at 50′ intervals. On 400′ level drift is 260′ long.

Equipment: includes a steam plant with hoist, necessary mine building and 528 cu. ft. compressor. Ore is taken over a 3-mile private railway of 42 gauge to Venus Bay.

Production: for 1918, 403,512 lbs, copper, 3,460 oz. silver, 609 oz. gold. Mine considered promising.

RUSSELL BALL COPPER CO. **ALASKA**

Property: a group of claims on the south side of Drier Bay, Knight Island.

Geology: a vein of solid sulphides about 8" thick, occurring along a iron stained shear zone in greenstone, developed by a short tunnel. The shea zone varies from 10" to 10' in thickness with a strike of N. 10° W. and dip o 70° E. Minerals present, are chalcopyrite, chalmersite, pyrrhotite with quart Property believed to be idle.

SALT CHUCK MINE **ALASKA**

Owner: J. E. Chilberg, 1414 Alaska Bldg., Seattle, Wash. F. Chapman mgr.; C. H. Bannerman, supt., Kasaan, Alaska.

Property: located on Kasaan Bay, Ketchikan district. The ore contain bornite and chalcopyrite with epidote in a gabbro country rock.

Equipment: includes 150 h. p. hydro-electric plant, 60-ton mill, consist ing of crusher, ball mill, drag classifier and flotation unit. First shipment, Jan 1918, reported assaying 44% copper, 2 oz. gold, 14 oz. silver and some platinum.

SEA COAST MINING CO. **ALASKA**

Holdings taken over by Alaska Hercules Mining Co., which see.

SEATTLE-ALASKA COPPER CO. **ALASKA**

Office: 638 New York Blk., Seattle, Wash. **Mine office:** Latouche, La touche Island, Alaska.

Officers: E. Sparks, pres.; Geo. W. Terwilliger, v. p.; Geo. J. Hodge sec.; Jos. Bjorn, treas., and O. B. Hess, directors.

Inc. in Washington. **Cap.** $1,000,000; $1 par.

Property: 35 claims, about 700 acres, near Montgomery Bay, in th southern and central part of Latouche Island. Claims are in 2 groups, one of 1 claims on tide water, with another of 25 claims about a mile from the harbo latter said to carry the extension of the Beatson-Bonanza vein.

Development: by 287' tunnel, on the Delta claim, showing a vein of to 6' width; ore, when sorted, assays 11 to 22% copper. The Santa Clara No. claim has a 101' shaft, with a 140' tunnel and an 85' crosscut, showing 2 veins one of 4' width. Ore is chalcopyrite with gold occurring in shear zone in green stone.

Equipment: includes steam power, Pelton wheel and air compressor Shipments were intermittently made to the Tacoma smelter. Mill dismantled i 1916 and only 3 men were said to be working.

SHELIKOF MINING CO. **ALASKA**

Address: Kodiak, Alaska, and 701 New York Blk., Seattle, Wash.

Officers and directors: Z. T. Halferty, pres.; F. S. Golding, v. p.; Car roll Hendron, sec.-treas.

Inc. Jan., 1916, in Washington. **Cap.** $500,000; $1 par; 105,000 issued Annual meeting in April.

Property: 7 claims, 154 acres, on Alaska peninsula, in the Katmai reser vation. Claims show a contact deposit, carrying copper in granite and diorite Shoots said to be 10' wide, assaying 36% copper. Openings by tunnels.

SNOWSTORM GROUP **ALASKA**

M. B. Anderson, owner, Ellamar, Alaska.

Property: 6 claims, at Unakirk Bay, Prince William Sound.

Ore: occurs in quartz vein in limestone, carrying gold, silver, copper and some zinc. A 65' tunnel has opened ore to a depth of 40'. A prospect.

STANDARD COPPER MINES CO. **ALASKA**

Idle. **Office:** 68 William St., New York. **Mine office:** Landlock, S. E Alaska.

Officers: Morris B. Mead, pres.; John L. Steele, v. p.-engr.; E. F. Bourke, sec.; J. O. Molander, treas.; Jas. A. Bourke, gen. mgr., with Thos. R. Manley and Chas. Williams, directors.

Inc. Feb. 2, 1906, in New Jersey. **Cap.**, $300,000; $100 par; issued $220,000. Bonds, $300,000 issued. Is operated as a close corporation. Annual meeting, third Saturday in December.

Property: 13 claims, at Thorn Arm, on Landlock Bay, Prince William Sound. The lands, which are very precipitous, show country rock of greenstone, reported to carry 17 fissure veins, of which 4 carry lenticular shoots of ore estimated to average 6% copper, 1 oz. silver and 90 cts gold per ton.

Development: by shaft and tunnels of 290', 175', 85' and 660', with about 1,300' of workings, said to show 20,000 tons of ore with 12,000 tons blocked out for stoping.

The mine is connected with 500-ton ore bunkers on a wharf at tide-water by a 3,300' aerial tram, in 2 sections, 1 of 912' and 1 of 2,526' length.

Was reported leased for four years to the Alaska-Standard Copper Mining Co.

SWEEPSTAKE MINING CO. **ALASKA**

Property: Harriman Fiord, Port Wells district, Prince William Sound. Reported developing during 1917 and completing a two-stamp mill.

TALKEETNA MINING CO. **ALASKA**

Address: Wasilla, Alaska. Reported under lease to W. R. Hocking, of Seattle, Wash.

Officers: D. M. Fulton, pres.; E. H. Barthoff, v. p.; C. T. Hatcher, sec.; K. I. Fulton, mgr.-treas., with H. McGregor, directors.

Inc. Sept. 25, 1915, in Washington. **Cap.** $1,000,000; $1 par; 800,000 issued. Annual meeting 1st Monday in October.

Property: 8 claims in Willow Creek district, about 40 miles N. of Anchorage, said to show a 2' quartz vein in diorite, carrying gold ore assaying $10-$200 per ton.

Development: by several tunnels, longest 130'.

Equipment: includes 2 aerial tramways and 15-ton mill. Further development planned. Reported 1918 production, $10,000.

TEIKELT GOLD MINING CO. **ALASKA**

Address: E. E. Ritchie, Valdez, Alaska.

Is a development company working on a small scale.

THOMAS-CULROSS MINING CO. **ALASKA**

H. H. Cowley, trustee, Port Wells, Alaska.

Property: on Culross Island, Port Wells district.

Developed by two shallow shafts and a 150' crosscut tunnel, with 250' of drifts. A Lane mill installed in 1916 to treat the gold ore. Employs five men.

THREE MAN MINING CO. **ALASKA**

Office: 31 Nassau St., New York. Mine office: Landlock, Prince William Sound, Alaska.

Officers: W. A. Dickey, pres.-gen. mgr.; H. C. Bryan, sec.; Duncan Edward, treas.; officers are the directors.

Inc. in New York. **Cap.** $1,000; $100 par; fully issued. Is a close corporation, having only 3 shareholders.

Property: 43 claims, 10 patented, 812 acres, on tidewater, at Landlock Bay, in the Valdez mining district of Alaska, giving the company nearly a mile along a great shear zone, only one end of which has been developed. The property, which has been under continuous development since 1903, is said to show 10 orebodies with a general E.-W. strike, occurring as fissure veins and as replacement deposits in shear zones in greenstone and slates. Orebodies reported to average 8' in width and to carry chalcopyrite ore in lenticular shoots averaging 10% copper. Low-grade ore is continuous, with rich ore found mainly on the footwall in paystreak of 1 to 8' width, the largest shoot carrying massive chalcopyrite, assaying 10% copper, 1 oz. silver and 50 cts. gold per ton. The quantity of low-grade ore of concentrating tenor is very much greater than that of the smelting ore, but it is not available for present use.

Development: by tunnels, with 6,000' of workings. Six levels have bee opened up on one orebody, giving a little over 600' of stoping depth on the or Another orebody has been opened up on 3 levels, giving about 500' of stoping dept No stoping has been done, all ore produced having been extracted from leve and upraises. Company claims to have over 200,000 tons of 3% copper o developed.

The mine has no machinery or power equipment, owing to development t tunnel, but has 14 buildings, with ore bunkers on a wharf at tidewater, connecte by a short ground tram with the portal of the 5th level.

Production: about 600 tons of 10% ore were shipped, 1910, to the T coma smelter, yielding 120,000 lb. fine copper, and over 3,000 tons of 10% o yielding 610,000 lb. fine copper in 1912. No shipments were made in 1913, 19 and 1916, but in 1915, 300,000 lb. copper was produced. Over 5,000 tons of 10 ore have been shipped. Total production to date is about 1,000,000 lb. coppe shipments being under name of W. A. Dickey and not the company. Proper considered promising.

UNITED METALS CO. **ALASK**

See Alaska Metals Co. Property is the Corbin mine, near Coppermount.

VALDEZ CREEK PLACER MINES **ALASK**

Office: 705-8 Newport Bldg., Boston, Mass. Mine office: McKinle Alaska.

Officers: G. W. Sias, pres.; F. E. Nye, v. p. and sec.; R. B. Griffin, trea also trustees.

Inc. Nov. 1, 1911, as Express Trust Co., in Massachusetts. **Cap.** $2,500 000; shares of no par value, non-assessable: 2,408,186 issued. Bonds: $500,0 authorized, of which $454,100 are outstanding.

Property: placer claims on Valdez Creek, headwaters of Susitna Rive Alaska. Examined by Forbes Rickard and Pierre Bouery. A large quantit of gravel awaits hydraulicking, for which ditches, piping, power plant, etc., hav been constructed. The property is in a remote district and the cost of securin supplies is high, 4.8 cents per lb. from Chitina, a distance of 240 miles. Th season is short also.

Production: in 1916 was 36,000 cu. yds. of 62-cent gravel. Since compan acquired property it has yielded $69,880. Prior to this about $300,000 wa recovered by simple methods.

Reported Jan., 1919, to have defaulted on payment of interest on $500,0 bonds and on $731,481 notes. Company to be re-organized as the McKinle Placers. Present bond holders to get $560,000 in 8% preferred stock in exchang for their bonds and coupons thereon up to Jan. 1, 1919. In exchange for note held, it is proposed to issue a second 8% pfd. stock. Shareholders to get on share of common stock, par $5, for every 5 shares of Valdez Creek stock. Henr A. Cutter, Nashua, N. H., is counsel.

VALDEZ GOLD CO. **ALASK**

Formerly Cameron-Johnson Gold Mining Co.

Office: Yakima, Wash., and Valdez, Alaska.

Directors: Geo. S. Rankin, W. A. Bell, Geo. Ker, Alex. Miller, Chas S Mead, J. M. Bruce, and H. Y. Saint. J. D. McDougall, supt.

Cap. $750,000; 50c par; $600,000 outstanding January, 1919.

Property: 26 claims on the right side of Shoup Glacier, N. W. of Valde which show fissure veins in graywacke and argillite.

Ore: free milling gold quartz. About 3% of the ore is said to be sul phides of iron, lead and zinc.

Development: several hundred feet of tunnels. The upper workings ar mainly on the Treasury Note vein, said to show from 3" to 36" ore. Lowe workings are chiefly on the Mazuma claim, said to have the largest vein, as wel as lowest grade on the property.

Equipment: includes a 3,850' aerial tram, 5-stamp mill, a 7' Lane mill concentrator and bunkhouse. Power is supplied by a No. 3 Pelton water whee operating under a 240' head. Fifteen men are employed on the property. Se U. S. G. S. Bull. 662, p. 192

VICTORY COPPER MINING CO. **ALASKA**

Inactive, and letters returned from company's last office, 817 Alaska Bldg., Seattle, Wash. Mine office: Ketchikan, Gravina Island, Alaska.

Officers: M. McTernan, pres.; E. D. Fisher, v. p.; Maurice D. Leehey, sec.; J. R. Kelley, treas. Dr. C. O'Connor, C. J. Cronin and E. F. Tiernan, directors.

Inc. March, 1901, in Washington. **Cap.** $1,500,000; $1 par; fully issued. Annual meeting, first Monday in September.

Property: 14 claims, 99 patented, 260 acres, on Seal Bay, Gravina Island, 22 miles S. of Ketchikan, extends from sea level to 4,000′ above the beach. Lands show granite, greenstone and limestone reported to be cut by 11 veins of which 4 were developed by 2,100′ tunnel.

WILLOW CREEK DEVELOPMENT CO. **ALASKA**

Mine office: Anchorage, Alaska.

Officers: Chas. Herron, pres.; Judge David, treas.; T. Bedell, sec.

Organized 1917.

Property: a bond on the Isaacs group, on Reid creek, Willow Creek district.

WILLOW CREEK MINES **ALASKA**

Office: 620 Alaska Bldg., Seattle, Wash. **Mine office:** Wasilla P. O., via Seward, Alaska.

Officers: L. C. Thompson, pres.; H. Doheny, v. p.; Archibald Beck, treas.; M. D. Leehey, sec.; N. B. Bothwell, mgr.

Company leases and operates the Gold Bullion mine (which see), one of the largest gold producers of the Willow Creek district.

ARIZONA

Arizona leads all other states in copper production. In 1918, the mines of the state yielded: 777,000,000 lb. copper; $5,550,000 gold; 13,000,000 lb. lead; 6,800,000 oz. silver; and 1,800,000 lb. zinc. The output of copper and gold was increased, that of the other metals, especially lead and zinc was less. Dividends paid amounted to over $45,000,000. For 1919, there will be a large decrease in metal production due to a general curtailment of operations. Dividends were nearly $27,000,000 in 1919.

Mines are arranged by counties and under principal districts.

COCHISE COUNTY.

AJAX-METAL MINING CO. **ARIZONA**

Office: 312 Cooper Bldg., Denver, Colo.

Officers: Nat P. Wilson, pres.; W. H. Wilson, v. p.; S. O. Foxworthy, sec.-treas., with C. S. Campbell, M. E. Peters, directors. M. H. Wilson, mgr., 1440 Stanley Ave., Hollywood, Calif.

Inc. Oct., 1916, in Arizona. **Cap.** $1,500,000; par $1; issued $824,897. Transfer office and registrar: Peters Trust Co., Omaha, Nebr. Annual meeting, first Tuesday in October.

Property: 24 claims, totalling 498 acres, California mining district, Chiricahua Mountains, Cochise county. Said to show "disseminated" ore occurring in a porphyry dike 220′ wide. Values reported to average 8% copper, 9% lead, 6 oz. silver.

Development: by 210′ shaft and 3000′ of workings; will sink to a depth of 650′ in near future.

Equipment: includes electric hoist, compressor and pumps. Management proposes to erect a flotation mill.

ARIZONA COPPER SHIPPING MINES CO. **ARIZONA**

Officers at last accounts: E. E. Wiseman, pres.; C. E. Cummings, v. p.; C. F. Elliott, sec.-treas.

Inc. 1910. **Cap.** $1,000,000; $10 par; issued $620,000.

Property: 8 patented claims, 160 acres, 2 miles N. E. of Dragoon, Cochise county, shows limestone crossed by numerous veins, averaging 2 to 12′ in width,

said to carry 4 to 7% copper, 1 to 6 oz. silver and a trace of gold.

Development: by several pits and shallow shafts, deepest 130', wit about 600' of workings. Is a prospect. Idle and apparently dead.

ARIZONA GOLD & COPPER MINING CO. **ARIZONA**

Clerk's office: Burlington, Vt. Mine office: Gleeson, Ariz. L. V. Hast ings, v. p.; Hamilton S. Peck, sec.

Inc. July 28,1911, in Vermont. **Cap.** $100,000; $5 par: as successor of th Vermont & Arizona Copper Co.

Property: 11 claims, 220 acres, 4 miles from Gleeson, Cochise county, i the Turquoise district, on the western slope of the Dragoon mountains, show gold and silver veins and several copper veins, giving average assays of $6 gol and 3% copper per ton.

Development: by 230' main shaft and 2 tunnels, longest 125'. Compan claims to have developed a large body of low-grade milling ore.

Equipment: includes steam power and 12 h. p. hoist. Property idl owing to lack of funds.

ARIZONA & MICHIGAN DEVELOPMENT CO. **ARIZONA**

Mail returned unclaimed, March, 1919. Property taken over August, 191 by Mines & Development Co., which see.

ARIZONA MIDDLEMARCH COPPER CO. **ARIZONA**

Office: Middlemarch, Pearce, Ariz.

Officers: W. A. Potter, pres.; D. E. Wellcome, v. p.; E. D. Elson, sec mgr., with F. C. Austin, Judge D. R. Weller, H. H. Bones, A. Sidney Jone T. H. Powell, J. W. A. Off, all of Los Angeles, Calif., directors. B. M. Snyde cons. engr.

Inc. Dec., 1916, to take over the property of Middlemarch Copper C under lease and bond. Has since acquired eight additional claims adjoi ing. **Cap.** $1.000.000; $1 par; 700,000 shares issued April 1, 1919.

Property: 43 claims, over 860 acres, in Dragoon Mts., 9 miles west Pearce. Sedimentary rocks are intruded by granite stocks and quartz porphy dikes of great width, making contact zones of garnet, epidote, pyroxene, et with limonite, hematite, copper oxides and carbonates. Most of such outcro are undeveloped, but commercial ore is shown on the Cobrelona and Missou claims.

Development: the Cobrelona workings show a contact vein betwe granite and slate, with commercial ore along a drift over 200' in length. Ve is 2 to 6' in width. Principal development is on Missouri claim, which shows chimney of contact metamorphic ore, increasing in area with depth. Stopes fifth level are 40 to 50' in diameter. Oxidized ore was high-grade, but bel a thin zone of enrichment primary chalcopyrite ore of approximately 2% copp was encountered. A 250' incline shaft has drifts at 50' intervals; a 300' vertic shaft is sinking. High silver values were encountered on the seventh level

Equipment: includes compressor, hoist and steam pump. Mill is straight flotation plant of 125 tons daily capacity erected in 1917 and operat as steadily as the limited water supply would permit. Water now sufficient f operating mill part time.

The ore is crushed to $1\frac{1}{2}$" max., then fed to 6' by 6' ball mill in clos circuit with an Akins classifier, pulp going to 2 Launder flotation machines. K. & K. flotation machine is used as a cleaner. Tailing from roughers goes to Dorr thickener for recovery of water. Power for mill and 25 k. w. alt. curre generator is obtained from a 200 h. p. oil engine. Mill makes recovery of 90 of copper content, concentrates averaging 16% copper and 6 oz. silver per t

Shipments to April, 1919, total 51 cars concentrate and 3 cars crude o Enlargement of mill contemplated when mine development warrants.

Management appears to be energetic and capable.

ARIZONA SMELTING & POWER CO. **ARIZON**

Office: Benson, Cochise county, Arizona.

Officers: C.E. Goetz, pres.; Martin Fishback, gen. mgr.-sec.; R. L. L supt.

Inc. in Arizona. **Cap.** 100,000 shares; $5 par. Company was organized to purchase the old lead-silver smelter at Benson, and engage in the reduction of copper-silver-gold ores from nearby districts.

Property: 60-acre site formerly occupied by a smelter that was operated 30 years, treating ore from Mexico, sent in via Nogales. These operations produced 75,000 tons of neutral slag, now available for resmelting by this company. It carries 5 oz. silver, 50 cents gold, and 15 lb. copper, equal to $8 per ton. The net profit on this slag is estimated at $3 to $5 per ton.

Equipment: modern 200-ton blast-furnace for copper ore, 32 by 100 in. at tuyeres; a No. 7 Connersville blower, 250-ton mechanical sampling plant of the Vezin type to handle car lots, crushers, boilers, engines, water-supply, etc.

Ore supply for the plant is principally from Johnson, 27 miles east; Rosemont and Helvetia, 27 miles west; Patagonia, 60 miles south, and several other smaller centers. It is reported that the ore already developed and available in these places will necessitate expanding the plant to 1,000 tons daily capacity in less than 3 years. A local smelter is needed for these districts, as they have heretofore been unable to find a market. The position of the smelter with respect to rail connection, labor supply, water, and other conditions, is said to be favorable. Future earnings are estimated at $10,000 per month, mostly from the slag mentioned.

This seems to be a project whose weak point is that the company has no mines of its own on which to fall back for a steady supply of ore. The plant was ready to be blown-in early in September, 1919.

ARIZONA UNITED MINING CO. **ARIZONA**

Office: 1420 Chestnut St., Philadelphia, Pa. **Mine office:** Johnson, Cochise county, Ariz.

Officers: Alfred S. Miller, pres.; Alfred C. Harmer, Jr., v. p.-gen. mgr.; David H. Ross, treas.; Alfred H. Miller, sec., with Chas. B. Cox, Geo. E. Barnett, M. D. Brown, W. M. Houston, J. N. Stetson, J. K. Kane, G. M. Jones and Earl P. Mendenhall, directors. J. M. Libby, mgr. Kirby Thomas, cons. engr.

Inc. Aug. 12, 1910, in Arizona, as successor to Arizona United Mining Co. of Delaware. Cap., $5,000,000; $1 par; $2,500,000 outstanding.

Dividends: 1% quarterly, begun October, 1916. Company is a close corporation.

Treasurer's statement, Jan. 1, 1919, for year 1918, showed total receipts of $208,247, including $161,541 from ore shipments. Disbursements totalled $192,270, including $25,000 paid on purchase of lease from Goodrich-Lockhart Co. Cash on hand, Dec. 31, 1918, $15,976.

A 10-year lease on the property given to the Goodrich-Lockhart Co. in 1913, was surrendered July, 1918, for $75,000, property reverting to the company. During the life of the lease the Arizona United paid all debts, including the mortgage, and distributed $100,000 in dividends from its 45% of net earnings received. The $75,000 payment to the Goodrich-Lockhart Co. was also paid out of royalty under the lease. These earnings came from ore containing 4% or more copper.

Property: 45 claims, 30 patented, about 1,000 acres, 7 miles N. E. of Dragoon, in the Johnson mining camp. Land includes the Mammoth, Republic, Copper King and Southern group of claims. Principal development is on the Republic claim, opened by a 1,500′ shaft, with about 1,200′ of workings. The most important ore deposit developed after the company resumed control was between the 900′ and 1,100′ levels, where there has been exposed a deposit 150′ long, 11′ average thickness, 150′ on the dip, with the bottom not reached; assays from this deposit are said to average 6.2% copper. Another deposit, but of lesser importance, has been opened on the 900′ level At the time of suspending operations, Feb. 1, 1919, on account of low price of copper, company states it had enough ore blocked out to give a daily output of 200 tons for sixty days. In addition an ore deposit on the Mammoth claim has been opened up by lessees. The mine has a considerable tonnage of low grade ore opened up.

Equipment: includes a 200 h. p. oil-burning boiler, with hoists at the Republic and Mammoth mines, an electric plant, 4 electric drills and an air

compressor. Transportation is by a standard-gauge railway from Johnson t Dragoon, connecting with the Southern Pacific Railway.

During first 6 months of 1918 lessees shipped 24,902 tons of ore, with value of $290,216, and in last 6 months the company shipped 18,041 tons, valu $174,223, while the Mammoth furnished 2,480 tons ore with net smelter valu of $38,196.

BISBEE AJO COPPER & DEV. CO. **ARIZON**

Officers: W. E. Holm, representative, Bisbee, Arizona; Ed. Sweene pres. and gen. mgr.

Cap. increased during 1917 from $650,000 to $3,000,000.

Property: said to be two groups. The first of 9 claims, 5 miles fro the Mexican border, has a shaft 140′ deep; assays are said to have shown fro 3% to 73% copper; shales and porphyry predominate. The second group of claims, south of the town of New Cornelia, is undeveloped.

BLACK PRINCE COPPER CO. **ARIZON**

Office: 420 Gas & Electric Bldg., Denver, Colo. **Mine office:** Johnso Cochise county, Ariz.

Officers: Robt. N. Bell, pres.-gen. mgr., Denver, Colo.; J. C. Thompso v. p.; J. B. Wright, sec-treas., with M. A. Hoag and F. T. Henry, directors.

Inc. May 10, 1901, in Arizona. **Cap.** $1,500,000; $1 par; issued 1,320,1 shares. Annual meeting, last Wednesday in May.

Property: adjoins Peabody mine and comprises 8 patented claims, 1 acres, showing replacement deposits in limestone. Mine has a 950′ two-com partment shaft, sunk in limestone and showing copper oxides and carbonate bornite and chalcopyrite, with silver, on various levels.

Equipment: includes two 100-h. p. boilers, 175-h. p. steam hoist, com pressor, gas engine, 3 pumps and electric generator.

BUNKER HILL MINES CO. **ARIZON**

Owned by the Phelps Dodge Corporation, which see.

BUTTE & ARIZONA COPPER MINING CO. **ARIZON**

Office: 619 Hennessy Block, Butte, Mont. Mine near Hereford, Cochi Co., Ariz.

Officers: B. H. Dunshee, v. p.; A. S. Nichols, sec.; John C. Adams, treas with L. O. Evans, Chas. S. Shoemaker, A. P. Henningson, C. B. Mosely, John Corette and D. M. Watts, directors.

Cap. $1,250,000; $1 par.

Property: 14 claims, 11 patented, costing considerably over $60,000, w exchanged for $450,000 stock. Property is in the Huachuca mountains, 35 mil S. W. of Bisbee, and about the same distance north of Cananea.

Geology: claims show an ochrous gossan of 10 to 300′ width, covering contact vein between syenite and limestone carrying occasional copper oxide carbonates, pyrite and argentiferous gray copper, and chalcocite of fair teno though not in large quantities.

Development: by a long main tunnel cutting several small veins givi assays up to 18% copper with an average of 4.5% tenor, mine having upwar of 3,900′ of workings. Main vein, 350′ from mouth of tunnel, is claimed show 39′ of 6% chalcopyrite, which is an overestimate.

Nearest railroad is 15 miles, with a fair wagon road. Has steam power a an air compressor. Idle since end of 1908. Company reported to have no debt considerable treasury stock and is being carried by the directors, who are a vancing the money required to pay taxes and maintain the property.

CENTRAL BUTTE MINING CO. **ARIZON**

Office: Box 973, Douglas, Ariz.

Officers: A. H. Struthers, pres.-mgr.; F. F. Williams, v. p.; Z. T Phillips, sec.-treas., with A. J. Thompson and Chas. M. Seaman, directors. H. W Evans, supt.

[redacted] 1917, i[redacted] **Cap.** $750,000; 50c par.

[redacted] Pearce mining district, Cochise county, [redacted] hipped some copper ore fro

the 70' level, from a stoping length of 42' on the vein. Ore carries from 1 to 10% copper, with some gold and silver.

Have installed an oil-driven air compressor and expended $25,000 on property.

CENTRAL MINING CO. **ARIZONA**

Address: E. A. Ely, Dos Cabezos, Cochise Co., Ariz.

Inc. 1919 in Arizona.

Property: 16 claims, 18 miles W. of Willcox, adjoining property of the Mascot Copper Co. Surficial exposures are said to be good.

CENTURION ARIZONA MINING CO. **ARIZONA**

Dragoon, Cochise Co., Ariz.

Officers: J. P. Richardson, pres.-gen. mgr.; Samuel Bennett, v. p.; H. A. Morgan, sec.-treas., with H. C. Arnold, J. W. Angle, W. H. Purdy, M. S. Richardson, E. F. Woodworth, directors. Willcox Bank & Trust Co., treas.

Inc. July 26, 1906, in Arizona. **Cap.**, $1,000,000; $1 par; issued 789,186.

Property: 23 claims, 430 acres, in two groups, 1st group about 2 miles N. W. of, and 2d group about 5 miles N. E. of Dragoon, in the Dragoon mountains, shows a contact deposit between pre-Cambrian limestone and altered schist, averaging about 15' in width and carrying azurite and malachite, associated with hematite. Ores carry an average of 2.7% copper.

Development: by a 660' incline shaft, several shallow shafts ranging from 40 to 100' in depth, and a 2,000' tunnel, with about 4,500' of workings, estimated by management to show 165,000 tons ore in sight. Work on the 600' level said to be in 8.12% ore for 50'.

Equipment: includes a 15 h. p. gasoline hoist, good for 800', a small air compressor, machine shop, smithy and other necessary mine buildings. Water encountered on 600' level has somewhat retarded development, but shaft is to be deepened when conditions permit. New pumping plant needed. Property considered promising.

COBRIZA MINES DEVELOPMENT CORP. **ARIZONA**

Company had a lease on property of the Arizona United Mining Co., but this was given up in 1918 and company has gone out of business. Described in Vol. XIII.

COMMONWEALTH EXTENSION MINING CO. **ARIZONA**

Mail returned unclaimed from Pearce, Ariz., March, 1919.

Officers: J. S. Metcalf, supt.; C. W. Hicks, pres. Control held in Bisbee, Arizona.

Property: a tract adjoining the Commonwealth mine on the E. and S. E. shows a mineralized contact that carries high-grade ore in the adjacent mine.

Development: a 250' shaft sunk in andesite with 230' level, equivalent to 4th level of the Commonwealth and corresponding to the water level of the district.

Equipment. includes steam plant, hoist and compressor.

COMMONWEALTH MINING & MILLING CO. **ARIZONA**

Property: the Commonwealth silver mine, at Pearce, Cochise Co., Ariz., closed down in 1917, and complete 350-ton equipment sold to Commonwealth Dev. Co. Although some rich shoots were found at depth, none persisted, and operations became unprofitable. See Vol. XII for description and other data.

COPPER DOG MINING CO. **ARIZONA**

Mail returned unclaimed Feb., 1919.

Office: A. Graydon, 1649 York St., Denver, Colo.

Officers: A. Graydon, pres.; G. J. Peterson, v. p.; H. J. Potter, sec.-treas.

Cap., $1,000,000, $1 par; issued 500,000 shares.

Property: 12 undeveloped claims in the Huachuca district, Cochise [illegible] held under bond and lease. Ore is gold, with some silver and copper. [illegible] as $90 per ton are reported in a narrow vein.

COPPERROX MINING COMPANY OF ARIZONA **ARIZO**

Office: Mail returned unclaimed June, 1919, from 96 Harris Ave., Pro dence, R. I. Mine near Courtland, Cochise county, Ariz.

Officers: T. F. Gilbane, pres.; Geo. F. Wordley, 1st v. p.; Thomson Going, 2nd v. p.; Hon. G. W. Esterbrooks, sec.-treas.

Inc., Jan. 17, 1910, in Arizona, as successor of the Arizona Copper S dicate of Providence. **Cap.,** $1,000,000, $1 par.

Property: 28 claims, 18 patented, and 2 mill sites, patented, in the D goon Mountains, 3 miles from Courtland.

Development: by 236′ shaft and about 500′ of tunnels on a contact s to be traceable 3 miles, with surface ores carrying gold, copper and mangan said to assay up to 16.5% copper. President reported, 1916, that a manganifer "mother-lode" has been opened up by recent work. Company a holding c cern that will lease or sell controlling interest.

DENN-ARIZONA COPPER CO. **ARIZO**

Office: Bisbee, Cochise County, Ariz. **Officers:** Martin Pattison, pr Lemuel C. Shattuck, treas.; J. G. Williams, sec.; Byron M. Pattison, Thos. F don and H. L. Mundy, directors. Arthur Houle, supt.

Inc., Jan. 14, 1907, in Minn., as successor of Denn-Arizona Devel ment Co. **Cap.,** $3,500.000, $10 par, fully issued; increased June, 1917, $5,000.000, and 55,000 shares new stock offered for sale, at $10. Listed on Bos Curb.

Property: 13 claims, patented, 200 acres, immediately east of the Ju tion shaft of the Superior & Pittsburgh. The Dividend fault traverses the c pany's ground for about 4,500′, and big orebodies have been found on adjoin properties near this fault.

Development: by 1,800′ shaft, started in conglomerate, but penetrat limestone at 840′, with over a mile of workings. The 1,000′ and 1,100′ levels sh considerable leached ore, with little commercial ore, though carrying occasi small bodies of rich cuprite. The 1,250′ and 1,350′ levels also show large a of leached ore, with some low-grade sulphides on the 1,250′ level, and a li native copper on the 1,350′ level. The 1,600′ level has a little ore of 12 to 1 copper tenor. The leached ore bearing zone is about 300′ wide, containing in the form of oxides and carbonates.

Management estimates the average tenor of ore developed almost exclusi oxides and carbonates, at 8% copper. Apparently some good orebodies may developed at 1,800′, or deeper, though the ore is erratic. The mine is wet, has two 1,000-gal. triple-expansion pumps on the 1,000′ level and five 800- sinking pumps.

In Aug., 1919, No. 11 crosscut at 1600′ had opened chalcocite and cha pyrite; No. 6 at 1700′ was in high-grade ore, and a new orebody was opene 200′.

Equipment: includes a 1,600 h. p. steam plant, with 6-drill and 25-d air compressors and an 18x36" Ottumwa Corliss first-motion hoist, raising dou deck cages. There is a railroad spur to the mine.

Production: 1909, was 90,222 lb. fine copper and 41 oz. gold. Devel ment work was energetically carried on, despite very heavy pumping expen until 1912, when an unusual influx swamped the pumps and the mine closed down. Operations were resumed in Sept., 1917, and development is p ceeding rapidly. Over $1,000,000 has been expended in development work s 1917.

Production from development reported about 2 cars ore daily, more t 300,000 lb. copper per month.

The Deep has an excellent chance of making a big mine, the claims cove an extension of the big ore zone of the camp, but the ore horizon at this p is lower than on the other properties. The deep development of the Junct C. & A., and Saginaw properties will drain this ground as well as prove it, further exploration will be easily and cheaply done. There is strong probabi that this company and the Shattuck will be merged at some future time. P

erty is a splendid prospect. It may be several years before it makes a mine, but eventually, we believe, will be a very valuable one.

DRAGOON MOUNTAIN MINING CO. **ARIZONA**

Mine office: Johnson, Cochise County, Ariz.

Developed: by 300′ vertical and 400′ inclined shafts. Reported to have shipped 11 cars of ore in Aug., 1918.

EMPIRE COPPER & GOLD MINING CO. **ARIZONA**

Mail returned unclaimed Sept., 1918, from Office: 510 Bradbury Bldg., Los Angeles, Cal. Mine address, Dragoon, Cochise Co., Ariz.

Officers: Leon V. Shaw, pres.-treas.; P. E. Woods, v. p.; Chas. R. Van Tilburgh, sec., with M. J. Gress, H. Hermanson, C. J. Nordquist, R. W. Pigeon, C. R. Lawrence, directors.

Inc. Jan. 31, 1905, in Arizona. **Cap.,** $1,500,000, $1 par; issued 953,814. Annual meeting, second Monday in October.

Property: 3 separate groups of claims, near Johnson and Dragoon, on the Southern Pacific Railway. The Empire group, 16 claims, 2 miles S. E. of Johnson, shows limestones and quartzite cut by porphyry and traversed by N. W. fissures carrying ore.

Development: by the 380′ Empire 2-compartment incline shaft, with about 500′ of drifts, so wet that it was abandoned, temporarily; also the 125′ Bridge, 158′ Copper Whale and a 2,000′ tunnel shaft started. Mine shows auriferous and argentiferous copper ore.

In May, 1913, machinery and supplies were moved from the Empire group 5 miles south to the Princess group, said to have attractive surface showings of iron gossan and copper carbonate and to be opened only by shallow shafts. Company also owns the Cowboy group of 8 claims, partly developed, showing veins in limestone near porphyry contacts.

Equipment: includes a 25 h. p. hoist and 1-drill air compressor. Buildings include an engine house, smithy, bunk house and boarding house.

No recent returns. Probably idle.

EMPIRE STATE MINING CO. **ARIZONA**

Office: 182 Buick Ave., Utica, N. Y. **Mine office:** Bisbee, Cochise Co., Ariz.

Officers. R. E. King, pres.; F. L. Guillaume, v. p.-treas.; E. M. Penny, sec.; W. A. Fenn, Geo. P. Langford, John A. Losee, John A. Urschel, directors. John A. Collins, gen. mgr. and purch agt.; O. P. Zane, cons. engr. and supt.

Inc. June 27. 1904, in Arizona. **Cap.,** $1,000,000. $1 par; 813,000 shares issued. Annual meeting in June.

Property: 11 claims, 230 acres, near the Modern mine, about 5 miles N. W. of Bisbee, is developed by a 1,400′ tunnel, said to show about 150′ of low-grade copper ore, slightly auriferous and argentiferous, estimated to average about $8 per ton. Ore is found in small stringers, typical of the district, and property is not considered well located. Idle since June, 1914.

GREAT WESTERN COPPER CO. **ARIZONA**

Address: Courtland, Cochise County, Ariz. Wm. J. Young, Jr., pres.; Edward A. Young, sec.; C. H. Young, treas., all of Clinton, Iowa; F. J. Gibbons, gen. supt.

Inc. Oct. 22. 1900, in Arizona. **Cap.,** $1,000,000. $10 par: fully issued.

Property: 23 patented claims, 407 acres, in the Turquoise district, acquired 1899.

Geology: Limestone is intruded and altered by monzonite and quartz-monzonite porphyry. The Humboldt, first opened, yielded high-grade ore from the surface to 150′, where it apparently ended. In 1908, good ore was opened in the Mary to 200′, and high-grade ended here also. Five diamond-drill holes during 1918 failed to disclose ore at depth, but a 6th encountered good ore in the ground. On this a 265′ prospect shaft was sunk and a 250′ crosscut cut a body of chalcopyrite and bornite ore. Lessees are mining ore from the Humboldt, Maine and Chance claims. Sulphide ore was opened in [illegible] 1909, and produced until 1914.

Development: 2,600 of workings from 5 shafts, 310', 300', 430', 200' an 265' deep, respectively.

Equipment: includes a 150 h. p. electric plant driven by steam powe and having one 150 k. w. generator, a 600 cu. ft. air compressor, 2 electric hoist electric pump, etc. Additional machinery was put in during 1919.

Production: 1916, 1,197,920 lb., 1917, 1,935,563 lb., and 1918, 1,201,893 l In Oct., 1919, the daily output was a carload of ore. There were 30 men employe

GREAT WESTERN GOLD & SILVER CO. ARIZON

Idle for years. Dragoon, Cochise Co., Ariz.

Inc. about June, 1908.

Property: in the Dragoon Mountains, shows lead and copper ores wit gold and silver.

HARTFORD-ARIZONA COPPER MINING CO. ARIZON

Address: Hamburg, Cochise Co., Ariz. Henry Hamburg, pres. and mg

In Sept., 1913, the Arizona Corporation Commission authorized the compan to incur a $100,000 6% bond issue, for further mine development.

Property: the Wisconsin group in the Huachuca Mountains. Surveye a line for tramway to wagon-road and planned shipping to Hereford or to point on Fort Huachuca branch of the El Paso & S. W. R. R. Developed b tunnels, has steam plant and compressor. Company employed 30 men at la accounts. No recent returns secured.

HAYES & GRACEY SYNDICATE ARIZON

M. P. Hayes and T. H. Gracey, Los Angeles, Cal., owners. Succeeds th Dragoon Copper Mining & Smelting Co., now dead.

Property. the Christmas and Eureka claims, carries replacement d posits with silver-lead-copper ores.

Development: by a 550' shaft.

Equipment: includes steam power and air compressor. Presumably id as no returns have been secured for years.

HELENS DOME MINING CO. ARIZON

Operating company holding bond and lease.

Owner: T. J. Quillin, Bowie, Cochise Co., Ariz.

Property: 18 claims, 14 miles S. of Bowie in Apache Pass; Paradis district. Ore contains gold, silver and lead with 2% copper. Hoist and sma mill on property.

HERSHEL MINING CO. ARIZON

Address: Douglas Gray, mgr., Tombstone, Ariz.

A silver-lead property in the Charleston district which was to ship some o during 1919. Reported to have shipped some ore worth $5,000 per car. Sma mill on property.

The high price of silver has helped this and many other small properties t resume operations.

HILLTOP EXTENSION MINES CO. ARIZON

Office: Box B, B., Douglas, Ariz. **Mine office:** Rodeo, N. M.

Officers: W. E. Hawley, pres.; J. G. Erickson, v. p.; F. H. Fisher, sec treas. J. Blumberg, mgr.

Inc. in Arizona **Cap.,** $750,000, $1 par; 250,000 shares are promotio stock.

Property: the Lily and Whale groups in the Chiricahua Mountain Cochise county, 18 miles N. W. of Rodeo, N. Mexico, claimed to have the N. W nd S. E. extensions of the Hilltop veins.

Developed by 750' tunnel, vein said to be 3' wide, shipping ore carrying 60% lead with 50 oz. silver. Molybdenum is also reported.

HILLTOP METALS MINING CO. ARIZONA

R. O. Fife, trustee-mgr., Rodeo, N. Mexico.

Formerly the Hilltop Mines (not incorporated).

Office, 1321 Otis Bldg., Chicago, Ill **Mine Office:** Rodeo, N. M.

Officers: J. O. Fife, pres.; P. J. Kasper, v. p.-treas. with F. A. Rehm J. R. Scott, Phil Hoffman, C. H. Putnam, F. J. Kasper, O. Kastrup, Jr., director A. C. Jo[illegible]

Inc. 1916 in Arizona. **Cap.**, $10,000,000, $1 par; outstanding 2,000,000 shares.

Property: 42 unpatented claims, 800 acres, in California mining district, Chiricahua Mountains, Cochise county, said to show copper-lead-silver ore in quartz veins and contact deposits; strike N. W.-S. E., dip 60° S. W. Ore-shoots reported as 2′ to 50′ wide, and 30′ to 110′ long, averaging 1 to 3% copper and 5 to 10 oz. silver. Examined by L. D. Hutton, Walter Vidler, and Charles Berkey.

Development: by 4 tunnels, 800′, 1,500′, 1,700′ and 2,000′ long; giving a depth of 1,100′ below the outcrop. Total workings, 15,000′. No ore blocked out, but developments show large probable tonnage. No shipments made in 1918. Cooperation with the Hilltop Extension was being arranged late in 1919, and doing considerable development.

Equipment: includes a 300-h. p. engine and an 1,000 cu. ft. compressor. Contemplated construction is a railway from the mine to Rodeo, in New Mexico, there to connect with the El Paso & Southwestern; also a mill and smelter.

It is to be hoped that this heavily capitalized company will actually block out ore reserves before attempting further ambitious equipment schemes.

HILLTOP MINES (not Inc.) **ARIZONA**

Now property of the Hilltop Metals Mining Co., which see.

JOHNSON COPPER DEVELOPMENT CO. **ARIZONA**

Office: Frankfort, Ky. **Mine address:** J. T. Tong, mgr., Johnson, Cochise Co., Ariz.

Officers: Henry S. Krug, St. Louis, Mo., pres.; Ralph R. Wilson, v. p.; F. H. Elliott, sec.-treas.; preceding, with P. S. Head, Hon. A. A. Hazelrigg, Hon. Baily D. Berry, Hon. A. C. Van Winkle, R. O. Duncan, and H. P. Hubbell, directors.

Inc. March 13, 1908, in Arizona. **Cap.**, $2,000,000, $1 par; issued 1,568,000. Annual meeting, second Monday in October.

Bonds: $100,000 5-year 6% 1st mortgage gold bonds authorized, interest payable annually on Dec. 21. Principal due Dec. 21, 1921. $43,000 worth of the bonds have been sold.

Property: 8 claims, 3 fractional, unpatented, 125 acres, known as the Climax group, in center of the Johnson camp, between the Peabody, Peacock, Republic and Black Prince mines. Claims show granite and limestone, with replacement deposits carrying malachite, chrysocolla, bornite and chalcocite, averaging 4% copper and 5 oz. silver per ton for the several thousand tons thus far developed. Orebody has a flat dip, averaging 32°, and is about 2′ wide on the 250′ level.

Development: by 240′ shaft giving a depth of 740′ on the orebody, with total of 2,500′ of workings. Shaft reported to be bottomed in bornite disseminated in limestone. The 100′ level has about 500′ of crosscuts and drifting, much of it in ore, but ground is leached and broken. The 250′ level has N. and S. drifts, 500′ of workings, on a 2′ vein. A 500′ winze was sunk from the S. drift. Development is said to show large bodies of low-grade carbonates near the surface and some sulphides at 400′ depth. A good grade of ore recently on 650′ level. Only work done in 1919 was a crosscutting toward the Republic mine on the 740′ level.

Equipment: includes a 40 h. p. gasoline hoist, 5-drill compressor and 5 buildings.

KEYSTONE COPPER MINING CO. **ARIZONA**

Office: Newton, Kans. Mine at Johnson, Cochise Co., Ariz.

Officers: W. W. Miller, pres.-gen. mgr.; A. Bannow, v. p.; T. C. Miller, sec.; W. J. Trousdale, treas.; Doane Merrell, state agt.; U. R. Miller, supt.

Inc. 1908, in Ariz. **Cap.**, $900,000, $1 par; 823,000 shares outstanding.

Property: the Bannon group, 16 unpatented claims, surrounding the St. George claim and 1½ miles from the Arizona United property, said to show a large deposit of iron ore and to have cut several veins dipping 38°.

Development: by 635′ shaft, to be sunk deeper; 3,000′ underground workings said to block out 500,000 tons of sulphide ore, including orebody 26′

wide and 150′ long, that runs 2% to 10% copper, with about $4 to $5 gold p ton.

A mill was proposed in 1919. Six men were working on 600′ level late 1919.

KING COPPER CO. **ARIZON**

Office: W. F. Dreher, sec., 536 First Natl. Bank Bldg., Denver, Col

Mine office: Rodeo, N. M.

Officers: N. P. Wilson, pres.-mgr.; C. E. Welch, supt.

Inc. 1917, in Arizona. **Cap.,** $1,000,000, 50c par.

Property: about 1,000 acres in the Paradise district, Cochise county. miles north of Rodeo, N. M. Company says a 200′ dike crosses property, al several fissure veins. Assays as given are 5.2% copper, 8.6% lead, 2.5 oz. silv per ton.

Development: by 2,000′ and 300′ shafts and numerous tunnels. Go grade ore reported on 300′ level.

Equipment: includes 200 h. p. gas engine, 700 cu. ft. compressor a concentrating mill.

LEADVILLE MINING CO. **ARIZON**

Address: Courtland, Cochise County, Ariz.

Officers: Wm. Holmes, pres.-gen. mgr.; W. D. Monmonier, sec.; Pearc Ariz.; Calvin Glenn and W. A. Stilson, directors.

Inc. 1905, in Arizona. **Cap.,** $600.000, $1 par.

Property: 13 claims, 199 acres, patented, in the Turquoise district, i cludes the Leadville and Maid of Sunshine mines, showing contact deposits b tween monzonite and limestone. Ores are mainly malachite, azurite, and chr socolla, with some chalcopyrite, and pyrite showing in the Maid of Sunshi mine. The orebodies said to carry an average of about 8% copper. Compa is developing the Lower group on the 300′ level. There are 5 shafts, deepe 365′, and a 60′ tunnel.

Equipment: includes a 250 h. p. steam plant, 2 hoists and air compresso Company resumed active operations, Oct., 1915.

Shipments: about 15 tons of 8% copper ore daily, and management est mates 100,000 tons ore in sight.

Property was under bond, 1916-17, to the Needles M. & S. Co., for $600,00 and extensively churn-drilled, but bond given up in July, 1917. No repor received since then.

LEONARD COPPER CO. **ARIZON**

Address: Gleeson, Cochise County, Ariz. J. W. Bennie, Clifton, Ari mgr.; J. E. Penberthy, supt., Gleeson.

Inc. 1910 by interests closely connected with the Shannon Copper C and property is under lease to that company.

Property: the Copper Belle mine, 8 claims, in the Turquoise or Cour land district, is opened by a vertical shaft and about 1 mile of workings, develo ing several orebodies on 3 different contacts. Ore is nearly solid pyrite, wi considerable chalcopyrite and some bornite.

Equipment: includes steam plant with 2 hoists, compressors, repair sho etc. Output 150 tons per day, loaded directly into railway cars at mine a shipped over the A. E. & S. P. Railroad to Clifton.

LOS CONQUISTADORES MINING CO. **ARIZON**

Office: Benson, Ariz.

Property: about 14 miles N. of Benson, developed by 3 shafts, 80′, 11 and 118′ deep. Gold quartz ore, in places, said to be 30′ wide, occurs in diorit pegmatite and schist dikes. It is stated that 600 tons on the dump will assa from $15 to $50 per ton.

LOUISIANA-ARIZONA COPPER MINING CO. **ARIZON**

Address: R. A. Clampitt, Bisbee, Ariz.

A silver-lead prospect, 6 miles west of Bisbee, Cochise county.

MANHATTAN DEVELOPMENT CO. **ARIZON**

Office: Post Office Blk., Houghton, Mich. A. O. Koppes, supt.; J. H Rice, pres.; W. G. Rice, sec.-treas.

Inc. March, 1905, in Arizona. **Cap.**, $200,000, $10 par; $5.50 paid in.

Property: 37 claims, 600 acres, owned in fee, in the California district, near Paradise, Cochise county, carries upwards of 2 miles of the outcrop of a mineralized zone lying W. and N. of the holdings of the Chiricahua Development Co.

Development: by several shallow shafts, deepest 80', and a 450' crosscut tunnel, latter showing leached ore and a little high-grade ore, with indications of persistent values at greater depth.

In 1913, company purchased the Arnold Mining Co. property, near Santa Cruz, Sonora, for $88,000. This property is developed by a 300' shaft and has shipped 12% ore to the Cananea smelter. The company's previous operations have been mainly in the Yaqui region of Sonora.

MASCOT COPPER CO. **ARIZONA**

Office: Harris Trust Bldg., Chicago. **Mine offices:** Dos Cabezos, Cochise Co., Ariz.

Officers: T. N. McCauley, pres.; R. V. Dixon, A. J. Baldwin, H. J. Gilbert, J. W. Phillips and D. S. Stevenson, directors. J. W. Prout, Jr., supt.

Inc. July, 1907, in Arizona. **Cap.**, $15,000,000, $10 par; outstanding, 1,200,000 shares.

Property: 56 claims, 22 patented, 1,100 acres, about 800 acres being classed as mineral lands, in the Dos Cabezos district. Company also owns a town site near Dos Cabezos, and miscellaneous lands, including placer claims, total holdings over 1,100 acres.

Property shows limestone near a granitic area, intruded by diabase dikes and quartz porphyry with a covering of rhyolite, on part of the ground. The limestone shows in the lower hills on the south. Granite constitutes the two pillars known as Dos Cabezos.

The ore occurs in lenses in contact deposits between altered lime and diabase. In many instances chalcopyrite is found in the diabase magma and shows a metasomatic replacement. Ores carry chalcopyrite in a gangue of contact minerals with 3 to 20% copper, the average being 5%, and small gold-silver values.

Development: by the 450' Oregon shaft, and 2 tunnels, longest the 1,800' Consolidated tunnel, connecting with the shaft at the 4th level. Total underground openings aggregate 29,000', and ore in sight is estimated by the company at about 1,000,000 tons, containing 5% copper. About 30,000' of diamond drilling has been done in various parts of the property. Recent results reported as good, especially at depth of 700'. Sinking new shaft.

Equipment: includes two 250-h. p. distillate engines, two 12-drill air compressors, machine shop, electric lighting plant, smithy, telephone system and boarding house, with about 80 buildings. The company finished building the Mascot & Western R. R., a 15-mile line connecting the town of Mascot with the S. Pac. R. R. at Willcox, Arizona. A 10,000' aerial tram, capacity 1,200 tons per day, is used for carrying ore and supplies from mine to railway. A concentrator is contemplated.

Production: 1918, 13,276 tons containing 3% copper and 0.5 oz. silver.

The mine management is good and property is reliably reported as promising. The A. S. & R. Co. relinquished its lease on April 1, 1918.

MASCOT MINING CO. **ARIZONA**

Last address: 1318 Majestic Bldg., Detroit, Mich. Company not favorably regarded. See Copper Handbook, Vol. XI, for full description of properties. Letters neither answered nor returned. Presumably idle.

MIDDLEMARCH COPPER CO. **ARIZONA**

Now Arizona Middlemarch Copper Co., which see.

MINES & DEVELOPMENT CORPORATION **ARIZONA**

Address: Martin Fishback, mgr., Johnson, Ariz.

Property: the Arizona & Michigan Development Co's. group of 7 patented claims, 140 acres in Cochise county, taken over in Aug., 1919.

Principal formations are porphyry and limestone. Claims said to carry 4 orebodies, one opened by vertical and incline shafts and tunnels, showing a 5' vein with poorly defined walls and impregnations in the limestone hanging and

porphyry footwall. Has a 450′ two-compartment main shaft with 24 opening showing cuprite, malachite and copper sulphides said to give average assays u to 12% copper, 18 oz. silver, and $1 gold per ton.

Equipment: 60 h. p. gasoline engine with double-drum hoist. 200 h. p boiler and compressor. Company owns a short railroad connecting with th Southern Pacific Railway at Dragoon. In Sept., 1919, announced that a mil would be built.

NEBRASKA & ARIZONA COPPER CO. **ARIZONA**

Mail address: Paradise, Cochise Co., Ariz. W. K. Morrow, supt. at las report.

Inc. Jan., 1910, and merged June 25, 1910 with the California & Paradise Mng. Co., in the California & Paradise Cons. Mng. Co.

NORTH HILL-TOP EXTENSION MINING CO. **ARIZONA**

Address: San Simon, Ariz.

Officers: F. P. Crane, pres.; W. W. Howard, v. p.; G. H. Ebson, sec Jas. M. Hall, treas., with R. D. Hall, J. L. Hill and C. J. Olden, directors.

Inc. June, 1917, in Ariz. **Cap.,** $2,000,000, $2 par.

Property: 30 unpatented claims, in California mining district, 20 miles S. W. of San Simon, said to show silver-lead ore in a number of veins.

Development: several open cuts and test-pits only.

Is a speculative proposition.

OCOTILLO COPPER MINING CO. **ARIZONA**

Office: 502 Corby-Forsee Bldg., St. Joseph, Mo. **Mine office.** Bisbee, Arizona.

Officers: R. A. Grant, pres.; C. A. Blair, v. p. T. G. Sorter, sec.-treas.

Inc. "under the common law" in Ariz. **Cap.,** $2,000,000, $1 par; 1,000,000 shares in treasury. Stock offered the public, 1917, at 35c. a share, either on the installment plan or with a 10% discount for cash.

Property: 16 claims, about 320 acres, 4 miles from Bisbee, Cochise county. Formation said to be lime and granite-porphyry.

Development: a shaft is being sunk on a vein near the lime-porphyry contact on the Lucky Tramp claim. Material is impregnated with iron and carries some gold and copper. Assays of the ore at 10′, 20′ and 40′ in depth are given as $2, $5, and $40 per ton.

Company's prospectus devoted mostly to the big producing mines of Arizona, their dividend records, etc., advises investment in the Ocotillo mine, which, it states, "will prove as good as any of the large paying mines surrounding us, such as the Copper Queen, C. & A., Shattuck, and the Sacramento." Company is "going to spend $650,000, as fast as conservative management can place it. We get the money from London. The price is 50c. a share, but we will raise it to $1 as soon as we hear from the London office again, which will be in one week. . . . ." (written in July, 1919). This prospect, for it is not even a near-mine, is in an unpromising area outside of Bisbee. Investors are warned to await results of development to at least 100′ in depth.

PARADISE MINING CO. **ARIZONA**

Paradise, Cochise Co., Ariz., was controlled through ownership of 60% of stock, by Bisbee-Sonora Development Co., fully described in Vol. XII.

PEABODY CONSOLIDATED COPPER CO. **ARIZONA**

Office: 111 Broadway, New York. **Mine office:** Johnson, Cochise Co., Ariz.

Officers: Leo Schlesinger, pres.; Alex T. Wells, v. p.; I. Niner sec.; J. Born, treas., with Jos. B. Mayer, Morgan J. O'Brien, Jr., Herbert R. Limburg, G. M. Minzesheimer and Jas. Muir, directors. John H. Banks, cons. engr.

Inc. in Ariz. **Cap.,** $1,500,000, $5 par. Empire Trust Co., New York, transfer agent. Listed on New York Curb.

Property: 12 claims, 5 patented 230 acres, covering 2,000′ along the ore belt at the Johnson camp, bought of the Bonanza Belt Copper Co., includes the Peabody mine, located 1879. Mine has a contact deposit between diabase and limestone and replacement veins, all within a 100′ belt. Mine is credited with a production of about $411,970. Ore is a mixture of zinc blende and chalco-

pyrite in a garnetized lime gangue and is oxidized to a depth of 200′. The ore shipped claimed to run 4-6% copper, with 5% iron, 15-20% lime and 55% insoluble; silver averages ½ oz. to each percent. copper.

Development: by a 350′ shaft, with crosscuts on the 200 and 300′ levels. No ore reserves reported.

Equipment includes 90 h. p. power plant, compressor and hoist.

Shipments: in 1917, 300 tons per month were shipped to the Cons. Kansas City S. & R. Co. (El Paso smelter), a subsidiary of the A. S. & R. Co., under a 3-year contract.

Prospectus issued by company was regarded as rather unduly optimistic. Property is an old one, having been operated intermittently for 20 years. Presumably idle.

RED MOUNTAIN DEVELOPMENT CO. **ARIZONA**

Office: P. O. Box 3007, Lowell, Ariz.

Officers: Frank Briggs, pres., treas.-gen. mgr.; Wm. Hawley, v. p.; E. J. Briggs, sec.

Inc. Oct. 5, 1908, in Arizona. **Cap.,** $1,000,000. $1 par.

Property: 17 claims, 340 acres, crossed by the Southern Pacific Railway, shows schist, porphyry and limestone, with a vein claimed to be 130′ wide and traceable 2 miles, carrying copper and lead ores, including copper oxides and chalcopyrite.

Development: consists of a 100′ shaft. Idle owing to lack of funds since 1917.

SAN SIMON COPPER CO. **ARIZONA**

Office: Marquette, Mich. **Mine office:** Paradise, Cochise County, Ariz.

Officers: Nathan M. Kaufman, pres.; Hon. Norman W. Haire, v. p.; S. R. Kaufman, sec.-treas., with Thos. F. Cole, John A. Duncan, Wm. G. Rice and Thos. H. Collins, directors.

Inc. 1907, in Arizona, as a reconstruction of the Chiricahua Development Co. **Cap.,** $2,500,000. $10 par.

Property: 40 claims, 7 patented, about 750 acres, 16 miles from nearest railway, at Rodeo, N. Mex., previously operated by Capt. Thos. Burns as a silver mine.

Development: a 750′ crosscut tunnel with a 100′ winze 700′ from the portal, cutting 50′ of leached ore, apparently the apex of a sulphide orebody. Also the 400′ Mars shaft, bottomed in chalcopyrite ore of 2 to 4% copper tenor. The 400′ Planet shaft has drifts on the 4th level.

Equipment: includes two 150 h. p. boilers, two 2,000′ double drum hoists, and a 16-drill air compressor. Idle; only assessment work done in recent years.

SIGNAL POINT MINING CO. **ARIZONA**

Office: 40 First National Bank Bldg., Douglas, Ariz.

Officers: G. E. Hemphill, pres.-gen. mgr.; E. G. Richards, v. p.; Z. T. Phillips, sec.-treas., with E. A. Hemphill and Charles Stephens, directors.

Inc. July 10, 1915, in Arizona. **Cap.,** $600,000, shares 50c par; 800,000 issued.

Property: 19 claims, 12 miles E. of Douglas, near International Boundary.

Development: one shaft 120′, another 150′ deep, equipped with gasoline hoists. No. 1 shaft was sunk on an iron dike, showing traces of copper and silver, and up to $3 gold per ton. This shaft was to be sunk to 300′, followed by crosscutting. No. 2 passed through 40′ of gold, silver, copper, lead ore into a leached zone. Churn-drills are to be used for prospecting other areas. Evidently idle, no recent returns.

STERLING COPPER CO. **ARIZONA**

Mail returned from last address: care Judson A. Elliott, Phoenix, Ariz. Mine office: Dos Cabezos, Ariz.

Officers: J. W. Thomas, pres.; L. C. Elliott, sec.; D. E. Nelson, treas.; with E. A. Congdon and J. A. Elliott, directors. C. H. Bean, supt.

Inc. 1906, in Arizona. **Cap.,** $1,000,000. $1 par; 482,600 shares issued.

Property: in the vicinity of Dos Cabezos, Cochise county, is deve oped by short tunnels and a 125′ shaft, following a limestone porphyry contac showing copper and lead ore which is said to average 5% copper. There ha been about 1,000′ of work done and $3,000 spent in development. Property a prospect. No recent returns.

SULLIVAN COPPER DEVELOPMENT CO. **ARIZON**

Office: care P. H. Nelson, pres., 610 Lonsdale Bldg., Duluth, Minn.

Mine office: Paradise, Cochise Co., Ariz. Geo. H. Crosby, sec.-trea

Property: 14 claims, 6 patented, 4 miles west of San Simon, Chiricahu Mts., has opencuts, showing leached copper ore and a little very rich ore, an has a 60′ tunnel showing lead ore. Management considered good and propert promising. Idle, except for annual assessment work, since 1917.

SWISSHELM GOLD-SILVER CO. **ARIZON**

Address: 32 South Stone Ave., or P. O. Box 188, Tucson, or Robt. Ra dell, supt., Webb, Cochise Co., Arizona.

Officers: F. J. Heney, pres.; Ben Heney, v. p.-gen. mgr.; G. H. Smalle sec.; Byrd Brooks, treas.

Inc. 1907, in Arizona. **Cap.**, $300,000, 50c par; 300,000 shares escrowe 300,000 in treasury; non-assessable.

Property: over 313 acres in the Swisshelm range, Cochise county, 1 miles by road to railroad, 30 miles N. of Douglas; said to have a contact met morphic deposit between limestone and andesite, with gold-silver-lead ore.

Development: 300′ incline shaft, 250 and 300′ tunnels, with total wor ings of 1,750′. Claims 5,000 tons of ore blocked out, averaging $25 per ton.

Management states that lead content of ore has hindered satisfacto smelter contracts, but in 1918 $6,265 was realized from ore sales. Gross ear ings are given as $9,247. A new smelting contract was arranged in Nov., 191 whereby the C. & A. works at Douglas will take the ore provided it contai over 70% silica. As the El Paso smelter had too much silicious ore, it penalize the excess silica. A saving of $1.50 per ton on freight will be made by shippi to Douglas.

Property has been examined by W. R. Ramsdell and others. He thin that the above estimate of reserves is too low. The superintendent "considers t ore potentialities or probabilities so immeasurable and so immediate" that disliked to estimate ore reserves. The circular of Dec. 1, 1919, contains a numb of optimistic and extraneous matters.

TEJON MINING CO. **ARIZON**

Office: Bakersfield, Calif. L. I. Thiers, supt., Gleeson, Cochise C Ariz.

Inc. in Arizona. **Cap.**, $1,000,000, shares $1 par.

Property: 8 patented claims, 150 acres, at Gleeson, in the Turquoise Courtland district, Arizona, adjoining the Copper Belle mine of the Leona Copper Co. mine, shows heavy bedded limestone dipping steeply eastward in the mountain ridge and cut by intrusive bodies of monzonite and later quar porphyry. Ore occurs as a contact deposit. Average assays reported at 5 copper, 6 oz. silver, 0.07 oz. gold per ton.

Development: by the 500′ Tejon shaft, and by several old tunnels wi extensive drifts and stopes in oxidized ore.

Equipment: modern and complete, includes electric and steam powe compressor, etc. Railway is close at hand. Property appears meritorious a management good. Reported closed down, February, 1919.

TETER-STONE AZURITE MINING CO. **ARIZON**

Dr. D. W. Teter, pres.

Property: 3 miles south of Dragoon, Cochise county, has a 4 to 1 contact deposit, between limestone and granite, showing outcrops of azuri and malachite, with some sulphide ore in a tunnel. Operations suspended, 191 owing to a heavy inflow of water. No later information.

TOMBSTONE CONSOLIDATED MINES CO., LTD. **ARIZON**

Controlled by Development Co. of America, which see.

TUNGSTEN REEF MINING CO. **ARIZONA**

Officers: A. J. Clark, pres.-treas.; L. E. Porter, v. p.-sec.; G. D. Kislingbury, supt.

Property: group of claims in Huachuca Mountains, 40 miles S. W. of Bisbee, and 16 miles S. of Hereford. Ore is said to contain a high percentage of tungsten with some gold. During the past winter deep snows have hindered work except on construction of a concentrator.

TWO PEAKS MINING CO. **ARIZONA**

Address: Turner, Ariz.

Officers: W. G. Gilmore, pres.; J. C. Akard, v. p.; E. P. A. Larrieu, sec.-treas., with J. S. Trowbridge and T. D. M. Larrieu, directors.

Inc. Jan. 4, 1916, in Arizona. **Cap.,** $2,500,000, $2.50 par; 432,054 issued.

Property: 45 claims, 1,012 acres, at S. end of Whetstone Mts., Cochise county, said to show a contact with a mineralized shear-zone striking S. 48° W., through the overlying monzonite porphyry, below which is limestone. Ore occurs as lenses in sheeting planes and through the porphyry mass, and according to company carries 3.16% copper, 0.034 oz. gold and 2 oz. silver per ton in shear zone. Minerals are chalcopyrite in shear-zone, and bornite and chalcopyrite in contact deposit. Carload in 1916 averaged 4.03% copper.

Development: by shafts 36, 55, 60, and 100′ deep, and by 270 to 280′ tunnels. Workings to depth of 150′; total, 1,500′. No recent information.

WAR HORSE COPPER MINING CO. **ARIZONA**

Mail returned, 1918, from former address, Bacher & Stelsel, 412 Mills Bldg., El Paso, Texas.

Cap., $1,000,000, shares $1 par.

Property: 15 claims in the Tombstone district, Ariz., 23 miles N. W. of Bisbee.

Development: 508′ shaft and other openings. At 265′ there was said to be 5½′ of ore assaying 8% copper, 16 oz. silver and $1 gold per ton. At 400′ the vein was reported to be 27′ wide and considered to run through 6 claims, a distance of 9,000′. Development probably disappointing as no recent returns have been received.

WILLIE ROSE COPPER MINING CO. **ARIZONA**

Mail returned, 1918, from former address, J. W. Sterling, mgr., Bowie, Ariz.

Property: the Willie Rose mine, near Triangle Springs, 13 miles S. of San Simon, Cochise county, Ariz., was operated under 10-year lease from 1914. Developed by 188′ shaft said to be bottomed in a 12′ vein carrying slightly argentiferous chalcocite, of about 2% copper tenor. Ore occurs in lime-porphyry contact, veins running E.-W., showing copper glance at slight depth. Made several shipments of $12 per ton ore to the El Paso smelter.

Equipment: includes hoist, oil engine, compressor and air-drills.

Probably idle.

BISBEE DISTRICT, COCHISE COUNTY

ANACONDA COPPER GROUP **ARIZONA**

Owner: D. W. Arte, P. O. Box 741, Bisbee, Ariz.

Property: 11 claims, 3 patented, in Warren mining district, stated as being on the S. W. contact of lime quartzite, 2,600′ west of the Shattuck, 1,600′ west of the Higgins, and adjoining the Copper Queen on S. E. and N. W. A 25′ shaft has been sunk in the crystallized lime quartzite. Assays along contact reported to carry $1.30 gold and 1.65% copper.

ARIZONA-BISBEE COPPER CO. **ARIZONA**

Mine office: Bisbee, Ariz.

A Phoenix corporation fathered by Mr. Ned Creighton and others formerly interested in the Higgins lease.

Property: 19 claims S. W. of the White Tail Deer property of the Copper Queen. Sinking a two compartment shaft. At 200′ level will explore the vein for ore. Reported to be well equipped with machinery and money for all work planned.

BISBEE COPPER MINING & DEVELOPING CO. **ARIZONA**

Office: Bisbee, Ariz.

Officers: Daniel B. Seed, pres.-mgr.; Joseph Waters, v. p.-supt.; W Hubbard, treas.; A. H. Livingston, sec.-mgr., with Jack Sheldon, directors

Inc. 1916, in Arizona. **Cap.**, $1,000,000; $1 par; 600,000 issued. U. S Corporation Co., transfer office; Empire Trust Co., registrar. Annual meetin first Saturday in September.

Property: 21 claims, 12 patented, 273 acres in Warren mining district comprising the Arizona and Winwood group and other claims, located ½ mil north of Lowell and a mile east of Bisbee. Lands are north of the Den Arizona. They are not near the Copper Queen mines, as has been claimed, bu are north of the Dividend fault and lie outside of the recognized ore bel Claims are said to show iron outcrops and some copper carbonate ore, but th U. S. Geological Survey map shows that schist and a very small acreage o porphyry occur on the southerly claims, but most of the group is covered by th barren Cretaceous rocks.

The tract shows some 2-6½% oxidized ore probably deposited by surfac waters, as the Cretaceous rocks do elsewhere in the district, but in such case the ore is only surficial, and rapidly fades out at a few yards or so in depth. I may be added that company's officers make affidavit to such ore being 50′ wid and going down to bottom of a shaft 12′ deep. Although one drill-hole wa down over 892′ July, 1917, sampling of the drill cores failed to show any com mercial value.

Equipment: a 10x12 electric hoist.

In our opinion the claims are entirely out of the mineralized area and hav little, if any, chance of becoming profitably productive.

A New York Curb house sent out very attractive-looking advertising matte regarding Bisbee and the Bisbee Copper Mining & Dev. Co., which contains man misleading statements. The property is not in the "heart of the Bisbee Coppe Camp," and such gross misrepresentation cannot be too strongly condemned Development on the property is quite insufficient to predict its becoming "second Calumet & Arizona" and an "early dividend payer," and the public buyin stock on such promises is doomed to be disappointed. Apparently the manage ment based all its hopes of developing a mine on its geographical position i utter disregard of geologic conditions.

No work has been done for some months, according to reliable information from Bisbee, late in Oct., 1919, and no pay-ore was found either in the shaf or drill-hole.

BISBEE-SONORA DEVELOPING CO. **ARIZONA**

Company owned several mining locations southwest of Bisbee in 1906-7 but failed to do assessment work and lost property. No meeting was held fo over 4 years, and company is insolvent.

H. C. Beumler, pres., Douglas, Ariz., wrote in 1917: "Company out o business." Was the holding company for Badger Hall, Bisbee & Duluth M. & D. Co. and Paradise Mng. Co. Fully described, Vol. XII.

BISBEE-WARREN COPPER CO. **ARIZONA**

Office: Bisbee, Ariz.

Inc. in Arizona. Application for patent made March, 1918, for 12 cop per-silver-gold claims, about 200 acres, in the Warren district.

BORAS LEASING CO. **ARIZONA**

Address: care Phelps Dodge Corporation, Bisbee, Ariz.

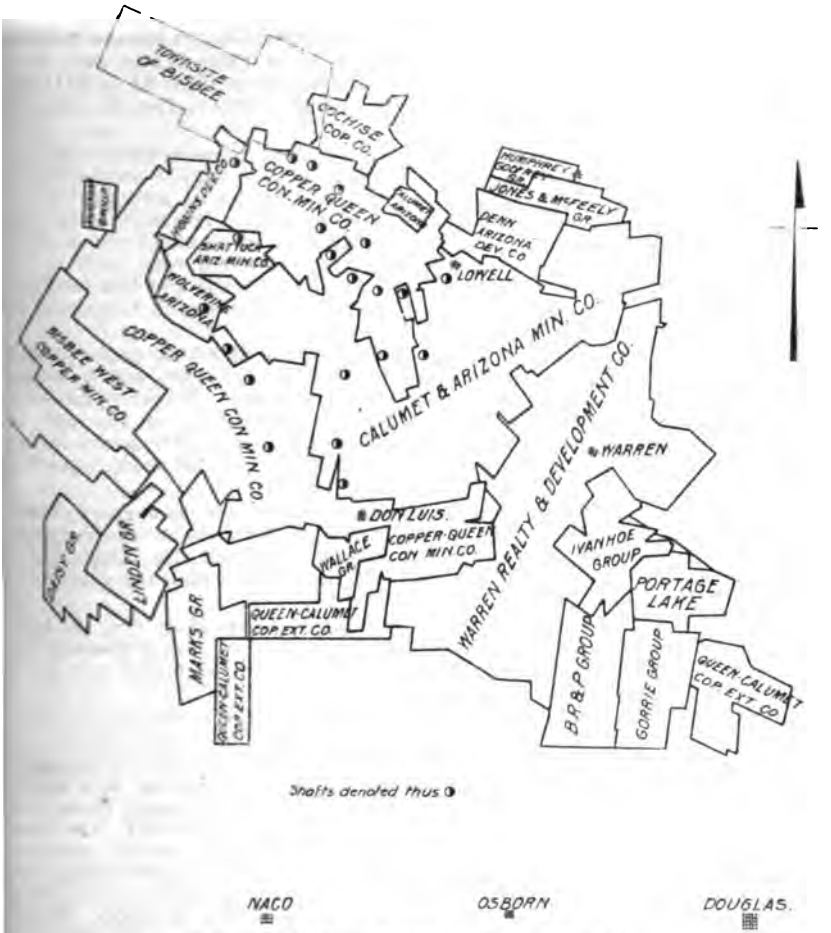
Property, a lease on part of the Copper Queen ground at Bisbee, ad joining the Night Hawk Leasing Co. Work at present is at 300′ depth, where high-grade ore was opened in August, 1919. Six men employed.

CALUMET & ARIZONA MINING CO. **ARIZONA**

Office: Calumet, Mich. **Mine office:** Warren, Cochise County, Ariz Works office: Douglas, Cochise Co., Ariz.

Officers: Chas. Briggs, pres.; Capt. Jas. Hoatson, v. p.; Capt. Thos. Hoatson, second v. p.; Gordon R. Campbell, sec.; Peter Ruppe, treas.; preceding with Thos. F. Cole, Walter B. Congdon, Chas. d'Autremont, Jr., William B.

Mershon, and Geo. E. Tener, directors; Henry B. Paull, auditor; John C. Greenway, gen. mgr.; E. E. Whitely, mine supt.; D. M. Rait, asst. mine supt.; H. A. Clark, smelter supt.; R. H. Dickson, engr.; J. B. Rawlings, purch. agt. John Hooper, supt. at Jerome, and M. Curley, supt at Ajo.



PROPERTY MAP OF BISBEE DISTRICT, ARIZONA

Inc. March, 1901, in Arizona. Cap., $2,500,000; shares $10 par, increased Feb. 15, 1911, to $6,500,000; shares $10 par; issued 642,519 shares; held for exchange, 273 shares. The company, which already controlled the Superior & Pittsburgh Copper Co., through ownership of 1,494,333 shares out of a total of 1,499,792 shares issued, in Feb., 1916, took over the property. All S. & P. assets were transferred to the C. & A. Co., effective Dec. 31, 1915, basis of exchange being 3½ shares Superior & Pittsburgh for 1 Calumet & Arizona, and a bonus of $1 per share for quick delivery of stock. American Trust Co., Boston, and Mechanics and Metals National Bank, New York, registrars; State Street Trust Co., Boston, and Bankers' Trust Co., New York, transfer agents. Stock is listed on the New York and Boston Stock Exchanges. Annual meeting, second Monday in April.

Balance sheet of Dec. 31, 1918, gave quick assets of $10,116,545, includi cash, $3,681,392; copper, silver and gold in process, $2,484,381; notes and accou receivable, $1,307,052; supplies and items in suspense, $1,291,220; Liberty bon $1,352,500; accounts payable are $781,182.

Total surplus $35,272,186. Total earnings on copper, gold and silver w $14,471,130; interest, $509,820; expenditures were $9,905,176; net income, $4,086,2

Dividends: $2 in 1903; $6.50 in 1904; $8.50 in 1905; $13 in 1906; $16 in 1907; $4 in 1908, 1909, 1910, 1911; $4.25 in 1912; $5 in 1913; $3 in 1914; $3 in 1915; $9 in 1916; $11 in 1917; $8 in 1918, and $3 in 1919 to Dec. 22. The to is $43,037,837.

In 1911 the company took an option on the New Cornelia claims, 243 ac in the Ajo district, 42 miles south of Gila. The C. & A. was to receive treasu stock of the New Cornelia Copper Co. (described under its own title), for money expended in development work on the property. It exercised its opti in 1913 and now owns 1,229,741 shares, or 68.3% of the stock of the subsidia company on which dividends of $306,935 was received during 1918. It bu jointly, with the E. P. & S. W., the 43 mile Tucson, Cornelia and Gila Bend Ra road, running from Gila Bend to Cornelia. The New Cornelia Co. entered t producing class in June, 1917.

The C. & A. also took an option on 70% of the $1,000,000 capital stock the Gadsden Copper Co., at Jerome, Arizona, in October, 1916, and is obligat to spend $100,000 in exploration work on the property. Property consists 39 claims adjoining the United Verde Extension Mining Co. on the south. April, 1919, property was fully equipped, shaft was down 1,200' where develo ments showed favorable geologic conditions. There were 60 men employed October, 1919.

Property: includes the original claims at Bisbee, claims formerly own by the Superior & Pittsburgh C. Co., bought Dec. 31, 1915; the American Sagin group, bought in 1912; the Calumet & Bisbee group and the Higgins grou bought in 1913; total area of about 2,068 acres, patented, within the mineral zo of the Warren district, Ariz.

Side-line agreements with the Copper Queen Cons. Mng. Co., the Den Arizona Mng. Co. and the Shattuck Arizona Copper Co., insure freedom fr litigation, and continuance of the friendly feeling and neighborly co-operati existing from the very inception of this company.

Geology: the mine is opened in limestone, near a porphyry conta with occasional porphyritic intrusions. The surface gives small indications values, showing but small and infrequent outcrops, the existence of the origin orebodies in the Irish Mag claim, farthest to the north, having been inferr from underground work in the adjoining territory of the Copper Queen, aft careful study of the general geological conditions of the district. Ore occu in highly irregular bodies, the mine having native copper, cuprite, melaconi azurite, chalcocite, bornite and chalcopyrite, usually with a talcose gangue, a with considerable hematite and manganese ores, the latter carrying malachite small disseminated nodules, frequently averaging 10 to 18% in copper. The o which is practically self-fluxing, averages about 2 oz. silver and 0.05 oz. go per ton, as smelted.

Development: diamond-drill borings to depth of 1,800' have penetrat limestone strata to that depth. The orebodies are extensively developed, b are not largely blocked out, owing to the constant shifting of the ground, caus by the creeping of the mountain above, as is the case at the neighboring Copp Queen mine, requiring very heavy timbering, with frequent bulkheading, a constant care for all openings, which renders it prudent to keep costs down blocking out ore but a comparatively short time ahead of actual stoping requir ments.

There are 6 main working shafts in operation, from which a rhomboid area a mile long is being actively developed and worked. These shafts are t 1,800' Irish Mag, 1,375' Oliver, 1,480' Cole, 1,630' Briggs, 1,680' Hoatson a

1,837' Junction shafts. Underground work totals about 144 miles, 50% of which is open and in use. New openings in 1918 amounted to 99,355', including 16,281' of diamond drill holes. During 1918, it required one foot of development work to open up 8.5 tons of ore. Mines have electric traction on the 1,400', 1,600' and 1,800' levels.

The 4-compartment Irish Mag shaft, sunk on a single 20-acre claim, was the original mine, and the shaft is sunk in hard limestone throughout, except where occasional orebodies were cut, rendering it unusually safe from drawing. The Irish Mag has yielded some of the best copper ever mined, including some entire stopes of 30 to 40% copper. The Irish Mag shaft has a 78' steel headgear, a 114' ore bin and a 250 h. p. electric hoist, raising 3-decked cages. The shaft is 1,390' deep and was retimbered to the 900' level in 1916. The Oliver shaft, 4 compartments, 1,375' deep, is equipped with 600 gal. Nordberg electric pump and hoist. It develops both of the Senator and Buckeye claims, cutting ore at 710'. Sulphide ore averaging about 5% copper is being mined from orebodies on the 1,150', 1,250' and 1,350' levels. Oxidized ore is being mined on the 850' and enriched sulphide ore on the 950' and 1,300' levels.

The Powell shaft, started Nov., 1908, is on the line between the Hope and Wagner claims, which lie 2,000' S. W. of the Irish Mag shaft. This ground was explored by a crosscut from the Irish Mag that traversed 600' of the Copper Queen ground, stopping about half way across the group, showing nothing of value. This shaft, about 600' deep, has an electric hoist.

The area below the 1,350' and 1,450' levels was diamond drilled, 1911, showing a downward extension of the mineral zone, several hundred feet to the bottom of the limestone, but without disclosing commercial ore.

The Washington, Angel and Old Republic claims lie on the porphyry side of the gulch, and were secured mainly as a possible smelter site, then being considered of little promise for ore.

In 1915, 5,165' of churn drilling on this group developed a substantial tonnage of low-grade disseminated ore in an irregular body from 170' to 450' below the surface.

The Cole shaft handles the output from the southwestern part of the company's holdings. The greater part of the recent production has come from a body of oxide ore of great size between the 800' and 1,100' levels. Smaller bodies have contributed sulphide ore from the 1,000' to 1,400' levels. This shaft has Prescott and Cameron station pumps caring for a flow of 225 gals. of water per minute.

The Congdon shaft, on the Black Bear claim, only 650' from the Mag, is 1,267' deep, but has been out of commission for several years, as the territory can be worked to better advantage through the Cole shaft. Surface equipment includes a 300-h. p. steam plant, with a 12x36" double-drum hoist.

The Hoatson shaft, on the Del Norte claim, 2,500' from the Briggs, has 5 compartments, and is 1,680' deep. Ore is being mined from a large body on the 1,300' level. This ore is taken by electric haulage to the Junction and Briggs shafts, where it is hoisted. Equipment at the Hoatson shaft includes a steel headgear, double-drum hoist, good for 2,000' depth. Power plant has 6 boilers.

The Junction shaft has 5 compartments and is 1,837' deep, being the deepest of any shaft in the Bisbee district. Shaft is concreted to bottom level. The Junction is the main hoisting shaft of the Briggs-Hoatson-Junction division, and virtually the entire production of the 3 mines, about 2,000 tons daily, is hoisted through it. Ore is hoisted in 5-ton skips, crushed in Allis-Chalmers gyratory crusher, and loaded by belt conveyor into railroad cars.

Large bodies of both oxide and sulphide ore have been opened up from the 1,300' to the 1,800' levels. Development of the 1,600', 1,700' and 1,800' levels was started in 1915, and valuable orebodies have since been found. The most important recent development is on the 1,400' and 1,600' levels from the Junction shaft south towards the Denn where indications are favorable for the development of important orebodies. In addition to the ore of shipping grade developed, immense bodies of solid pyrite, carrying between 1% and 2% copper, have been found on the 1,400', 1,500' and 1,600' levels.

The Junction shaft drains the entire Calumet & Arizona and Copper Queen group of mines. Water pumped during 1918 was 1,664,518,500 gals.

Pumping plant has been much simplified by the installation of a 1,500-gal electric pump on the 1,800′ level of the Junction. They are now handling 1,50 gals. p. m. from the 1,500′ and 1,900 gals. p. m. from the 1,800′ levels.

Surface plant consists of thirteen 250 h. p. Marine boilers, a 4-cylinder Nordberg, double-reel main hoist, good for 2,500′ depth, and a Sullivan single-drum hoist, used as an auxiliary hoist for handling men and timber.

There is a 5,000′ Nordberg compressor having compound air cylinders driven by a four-cylinder triple expansion steam engine. This machine has an attached air pump and condenser. In addition, there is a 3,500′ Nordberg compressor having compound air cylinders, driven by a cross compound steam end.

The Briggs shaft, about 3,000′ south of the Junction shaft, is 1,630′ deep and 3,000′ east of the Lowell shaft of the Copper Queen. Large bodies of enriched sulphide ore of much greater horizontal than vertical extent, averaging about 5½% copper, have been developed between the 1,200′ and 1,400′ levels. A substantial tonnage of oxide ore of good grade is being mined from the 900′ to the 1,400′ levels from nearly vertical fracture zones. On the 1,400′ level, 500′ south of the shaft, an important sulphide orebody 300′ long by 30′ wide was developed. Ore from this mine is handled by electric haulage on the 1,400′ level to the Junction shaft and hoisted.

Equipment at the Briggs shaft includes steel gallows frame. Power plant has 2 boilers of 250 h. p. each, burning crude petroleum, with a powerful hoist.

The Campbell shaft, recently started on the Regular Claim, about 2,000′ east of a point midway between the Junction and Briggs shafts, was stopped in 1917 on account of labor shortage. By December 31, 1919, it was 1,400′ deep. This shaft will develop an extensive and hitherto unprospected territory.

The Copper Giant group, at Copper Creek, Graham County, Ariz., includes 35 claims, known as the Scanlon or Clark-Scanlon property, 16 miles northeast of Mammoth. This property, bought Sept., 1908, has been extensively tested by diamond drills, giving good cores, and has a 600′ two-compartment working shaft, with several levels opened, and considerable medium to high-grade sulphide ore is blocked out. A 15-mile railway will be required to render this property a producer.

Equipment: surface equipment is very complete. The original machinery plant was clustered about the Irish Mag shaft, on a steep hillside, where limited room was secured by grading, but the principal plant is now at the Oliver shaft, including five 280 h. p. marine boilers, burning crude petroleum, with storage tanks.

The principal compressor plant, at the Oliver, has a 35-drill Sullivan Corliss cross-compound 2-stage air compressor, with 17x34″ steam cylinder and 20x34″ air cylinder, having a piston displacement of 6,600 cu. ft. of free air per minute. There also are 3 Sullivan straight-line air compressors. Much of the ore is so soft that it can be bored with a breast auger, thus reducing requirements in the way of air for power drills. Electricity is used extensively on surface and also for pumping. The electric power plant at the Oliver shaft has 1,000 k. w., 500 k. w. and 300 k. w. Westinghouse-Parsons 2,200-volt, 60-cycle, 3-phase turbo-generators, two 220 k. w. 2,200-volt 60-cycle 3-phase motors, direct-connected with the steam turbine, a 300 k. w. General Electric rotary converter, transforming a 2,200-volt alternating current to a 550-volt direct current, for operating the street-car line to Warren.

The steel-frame machine shop is divided into two 60x48′ parts, for the machine shop and smithy. Adjoining is a plate shop, 40x128′, of steel frame, with corrugated iron roof and siding. There is a framing mill at the Irish Mag shaft, also a warehouse and office building. A 60x125′ administration build is planned to be erected at Warren, the town site adjacent to the Calum Arizona. A hospital with an efficient staff is maintained for the employees a model changing house has hot and cold running water, tub and and lockers for 500 men. Fire protection is

large storage tanks, all hose couplings being made to connect with those of the Bisbee fire department. An automatic telephone system has stations underground and on surface, and is connected with the smelter at Douglas.

The company's smelter is located at Douglas, 25 miles from the mine, receiving ore over the El Paso & Southwestern Railway, at a very favorable freight rate. The original smelter was blown in Nov. 15, 1902, and has been twice enlarged, giving the old works a capacity of nearly 3,000 tons daily.

The Smelter

The new smelter, completed 1913 at a cost of about $2,000,000, was designed by C. H. Redpath and built and equipped with the able assistance of Messrs. Greenway and Wood. It is fully described by Richard H. Vail, in the "Eng. and Min. Journal." Vol. 98, p. 102, July 18, 1914. The works consist of a sampling mill, crushing plant, calcining plant, reverberatory, blast furnace and converter departments and 6 mixing beds, each of 10,000 tons capacity, together with a 5,000-ton coke storage bed.

The crushing and sampling plant, 40x84′ on the ground and 5 stories high, is built of steel and concrete throughout, and is divided into 2 sections, operating independently of each other. Each section has a crushing and sampling department. Ore from the crushers at the receiving bins is delivered over an incline conveyor to the crushing and sampling plant, where the large sizes are screened out for the blast furnaces. The sampling department, equipped with Snyder automatic samplers, cuts the ore 4 times, making a sample weighing 1.6 or 3.2 lbs. as desired, per ton of ore passing through. The plant is flexible and ore may be crushed and screened and discharged at any desired size.

The material from the sampling and crushing plant is passed to mixing beds similar to those in use at the Cananea smelter, there being 3 beds for coarse and 3 for fine ore. The coarse ore mixed with coke is conveyed directly to the coke charge bins over the blast-furnace charge floor, the fine ore going directly to the calciner, or roaster plant.

The roaster plant has twenty-four 258″ Herreshoff roasters, having a capacity of approximately 80 tons of fine ore per day. The plant is equipped with a tile and steel dust chamber, 60x140x70′ high, equipped with baffles and wires and roofed with copper, discharging into a brick-lined steel chimney, 20′ inside diameter by 279′ high.

Twelve of these roasters were completed early in 1917, and are being used in connection with a newly constructed sulphuric acid plant, which is furnishing 200 tons of 60 degree Baume acid to the New Cornelia Copper Co.

A 222x460′ building, of steel frame, sheathed with iron, covers the blast furnace, reverberatory, converter, and copper-casting departments. The blast-furnace department consists of two 48x40′ blast furnaces, and has a steel dust chamber, 60x180x70′ high, equipped with suitable baffles and wires. The gases from the converters will also pass through this chamber and be discharged into a brick-lined steel chimney, 25′ inside diameter by 305′ high. Ore and coke is discharged directly from the bin over the charge floor into cars resting upon platform scales, the charge car being propelled from the scales to the charge doors of the furnace by an electric motor.

The reverberatory department contains 4 reverberatory furnaces, 19x100′ in size, with a foundation and building for a fifth furnace in place. Each furnace is equipped with two 712 h. p. Stirling boilers. Steam at 80 lb. pressure is generated by using waste heat, driving a 3,000 k. w. turbine alternating-current generators. The furnaces are charged directly from the calcine cars running on a track overhead. Matte is tapped into 20-ton pots, and transferred by cranes to the converters, slag being skimmed directly into 25-ton pots, running on tracks underneath and just in front of the skimming end of the furnaces.

The converter department, having a main converter aisle 55′ wide, and two 40-ton electric traveling cranes, has stands for 6 Great Falls type converters. There are also 2 straight-line casting machines and other necessary equipment. The converter slag is poured directly into the reverberatory furnace.

The power house, formerly 80x160′ in size, was increased, 1907, by the building of a transverse section 100x100′ in size, the new building being divided through

the center by a row of columns into 2 bays, each 50′ wide, and each served by 10-ton hand-power traveling crane. Equipment includes two 14 & 28x36 Alli Chalmers Tandem Corliss engines, all driving No. 10 Connersville blowers. O 22 & 48 & 52 & 52x48 and one 22 & 42 & 48 & 48x48 Nordberg cross compou Corliss blowing engines, and one 20 & 40 & 44 & 48 Allis-Chalmers blowi engines.

There are also a 750 k. w. and a 500 k. w Allis-Chalmers steam turbi driving 440-volt, 60-cycle, 3-phase generators, and one 165 k. w. and one 200 k. motor generator sets for converting alternating current to direct current f cranes and locomotives.

There are also 2 triple expansion steam pumps, size 8 & 12 & 20 & 22x2 and 3 motor-driven centrifugal pumps for water service; also two 14 & 25 2-36x24 Prescott steam condensers. Steam is supplied from the boilers over t reverberatory furnaces and the old boiler plant is closed down.

The smelter plant includes a machine-shop and smithy, both of steel fram and a considerable number of dwellings. The whole plant is fully described "Mining and Scientific Press" of August 10, 1918.

A sulphuric acid plant, to produce sulphuric acid for leaching the Ajo or was designed by the Process Engineering Co., and put into operation duri 1917. K. B. Thomas is supt. It is complete and modern in every respe Capacity is 186 tons 60% B. acid per day, of which Ajo uses about 75%, t balance finding a ready market with other mining companies and with the farme The works were fully described by Courtenay De Kalb in "Min. & S. Press" March 30, 1918.

The Safety Department, organized in 1915, has been effective, though costly.

Ore reserves: October, 1916, are given as 1,976,815 tons of 4.99% or compared with 1,610,264 tons in 1915.

Production: since 1910 is as follows:

Year	Lb. Copper	Oz. Silver	Oz. Gold	Net Cost Copper (a)	Selling Pri Copper
1911.....	49,945,905	453,947	18,114	7.34 cts.	12.49 cts.
1912.....	53,108,628	594,319	22,881	7.02 cts.	16.25 cts.
1913.....	52,987,383	880,915	18,989	7.65 cts.	15.57 cts.
1914.....	52,667,929	922,143	24,122	8.19 cts.	.....
1915.....	65,268,910	1,381,077	35,264	8.00 cts.	.....
1916.....	74,898,788	1,863,149	46,377	9.04 cts.	24.70 cts.
1917.....	62,397,017	1,257,081	37,130	13.00 cts.	.....
1918.....	51,357,154	1,133,801	33,868	15.50 cts.	.....
1919.....	46,450,000	.....	.....	.....	.....

(a) Per pound copper, after crediting gold and silver.

During 1918, 676,888 tons of ore were mined, dry weight. There we shipped 105,074 tons of ore to various smelters. Smelter treated 850,894 tons dry ore, of which 245,443 tons were custom ores.

Production for 1918 was somewhat hampered by labor shortage and a decrea in labor efficiency, estimated at fully 30% less than in normal time. Since t signing of the armistice, production has been greatly curtailed.

New Cornelia is a big property and will pay dividends for years to come.

COCHISE DEVELOPMENT CO. ARIZON

Address: Bisbee, Cochise county, Ariz.

Officers. Lemuel C. Shattuck, pres.; Chas. L. Jones, v. p.-gen. mgr T. O. McGrath, sec.; Jos. M. Muheim, treas.

Inc. Aug. 1, 1905, in Arizona. Succeeding the Cochise Copper Minin Co. **Cap.,** $1,000,000; $10 par. Annual meeting, second Tuesday in Januar

Property: 16 claims, 176 acres, abutting on the Holbrook mine of th Copper Queen Consolidated, and lying north of the Dividend fault and Dubach gulch.

Development: by a 900′ three-compartment shaft. Drifts on the 300 600′, and 900′ levels show small bunches of sulphide ore.

Equipment: includes a 100 h. p. boiler, a 10x30" first-motion double-drum hoist, good for 1,200', and a 6-drill straight-line air compressor. Buildings are an engine house, boiler house, 20x40' carpenter shop, 20x30' smithy, and a coal trestle. Idle since 1907.

COPPER QUEEN CONSOLIDATED MINING CO. **ARIZONA**

Company merged into Phelps Dodge Corporation, which see.

HIGGINS LEASING CO. **ARIZONA**

Inc. 1912, to prospect the Higgins property for silver-lead and copper ores. Lease has expired and property reverted to owner, Thos. Higgins, of Los Angeles, in 1916. See Higgins Mine.

HIGGINS MINE **ARIZONA**

(Formerly Higgins Copper Co.)

Owner: Thos. Higgins, Higgins Bldg., Los Angeles, Calif. **Mine office:** Jas. J. Flanagan, mgr., M. F. Ryan, supt., Bisbee, Ariz.

Property: 200 acres in the Western end of the Bisbee district lying between the Copper Queen property on the E. and W. and the Wolverine-Arizona on the S. Shaft is 300' deep. In 1918, lessees were extracting 3 to 5 cars of manganese weekly from surface workings. An important strike of copper ore was made during 1918, dimensions of orebody are given as 8' by 350' by 450', assaying 2.5 to 50% copper. Daily shipments of rich ore to smelter are reported.

Production: copper, 1916, 1,250,452 lb.; 1917, 951,368 lb.; 11 months 1918, 3,013,060 lb.; about 12,000 oz. silver, and about 300 oz. gold yearly.

NIGHT HAWK LEASING CO. **ARIZONA**

Address: James Z. McKenna, supt., Bisbee, Ariz.

Property: a lease, until 1923, on the Night Hawk mine of the Phelps Dodge Corporation, in the Warren district.

Development: under way to depth of 650'. In September, 1919, it was reported that a shoot of rich copper ore had been opened on the bottom level, presumably an extension of that worked at 450'. The main orebody said to average 10%.

Ore is shipped to Douglas for smelting, but no figures are available.

PORTAGE LAKE & BISBEE MNG. CO. **ARIZONA**

Office: care John Funkey, Hancock, Mich. **Mine address:** Bisbee, Ariz. Chas. Lewis, treas.

Inc. April, 1903, in Arizona, succeeding Portage Lake & Calumet Development Co. **Cap.,** $1,000,000; $1 par.

Property: 12 claims, 3 fractional, 191 acres, several patented, 3 miles S. E. of Bisbee, S. E. of Warren Dev. Co., showing limestone, with a porphyry contact. The mine has a 2-compartment 302' shaft, with a small compressor, Worthington pump, 75 h. p. hoist, etc. Inactive many years.

QUEEN CALUMET COPPER EXTENSION CO. **ARIZONA**

Address: 121 So. Central Ave., Phoenix, Ariz., or Bisbee, Ariz.

Officers: Jas. Wood, pres.; P. L. Woodman, v. p.-gen. mgr.; J. F. Cleaveland, sec.; Chas. A. McDonald, treas., with A. K. Stacy, W. W. Perkins and W. W. Searles, directors.

Inc. Dec. 12, 1916, in Ariz **Cap.,** $1,500,000; shares $1 par.

Property: the Don Luis group of patented claims, about 421 acres and the Gold Knob group of 253 acres in the Warren mining district, Cochise county. Structural geological conditions said to warrant drilling.

SHATTUCK-ARIZONA COPPER CO. **ARIZONA**

Office: 120 Broadway, New York. **Mine office:** Bisbee, Cochise county, Arizona.

Officers: Thos. Bardon, pres.; H. L. Mundy, v. p.; Thos. Bardon, Jr., v. p.; E. R. Early, v. p.; Norman E. LaMond, v. p. and sec.; Archibald M. Chisholm, treas.; Lemuel C. Shattuck, gen. mgr.; Arthur Houle, supt.; T. O. McGrath, auditor.

Inc. March 22, 1904, in Minnesota. **Cap.,** $3,500,000; $10 par; non-assessable; fully issued. Company is closely connected, in ownership and management with the Denn-Arizona Copper Co. National Shawmut Bank, Boston,

and Bankers' Trust Co., New York, registrars; Old Colony Trust Co., Boston and Guaranty Trust Co., New York, transfer agents. Shares listed on the Boston and New York Stock Exchanges. Annual meeting, third Saturday in February.

Dividends: $2 in 1910; $1 in 1911; $1.50 in 1913; $1.50 in 1914; $2.50 in 1915; $4.75 in 1916; $5 in 1917; $4 in 1918, and $1.25 in 1919, making a total of $23.50 per share.

Annual report for 1918 shows net income of $784,658, as compared with $1,477,500 in 1917. Net profits in 1918 were $243,467, compared with $713,64 in 1917. Operations during the first half of 1919 resulted in a deficit of $256,99

Property: 8 claims, patented, 109 acres, lying in the northeastern portion of the Bisbee camp, about one-half mile south of the original workings of the Copper Queen, and to the north of the Calumet & Arizona. The property shows carboniferous limestone, with intrusive porphyry dikes, and a big fault covered with a silicious gossan of 30 to 50′ width. Ores carry copper and lead with gold, silver and vanadium values, and are oxidized down to 800′, with low grade sulphides at depth.

The orebodies occur as irregular replacements along certain bedding planes and along dike contacts.

Development: the mine is opened by a 935′ three-compartment shaft 15x4′ 6″ in size, connected with the Uncle Sam shaft of the Copper Queen on the 800′ level, with the Powell shaft of the Calumet & Arizona on the 600′ level and with the workings of the Wolverine & Arizona on the 200′ level. Mining work was begun Aug., 1904, and ore shipments started Sept., 1906, continuing until Nov., 1907, when the panic put a stop to all work for some months. Production was resumed Dec. 4, 1908. The mine is opened by levels at 100′ intervals from 100′ to 900′ inclusive.

Development during 1918 totalled 15,125′, making 27 miles in all. Work was done on all levels from 100′ to 900′, inclusive, and company's report for the year notes the following results of new work.

On the 100′ level two small orebodies produced a good tonnage of copper ore; one is important because it proves continuation of ore bearing territory in west side of property. Work on 200′ and 300′ levels was mainly to block out low-grade silver lead ores. On 400′ level a body of carbonate ore was found 4′ to 8′ in width and 180′ long. On 500′ level a new block of ground was opened up with encouraging results. Development work on 600′ level did not open up any new ores of consequence. On 700′ level an ore-shoot was developed that was the most important as to tonnage and copper contents found during the year. Over 900′ of development work on 800′ level did not disclose any ore of commercial grade. No important finds were made on the 900′ level, but between the 800′ and 900′ levels a large body of primary sulphides was exposed, high in iron and sulphur, assaying approximately 2% copper. There is still a large unexplored area of limestone geologically favorable for ore deposition.

The milling plant for low-grade lead ores began operations on a limited scale July 1, 1918. Tonnage milled amounted to 27,851 wet tons, average assay 6.6% lead, 8.1 oz. silver and 0.07 oz. gold; 3,930 tons concentrates were shipped to lead smelters at El Paso. Recovery did not equal the results obtained from the experimental mill operations. In Jan., 1919, the mill was closed down to wait for a better price of lead. Total expense for construction and equipment of the mill was $294,902. The amount of lead ore available is approximately 1,000,000 tons, assaying 10% to 12% lead and $1 gold and 6 oz. silver per ton. Experiments indicate a profit of at least $4 per ton can be realized on this ore at normal market prices for lead and silver. Many of these orebodies are only partly developed. January 1, 1916, the total and partly developed reserves were estimated as 921,968 tons, containing approximately 56,600,000 lbs. copper, 70,000,000 lbs. lead, and $4,000,000 in gold and silver.

The ore is smelted by the Calumet & Arizona Mining Co., at Douglas, Arizona, under contract in effect to July 1, 1923. During 1918, 550 tons of copper ore was shipped daily, returning about 5% copper, with appreciable gold and silver.

Equipment: 12 mine buildings, includings, including machine shop, carpenter shop, smithy, boiler house, engine house, warehouse, sawmill, and a change house with accommodations for 300 men.

The 750 h. p. steam plant has five 150 h. p. boilers. The main hoist is an 18×48" duplex double-drum engine, working under 125 lbs. steam pressure, with 2 drums, each carrying 1,500' of 1⅛" round steel cable, capable of handling continuously a 15,000-lb. unbalanced load at a vertical hoisting speed of 2,000' per minute. The air plant includes a 40-drill cross-compound air compressor. Fuel is petroleum, with a normal yearly consumption of about 20,000 bbl.

A 3,300' aerial tram of 500 tons daily capacity, with average grade of 18%, supported by 14 towers of 12 to 40' height, built of 12" timber and set on concrete foundations, leads from a 1,000-ton ore bin near the shaft to the El Paso & Southwestern Railway, the buckets discharging loads direct into 50-ton ore cars.

Recent production:

	Copper Lb.	Lead Lb.	Silver Oz.	Gold Oz.	Copper Cost	Per Lb. Sold
1919	2,111,841	4,477,228	.....	.....	22.4	22.2
1918	9,081,959	2,420,690	233,925	2,061	14.635c.	25.66c.
1917	11,935,317	2,010,145	154,344	1,542	13.242	28.317
1916	18,161,763	3,413,445	314,718	4,721	8.71	23.18
1915	11,154,211	2,345,342	201,869	3,151	(b)8.44	18.5
1914	10,846,918		198,419	2,444	(b)8.47	14.13
1913	13,219,756		236,000	2,033	7.22	

(b) Under curtailed production from Aug. 14 to Oct. 23 when shipments were discontinued, resumed in April, 1915.

On Feb. 22, 1919, fire broke out between the 700' and 800' levels in the old workings and the mine was flooded to the 700' level to extinguish the fire; this was finished in May. As a result of this misfortune report for first quarter 1919, shows a deficit of $163,988. Output amounted to 1,000,844 lb. copper, 678.914 lb. lead, 160 oz. gold, and 44,129 oz. silver.

WARREN REALTY & DEVELOPMENT CO. ARIZONA

Property sold in 1917 to Phelps, Dodge & Co., and company liquidated. For description, see Vol. XII.

WOLVERINE & ARIZONA MINING CO. ARIZONA

Office: Calumet, Mich. Marc Bailey, mine supt., Bisbee, Ariz.

Officers: John Daniel, pres.; Paul P. Roehm, v. p.; Edw. Ulseth, 2nd v. p.; W. Frank James, treas.; Chas. Chynoweth, sec., with Jos. Bosch, W. H. Bradley and Fred C. Smith, directors.

Inc. March, 1905, in Arizona, as successor of Wolverine & Arizona Development Co. **Cap.**, $3,000,000; $15 par; issued 118,674 shares, par value $1,457,340, subject to assessment, and 21,792 shares, par value, $326,880, of full-paid stock. Levied 25-cent assessments March 19, 1906; Sept. 17, 1906; June 17, 1907; Nov. 18, 1907. Annual meeting in April.

Receipts for fiscal year ending Sept. 30, 1918, totaled $262,673, including $97,175 from 1917, and $162,004 ore sales; with total disbursements of $119,145, including $58,745 for mining and $29,699 for dividends. Cash on hand, Sept. 30, 1918, $140,861.

Dividends: 10 cts. per share, in Dec., 1914; 25 cts. per share, in Dec., 1915; 25 cts. in 1918.

Property: 9 claims, 152 acres, known as the Cairo, Memphis, Kentucky, Georgia, Louisiana, Chicago, Warren, George and Broken Promise. The Georgia lies 600' from lands of the Calumet & Arizona, and is about 3,000' from the Irish Mag shaft of that company, and from the Spray and Holbrook shafts of the Copper Queen. The Uncle Sam and White Tail Deer claims of the Copper Queen are adjacent to the Wolverine & Arizona.

Development: claims lie along the high limestone ridge W. of Bisbee, extending westward to the open valley, and the first development was begun on the farthermost side of the group. The Broken Promise shaft, 700' deep, with

3 compartments, cut mineralized limestone showing considerable iron but no o in commercial quantity. A drift on the 500′ level, running 850′ toward the Pitt burg & Duluth group (Cal. & Ariz.) cut leached ore and ledge matter, carryin traces of copper. Drifts running in other directions showed leached ore, but n in encouraging quantities, and work in this area was suspended, 1909.

Exploratory work on the western claims proving disappointing, the eas ernmost claims were prospected in 1906 by diamond drill and a hole 410′ de passed into 50′ of 4 to 10% oxidized copper ore near the Shattuck mine. Th orebody being inaccessible from the Broken Promise shaft, the use of the Hi gins tunnel was acquired and the ore opened up from the Bisbee side of t mountain. The tunnel was extended 310′ to the Wolverine boundary and th southerly to intersect the orebody on the Wolverine ground. Orebody proved be a replacement deposit of rich oxidized ore, lying within the limits of t Warren claim, about 2,700′ from the tunnel portal. After working out the ox dized ore down to the Shattuck boundary, exploration upward was begun ar a fine body of sulphide ore was developed in the footwall limestone above t oxidized zone. This was exhausted in 1918.

A tunnel to explore the Shattuck fault, which crosses the property, has be put in. In year ending Sept. 30, 1918, work on Broken Promise claim, amounte to 1,769′, including shaft sinking from 2nd to 4th level, at depth of 386′. O from this claim came from an orebody on southeast end line of claim; develo ments here look promising. Tonnage shipped during the year came from t Broken Promise, and Warren claims, and amounted to 10,597 tons of 6.19% or

The mine has been a small but steady shipper of high-grade ore to t Douglas smelter, this ore paying all working expenses and building up a sma surplus. It formerly averaged about 10% copper, but the sulphide ore is lower grade. The mine has about 5,000′ of workings and its orebodies conne downward with great stopes in the Shattuck mine, the deposit being the top of o of the ore-shoots of that property. The mine is connected underground wi the Uncle Sam mine of the Copper Queen Co., as well as with the workings the Shattuck mine.

Equipment: includes a 250 h. p. steam plant, 2 single-drum hoists a a 6-drill air compressor, all at the Broken Promise shaft and all unused f several years.

Production: 2,524 tons, netting $37,962 in 1910; 984 tons, netting $11,8 in 1911; 762 tons, netting $12,861 in 1912. The output for fiscal year endi Sept. 30, 1915, yielded $130,370, or $17.13 per ton. In 1915-16 the output w 1,193 tons, averaging $23.96 per ton, equal to $28,588, and in 1917-18, 10,597 to yielding $162,004.

The property is excellently handled.

COCONINO COUNTY

KAIBAB COPPER CO. **ARIZON**

Owners: Cyrus A. Phelps, John J. Kamm, Los Angeles, Calif. **Mi address:** Fredonia or Ryan, Coconino county, Ariz.

Property: a copper mine on Buckhorn or Kaibab plateau, north of th Colorado river, about 154 miles from Lund, Utah, the nearest rail point. Freig is taken into Ryan by way of Hurricane, Utah.

In July, 1919, company was remodeling its old mill, buildings, laying pip line, and preparing to start running. Regarded unfavorably.

NORTHERN ARIZONA MNG & ELECTRIC POWER CO. ARIZON

Address, Prescott, or Supai, Ariz.

Officers: W. I. Johnson, pres., with Geo. Brookshea, W. P. Burk W. C. Miller and F. Blucher, directors.

Inc. 1916, in Arizona. **Cap.,** 1,000,000 shares; 50c par; pre-organizatio stock offered on the installment plan for 10 c. per share.

Property: 5 claims, 100 acres, in Cataract Canyon district, Coconin county, said to show deposits of lead-silver ore, with some vanadium in lim stone.

Development: by tunnels, with total workings of 1,000′.

Equipment: includes a 20-ton mill, to be enlarged, giving concentrate assaying 65% lead and 25 oz. silver per ton.

Management claims the water-rights are worth $100,000, that 20,000 tons of lead-silver ore blocked out will net more than $100,000, and that $25,000 in vanadium ore has been opened up, all of which remains to be proved.

UNITED STATES PLATINUM CO. **ARIZONA**

A "war-baby," born in 1918, presumably died the same year.

See Philadelphia North American, for August 22, 1918.

Address: 1006 Land Title Bldg., Philadelphia, Pa.

Officers: Ralph H. Cameron, pres.; H. N. Williams, sec.-treas.

Property: in the Grand Canyon of Arizona. The U. S. Geological Survey in a Press Bulletin, issued in Jan., 1919, says:

"From time to time the supposed presence of platinum ore in the Grand Canyon has received new advertisement, and recently stock in a company organized to exploit the alleged deposits was offered for sale in an alluring prospectus wherein were published assays of the so-called ore that showed as much as 24 oz. of platinum to the ton. . . . The supposed platinum-bearing deposits are beds of green and red ferruginous sandstone that constitute a subordinate part of the geologic formation known as the Bright Angel shale, of Cambrian age."

In 1911, F. L. Ransome of the U. S. Geological Survey, and, in 1915, H. G. Ferguson, of the Survey, examined claims near Indian Garden that were being held as platinum-bearing ground. In 1918, Mr. Ransome again examined the supposed platinum deposits. The Press Bulletin says, "As a result of these investigations it may be safely stated that the supposed platinum deposits in the Grand Canyon do not contain platinum—certainly not enough to be of any value."

The ground was also examined by John M. Boutwell, who stated that he made a geologic study and took 275 samples. As the result of careful duplicate and triplicate assays, special chemical work, and duplicate concentration tests, "platinum ore has not been found in the ground examined in form and grade of commercial value."

The U. S. Platinum Co. should now apologize and disband.

GILA COUNTY

ASH CREEK GOLD MINING & MILLING CO. **ARIZONA**

Address: Winkelman, Ariz.

Officers: E. W. Childs, pres.; J. H. Pool, v. p.-mgr.; F. M. Pool, sec.-treas., with Dr. P. M. Butler and E. Rargel, directors, at last accounts.

Inc. in Arizona. **Cap.,** $1,000,000; $1 par; 150,000 shares outstanding

Property: 10 claims, 200 acres, 5 miles E. of Winkelman, Gila Co., Ariz.

Ore: occurs in fissure vein, 4' wide, in andesite, diorite and diabase, said to show a 30" shoot of sulphide ore, assaying 0.42 oz. gold and 2,.13% copper.

Development: by tunnels and shaft, totaling 600'. Property reported on by R. W. Hollis, Los Angeles, who recommended development at depth and erection of a small mill.

BISHOPS KNOLL MINING CO. **ARIZONA**

Main and mine office: Payson, Gila county, Ariz.

Officers: E. B. Simanton, pres.; John McCormick, v. p.; Mrs. E. M. Simanton, sec.; A. J. Hammons, treas.

Inc. 1917, in Arizona. **Cap.,** $3,000,000; $1 par; 1,000,000 issued.

Property: 50 unpatented claims, 1,000 acres, 15 miles south of Payson. Ore said to contain copper sulphides, gold and silver in quartz veins occurring in porphyry and diabase; dip 45°.

Company is developing and prospecting the property.

CASTLE DOME DEVELOPMENT CO. **ARIZONA**

Address: 100 Broadway, New York City.

Officers: Mulford Martin, pres.; Garrett Mott, v. p.; E. C. Curnen, sec.-treas., with H. A. Tingley, John Kasser, S. D. Wright and L. B. Pearson, directors. F. R. Drummond, gen. mgr.; J. E. Owen, supt.

Inc. in Maine. **Cap.,** 600,000 shares, $5 par.

Property: 34 unpatented claims, in Castle Dome group: owns 97% the outstanding capital and has bond and lease on the Inspiration Extensi Copper Co. (which see): also owns four adjacent claims, located five miles we of the Inspiration Cons. Copper Co., Miami, Gila county.

Development: by a tunnel and by churn-drills reported to show a di base intrusion 10' wide in porphyry, course N. 50° E., dip 18°. Company h developed a substantial deposit of copper ore on its main property. Ore ru from 1 to 3½% copper, with some gold and silver. Further prospecting wi churn-drills under way.

CHOLLA COPPER CO. **ARIZON**

Mail returned unclaimed, March, 1919, from former office: Winkelman, Ar

Officers: E. R. Rice, J. F. Shaw, D. R. Williamson, R. J. Rice and Williamson.

Inc. Jan., 1917, in Arizona. **Cap.,** $1,000,000; shares $1 par.

Property: Henry Owen group of 12 claims, about 18 miles from Hayd Values are in copper and gold.

COPPER EXPLORATION CO. **ARIZON**

Office: 8 West 40th St., New York City.

Officers: David K. Jeffries, pres.; Geo. B. Leighton, 1st v. p.; Chas. Finney, 2nd v. p.; J. M. Simonton, sec.; Jacob Schafer, treas. David K. Jeffri Geo. B. Leighton, C. E. Finney, J. H. Banks, P. G. Cogan, H. D. Critchfield, W L. Detmore, Edward L. Hearn, J. S. Jenkins, R. P. Marshall, Wm. L. Marti Geo. F. Shurtleff, directors. Transfer agents, Security Transfer & Registry C N. Y. Registrars, Metropolitan Trust Co., N. Y. Annual meeting, first Mond in August.

Inc. 1918, in Delaware. **Cap.** $1,000,000 cum. 8% pfd.; $1,000,000 co shares, $10 par; outstanding $398,340 pfd., and $1,000,000 common.

According to the company statements, the aim is "to purchase an intere in a (mining) corporation, to hold that interest during the period of developme and later to sell with a view to using the money to assist in the development some other enterprise."

Property: holds stock interests in several mining companies includin London-Arizona, Cons. Copper Co., Ball Copper Co., London Range, Owl Copp Co., 100,000 shares Canario Copper Co.; 100,000 shares, Cia Cobre Mexican S. A., equal to 80%.

This is evidently a scrambling of various Cameron Michel and outside corp rations in which several companies that have failed to make good, are combin with others whose properties show more promise of becoming producing mine

COPPER STATE MINING CO. **ARIZON**

Office: 936 Plymouth Bldg., Minneapolis, Minn.

Officers: Martin E. Tew, pres.; John A. Nelson 1st v. p.; E. E. M Carthy, 2nd v. p.-treas.; S. H. Hudson, sec., with Otto Hanson, A. M. Anders and Walter De La Hunt, directors.

W. C. Steubing, mgr.; Geo. S. Croyle, supt. and electrician; Gilbert O. Te store mngr. Mine address: Copper Creek, Ariz.

Inc. 1915 in Ariz., as a successor to the Calumet & Copper Creek Minin Co., the Old Reliable Copper Co., the Copper Creek Mining Co. and other co panies. **Cap.,** $7,500,000; $2,000,000 issued. All stock certificates held trust under a pooling agreement until the financing of the company has be completed.

The president, Mr. Tew, informs us that "all stock is still pooled. No offic or director receives salary or cash commission and all the money raised in 1918-1 has come from business men who have visited the property. The manager trained both technically and by experience."

Company is controlled (51%) by Chemical Copper Recovery Co. The lo of company's quasi-title to the Sombrero Butte property by adverse decision the Court, ends that controversy, but does not affect the principal holdings the company on Copper Creek.

Property: 55 claims, unpatented, including 100 acres mill and smelte sites, and 100 acres miscellaneous lands; also 28 patented claims under optio

making total area 1,500 acres in the Copper Creek, or Bunker Hill district, Graham and Pinal counties, Ariz. Properties are in the Copper Creek basin, on the western slope of the Galiuro Mountains, 31 miles S. E. of Winkelman and Hayden, on the Arizona Eastern R. R. Claims include the Sycamore Flat, Cumberland, Sioux Chief, Silver Reef, American Eagle, Copper Giant and Old Reliable groups.

Geology: country rock in lower basin is diorite, with porphyry intrusion, showing a large number of orebodies, there being several different breccias and oxidized zones carrying mineral, orebodies usually being elliptical, but sometimes occurring in chimneys. Outcrops, of which there are more than 50, are prominent. Oxidized ores, including chrysocolla, are found at and near the surface, sometimes in commercial quantities, giving place, at shallow depth, to sulphides, chalcopyrite, bornite and chalcocite, associated with pyrite, in altered and brecciated diorite, some native copper showing in flakes and grains along shear zones. Company reports that one orebody 300′ wide and 420′ long has been developed to 30′ depth, in a porphyry breccia.

Development: the Old Reliable mine has an orebody with the second largest outcrop in the district, same having a sectional area of 147,000 square feet, or about 3½ acres. Development is by an 800′ upper tunnel, with back of 775′ and 13 crosscuts; a 258′ shaft from the surface to the tunnel; and a lower tunnel 800′, with about 3,800′ of workings, and 2 connecting winzes, estimated by manager to show 250,000 tons of 3% ore on each level. Most of the work at this property has been done on the Old Reliable.

The American Eagle group has 3 prospect tunnels, a 1,025′ working tunnel, and a 300′ three-compartment shaft, with about 3,500′ of workings, showing oxidized ores at surface, with an orebody reported to be developed for about 50x100′. This mine is estimated by company to have developed about 60,000 tons of ore, averaging 3.78% copper and 8 oz. silver, with a trace of gold.

The Prince mine, under option, is developed by a 300′ shaft and drifts on 3 levels. Company claims 300,000 tons of ore averaging 3.56% copper in this mine. On the Globe mine a shaft has been sunk 650′ and 100,000 tons of 3.08% ore are said to be blocked out on the 150′, 250′ and 450′ levels. The Copper Giant mine, said to have an outcrop of nearly 4 acres, has a 200′ shaft connecting at depth of 124′ with a tunnel from which 2 drifts several hundred feet in length have been driven into the ore breccia. In the Silver Reef, Kimbro, Lead Carbonate, Cumberland, Velasquez, and several other claims belonging to the company, copper ore has been exposed by short tunnels and shallow shafts. Handsorted ore from these workings has been shipped to smelters, giving returns of 12% to 30% copper and $5.50 to $27 gold and silver per ton.

Equipment: electric hoist, compressors, drills, smithy, machine-shop, etc. A 150-ton concentrating mill was built several years ago. Power plant consists of two 100 h. p. boilers, a 200 h. p. engine, a 160 k. w. 2,300-v. dynamo. A 3-phase transmission line, 4 miles long, supported by steel towers, connects power plant with mill and 3 of the mines. Water supply system includes 5 miles of 2½″ pipe, and a concrete dam 26½′ high and 131′ across the canyon, creating a reservoir holding 8,000,000 gal. of water. Company also owns and operates a 3½-mile narrow gauge railroad, connecting the Old Reliable mine with the mill, equipped with 18-ton Porter locomotive and 8 cars; a 31-mile telephone line connecting the mine with Mammoth, Winkelman and Hayden, and a store, used as a commissary and office building. Other improvements are assay office, ice-making plant and 25 buildings for employees. Additional equipment installed 1917, includes a 285 h. p. Diesel engine with direct-connected generator, a 5-drill air compressor, a 5x6′ Marcy ball-mill and Callow flotation cells.

Production: by former owners in 1914 was 8,400 tons of ore, making 758 tons of concentrates averaging 28.26% copper, or a total of 428,421 lb. copper. Production from Nov., 1916, to Jan. 1, 1918, was 746 tons of concentrates, averaging 24% copper, from ore extracted in development work. The total output has been 8,000 tons of 3% and 12,000 tons of 1.75 to 2.5% ore, yielding 650,000 lb. of copper, equal to 1.6% recovered. This product was hauled 31 miles by wagon, and then 400 miles by rail.

It is planned to enlarge the mill to 500 tons capacity, employing the Green walt acid leaching process, which is said to be very cheap, producing pure copp on the ground. This will save the large contemplated expenditure in constructi a tramway to rail, a distance of 31 miles. Estimated cost of making copper 8 to 10 cents per pound.

GILA CANON CONSOLIDATED COPPER CO. ARIZON

Office c/o R. W. Hollis, mgr., Phoenix, Ariz. **Mine office,** Chilito, Pin Co., Ariz.

Inc. 1916 in Ariz. **Cap.,** $750,000; shares 50c. par

Officers: J. C. Callaghan, Phoenix, Ariz., pres.; R. W. Hollis, E. M., v. p gen. mgr.; R. A. Lewis, sec.-treas, above, with C. H. McArthur and F. Dawson, directors.

Property: 17 claims, known as Schneider group, adjoins that of Londc Arizona on west, in Banner district, Gila county, 4 miles from Ariz. Easte R. R. and only 6 miles from A. S. & R. smelter at Hayden.

Development: principal work done from crosscut tunnel 1,800′ long depth of 350′ to 400′, with total of over 3,950′ underground work. During 191 new work totaled 425′, exclusive of surface work.

Property shows ore at many places, but gives no indication of disseminat or porphyry ore, such as those of Miami and Ray, and though it is a conta metamorphic deposit, it is quite unlike that of Christmas. The geologic cha acter observed and the presence of commercial ore at many points is indicati of diffused mineralization, with workable concentrations of ore in one mark bedding horizon, where cut by fractures. Deep development work to date di appointing, ore not going down to tunnel level, but several very promising vei are practically undeveloped, as yet. Can be operated at a profit if developme expenses were eliminated, shipments having paid for all development to da Forty men employed. Company derives revenue from lessees' production. Mu surface ore is too low grade to ship and experiments have been made with leachi but owing to lime content, acid treatment cannot be used; the Benedict ammon process, used by Calumet & Hecla Co. in Michigan, is applicable.

Production: from Aug., 1916, to Jan., 1919, 225 railway cars of o were shipped to the Hayden smelter, netting $129,384.

Regular shipments of 2 cars weekly made 1917 and 1918. Examined a reported on by W. H. Weed in 1917.

GILA CANYON COPPER CO. ARIZON

Dead. Property sold to Gila Cañon Consolidated Copper Co., which s Described, Vol. XII.

GILA COPPER SULPHIDE CO. ARIZON

Office: 26 Cortland St., New York. **Mine office:** Christmas, Ariz.

Company was in hands of Receivers, Allan Forbes and Geo. D. Morris, a was operated by them until reorganization late in 1919.

Inc. 1909, in Ariz., as a subsidiary of the Development Co. of Americ which bought the property from the Saddle Mountain Mining Co., which st retains a 20% interest. Cap., $2,500,000; $10 par; 150,000 issued; in treasu for bond conversion, $690,800; treasury stock, $309,200. Before their maturi company had retired $309,200 of its $1,000,000 outstanding 1st mtge. 5-yr. 6 convertible bonds due April, 1918. Listed on Boston Curb.

On Sept. 18, 1919, stockholders approved a contract with the Western Secu ties Co., providing for furnishing by said company of $690,800, the amount the par value of the Gila Co. bonds outstanding and due since April 1st, 19 and extension of these bonds until Oct. 14, 1926, at 8%, and for issuance to t Securities Co. of 50,000 shares of treasury stock.

Company spent over $500,000 developing its property at Christmas, befo it was obliged to stop operations and give a lease on it to the American Smelti & Refining Company. This was cancelled in 1918 by mutual agreement, but smelting contract is still in force.

Property: 2 groups of mineral claims, comprising 53 claims, 817 acr 49 patented, and 640 acres coal land. Holdings include Christmas mine and clai

Banner district, Gila county, and coal, gold and copper claims in the Saddle Mountain district, Pinal county, all within a radius of 10 miles.

The Saddle Mountain group of gold and silver claims, patented 265 acres, with 3,450' of workings, shows base dry ore, with little lead and zinc and traces of copper, an average of 300 assays showing $13 per ton in gold and silver values.

There are also 640 acres of patented coal lands, in the lower basin of Deer Creek, showing two veins of dirty bituminous coal, developed by a 175' incline shaft and 800' of workings, equipped with a small steam hoist and pump. There is a bee-hive coke oven for testing the coal.

The Saddle Mountain group and the coal lands have not been sufficiently developed to prove or disprove their value.

The Christmas Mine is at the junction of Christmas canyon with the Gila river, on the north side of the stream, 8 miles from Hayden. The mine was opened 1883, but being on the San Carlos Indian Reservation, was idle until the lands were restored to the public domain, 1902.

Geology: the basal rock is a pre-Cambrian formation, known as Pinal schist, overlain by conglomerates, shales and quartzites of probable Cambrian age, covered by Paleozoic limestone. All these rocks are cut by intrusions of a quartz-mica-diorite porphyry and granite, and altered by intense contact metamorphism, to marble, garnetite, etc.

Ore occurs mainly as replacements in limestone, largely garnetiferous, extending outward for a distance of 10' to 100' from the contact. The ore carries copper sulphides, mainly chalcopyrite, but with bornite and some copper glance. The contact zone has shown copper ore for 4,000'. The orebodies so far mined range from 4 to 135' in width. In places the ore contains nucleal blocks of undigested limestone, reducing the average grade, which as mined assays about 3% copper and 30 cents gold per ton.

Development: at Christmas is by 4 shafts to depth of 850', all showing oxidized and sulphide ores. The mine has 30,000' of workings. Mining is confined to a block between the 350' level and surface, but orebodies are developed on the 500' and 800' levels. Improvements include the construction of an aerial tram, connecting the mines with the Arizona Eastern Railroad, crusher plant, compressor, pumps, etc., all electrically operated.

Production: from the time mining operations were begun in 1916 to Dec. 31, 1918, the company has produced 1,800 oz. gold, 70,000 oz. silver and 14,500,000 copper, valued in excess of $3,260,000.

GILA COUNTY EAST VERDE MNG. & SMTG. CO. ARIZONA

Address: Payson, Gila county, Ariz., in Tonto Basin East of Jerome.

Inc. 1917 in Ariz. **Cap.**, $750,000; shares $1 par.

Directors: W. W. Brooker, E. R. Oliver, F. H. Gardner, T. S. Rush, O. L. Scribner, E. R. Lindsey and F. W. Washichek.

The articles of incorporation shows the usual preamble, but specify no special property to be developed as yet.

GLOBE COMMERCIAL COPPER CO. ARIZONA

Property: near Copper Hill, Gila Co., shows copper and manganese ore. A. R. Jameson shipped copper ore, 1917. Mail returned unclaimed Sept., 1918. Probably idle.

LAVELL GOLD MINING CO. ARIZONA

Office: Woodbury & Co., fiscal agents, 44 Pine St., New York.

Officers: G. B. Leighton, pres.; C. P. Woodbury, v. p.; St. John Smith, sec.-treas., 66 Broadway, N. Y.; E. C. Jacobs, supt., Winkelman, Ariz.

Cap., $2,000,000; $1 par; 400,000 offered at par, Oct., 1917.

Property: the Apex group, 19 claims, 386 acres, elevation 4,300', in the Banner district, 6 miles N. of Hayden Junction and 21 miles S. of Globe, Gila county. South of the property is the London & Arizona, S. W. is the Gila Canyon Copper, and N. E. is the Copper Belt group of mines, all adjoining.

Examined in 1917 by J. M. Boutwell, C. H. James, E. H. Dawson and E. C. Brown.

Geology: the claims show diabase overlain by pre-Cambrian quartzite, capped by limestone. The diabase in places intrudes the upper formations. The

sedimentary series has been distorted, faulted and intruded by a series of qua porphyry and rhyolite porphyry dikes. Ore is gold and copper bearing a occurs as flat lenses or beds, replacing limestone and shale mainly along a beddi plane, but also as veins along contacts of quartz porphyry dikes and in pla along fissures in limestone near dikes. The usual ore is gold-bearing, next importance being copper-lead-silver ore.

Development: by 12 tunnels, from 40 to 350′ long, and 6 shafts from to 35′ deep, on the Apex claims. No. 3 is in 320′ and is said to have opened 250′ long and 60′ at the widest point. Forty samples averaged about 1 oz. gold to 10 oz. silver, and 7 to 35% lead. Above No. 3 tunnel is a 100′ raise and bel it a 200′ winze. Ore reserves given as 500,000 tons. Shipments to El Paso said yield about $50 per ton. Plan erection of second 50-ton unit to be added to dry concentration mill.

Property seems to have merit and the promotion to be conservatively handl

LONDON-ARIZONA CONSOLIDATED COPPER CO. ARIZON

Option for control of company held by Copper Exploration Co., which s

Office: 1005 Title Insurance Bldg., Los Angeles, Calif. **Mine offi** Chilito, Gila Co., Ariz.

Officers: Chas. E. Finney, pres.; F. B. Pugh, v. p.; Edw. W. Brool v. p.; Robert J. Simpson, sec.-treas., with B. P. Cheney, D. C. Kurtz and S. Parrish, directors. Edward W. Brooks, cons. engr. and geologist. Harry Sc supt.

Inc. Sept. 18, 1913, in Maine, as a merger of the London Arizona Co per Co., London Range, London Shamrock and Ball Copper companies. **Ca** $12,000,000; $5 par; 920,500 shares outstanding. Bonds: $253,000 6% o standing. Commercial Trust & Savings Bank, Los Angeles, trustee. U. Corporation Co., 65 Cedar St., N. Y., registrar. Annual meeting first Tuesd in October. Company says funds for necessary equipment and developm work have been arranged for with Copper Exploration Co., a Cameron Mic & Co. organization.

Property: 132 claims, 2,100 acres, in the Banner mining district (R quadrangle), 5 miles N. of Hayden. Claims form a compact group covering extensive, well-mineralized area.

Geology: the tract shows a series of 1,500′ of well-bedded limesto quartzite and shales resting on a laccolithic mass of diabase; these rocks broken, faulted and later intruded by dikes and sheets of diorite porphy presumably the offshoots of an underlying batholithic mass of granite materi The ore occurs in contact metamorphic deposits and replacements, especially the limestone. Much of the ore consists of garnet (andradite, the lime and ir species) intergrown with specular hematite copper sulphides and a variety iron-magnesian lime silicate minerals. The copper ore occurs largely in "blank deposits, but also in fissures and vertical contacts. The main ore outcrop is to 30′ wide and about three-fourths of a mile long, lying between beds of lin stone and quartzite.

Silver-lead ores do not occur in the contact deposits, but are found in lin stone along the dike contacts where contact alteration is not noticeable.

Development: includes the 300′ Curtain and 182′ Arizona shafts dev oping the copper and the 90′ O'Carroll shaft developing the silver-lead depos Total development aggregates 11,000′. The O'Carroll ore bed has been open by 60 shallow tunnels, covering a distance of 2,000′ along the outcrop, and m agement states ore has been extracted from practically all of them, sulphide having been encountered in four.

Production: to date from development, 15,443 tons copper ore, 1 tons lead ore, 51 tons zinc ore, 14,437 oz. silver.

The ores are shipped to the Hayden plant of the A. S. & R. Co.

LONDON-ARIZONA COPPER CO. ARIZON

Office: 1005 Title Insurance Bldg., Los Angeles, Calif.

Officers: Chas. E. Finney, pres.; F. B. Pugh, v. p.; Robt. J. Simps sec.-treas., with Edward W. Brooks, D. C. Kurtz, S. F. Parrish, R. E. Sh B. P. Cheney directors.

Inc. 1907, in Arizona. **Cap.** $10,000,000; $10 par; 592,260 outstanding.

September, 1913, the company transferred title to its property to the London-Arizona Cons. Copper Co. for 753,045 shares of stock of the London-Arizona Cons. Copper Co., which it now holds in its treasury. For description of property see London-Arizona Cons. Copper Co., also Volume XI.

MAZATZAL MINING CO. **ARIZONA**

Office: Globe, Ariz.

Officers. W. C. Stanley, pres.; A. J. Crossley, sec.-treas., with G. B. Peart and W. Thomas, directors; R. H. Bradley, mgr.

Inc. Jan. 25, 1917, in Arizona. **Cap.**, $3,000,000; $1 par; 1,029,000 issued.

Property: 65 unpatented claims, 1,300 acres in Mazatzal district, Gila county, said to show gold-silver-copper deposits in granite, schist and porphyry. Veins dip 70° N. E., and pitch N. W. Ore is both oxide and sulphide.

Development: by 1,000′ tunnel, in which 3 fissure veins were cut varying from 1 to 3′ in width, and showing copper ore assaying from $4 to $125 per ton. Plan sinking 500′ shaft. Reserves reported to be fairly large.

McMILLEN-STONEWALL MINING CO. **ARIZONA**

Address: Globe, Gila county, Ariz. V. Y. Smith, pres.-gen. mgr.; C. N. Lightle, sec.-treas.

Inc. March 27, 1907, in Arizona. **Cap.**, $1,000,000; shares $1 par.

Property: 34 claims, in the Richmond basin, 16 miles N. E. of Globe, Gila county, carry 3 miles of the strike of the Stonewall Jackson vein, of 25 to 35′ average width.

Property: includes the Stonewall Jackson mine, worked 1876-83, with an estimated production of about $500,000 of silver ore, of high average grade.

Development: by the 300′ three-compartment McMillen shaft and the old 600′ Stonewall Jackson shaft, latter showing no stoping done below 230′. The mine is said to have considerable ore carrying 5 to 50 oz. silver per ton, with about 40,000 tons of discarded silver ore on the old dumps.

Equipment: includes an old stamp mill and a small cyanide plant. A full and favorable report on the property was made May, 1912, by R. B. Wagner.

In 1914, property was bonded to G. H. Hayes and explored by diamond-drilling, which proved unsatisfactory owing to the broken nature of the ground. No recent reports, mail unanswered. Probably idle.

MINE OPERATORS CO. OF AMERICA **ARIZONA**

Address: Wm. D. Steadman, Miami, Ariz.

Incorporators: W. D. Steadman, W. J. Scott, of Miami, Ed. Arhelger, J. Cubitto, J. H. Mayer, F. W. Rolando of Globe, Ariz.

Inc. 1918 in Arizona. **Cap.**, $3,750,000; $5 par.

Property: low-grade copper-manganese mine near the Independence, Bellevue.

A prospect. Company regarded with disfavor.

MOUNTAIN CONSOLIDATED MINING & MILLING CO. **ARIZ.**

Letters returned unclaimed, 1919, addressed to Box 1899, Globe, Ariz., and G. B. Reed, Payson, Ariz.

Officers: G. B. Reed, pres.; J. W. Reed, v. p.; W. B. Haynie, sec.; A. T. Hammons, treas., with W. H. Shenk, A. C. McKillop and J. Nugent, directors.

Inc. March 22, 1917, in Arizona. **Cap.**, $3,000,000; $1 par; 1,285,000 issued.

Property: 66 claims, 1,260 acres, in Payson and Brown's districts, Gila county, said to show gold-silver-copper-lead-vanadium quartz veins in schist, slate and diorite. Ore occurs as veinlets. Copper minerals are sulphides.

Development: by 214′ shaft and 270′ tunnel. Estimated reserves are 36,200 tons, but as only 98 feet of lateral work had been done to June, 1917, this amount must include probable ore based largely on outcrops. The Black Rattler claims in the Brown district are reported to have a silver-copper vein 10,500′ long and from 40 to 100′ wide, in a slate-schist contact, which outcrops from 50 to 75′ above the surrounding country. Presumably idle.

OVERLAND MINING CO. **ARIZON**

Mine near Winkelman, Ariz., adjoins the London Range mine of the Lond Arizona Copper Co. and "79" mine on the south and west. Claims said to car an extension of the main dike system of the London range, showing metamorpl contact orebodies. Hayden Junction is the nearest railway point. Mine report under lease to M. H. Murphy and W. E. Dunlap, of Kingman, in 1915.

No recent returns.

POWERS GULCH DEVELOPMENT CO. **ARIZON**

Idle. John Matson, supt., at last accounts.

Property: 23 claims in Powers gulch near Globe, Gila county, is sa to show a vein carrying bornite and chalcopyrite ore associated with pyri Mine idle for a long time, was reopened in 1915 and a strike of tungsten o reported in April, 1916.

Development: by 2 shallow shafts and 2 short tunnels.

RAY CENTRAL COPPER CO. **ARIZON**

Formerly the Finney Copper Co.

Address: Box 488, Phoenix, Ariz.

Officers: E. O. Petro, pres.; A. G. Dulmage, v. p.; H. T. Weldon, sec treas.-mgr., with W. O. Temple, directors.

Inc. May 20, 1916. **Cap.**, $150,000; 10c par; 700,000 outstanding. Annu meeting first Tuesday in May.

Property: 13 claims, 260 acres in Banner mining district, Gila count said to show gold-silver-copper ore in a contact deposit in diabase and lime.

Development: by 165' shaft; and drift on the lowest, or 165' level. prospect. Probably idle.

SILVER BUTTES MINING CO. **ARIZON**

Address: C. P. Crawford, 121 South Central Ave., Phoenix, Ariz.

Inc. in Arizona. **Cap.**, $1,200,000; shares $1 par; 503,839 issued.

Property. 12 claims in Mazatzal mountains, Gila county. Geologic conditions are said to be similar to those of Jerome. According to a report b A. F. Muter, there are two vein systems in diorite, really fault fissures co taining ore, especially at junctions of the two. All ore near the surface show intense leaching. An incline shaft was recommended on the N.-S. vein, whic can be traced on surface for 3,000'. The Butte vein, 2 to 7' wide, is said t contain from 25 to 300 oz. silver per ton, $2 to $15 gold, and 2 to 12% coppe Some rich ore has been shipped.

In Sept., 1917, work was reported resumed. No recent report, presumabl idle.

SOMBRERO DEVELOPMENT CO. **ARIZON**

Office: Houghton National Bank Bldg., Houghton, Mich. **Mine office** Globe, Gila Co., Ariz. Dr. Lucius L. Hubbard, gen. mgr. Company is a syndi cate, not incorporated.

Property: on Cherry creek, west of Sombrero Butte, and about 50 mile north of Globe, is slightly prospected by adits. The mine has a small wate driven plant. Inactive.

SOUTHWESTERN LEASING & DEVELOPMENT CO. **ARIZON**

Care of Henry Snell, Globe, Ariz. Company inactive.

WARRIOR COPPER CO. **ARIZON**

Office: Brown Bldg., Philadelphia, Pa. **Mine office:** Black Warrio Gila Co., Ariz.

Officers: Spencer D. Wright, pres.; Philip Godley, v. p.; Geo. H Buchanan, treas.; D. H. Paris, sec., with Ernest L. Tushin, H. B. Hopper, J. K Kane, W. W. Doughten, T. A. Blythe, C. Gallagher, G. B. Walker and Thos D. Martindale, directors.

Inc. March 10, 1905, in Delaware, as successor of Black Warrior Coppe Co., Amalgamated, which came to grief. **Cap.**, $1,600,000; shares $10 par in $750,000 cumulative 7% preferred stock and $850,000 common stock.

Property: 50 claims, 46 patented, about 800 acres, including the Blac Warrior group and the Lost Gulch group, near the Inspiration mine. Th

principal property is the Black Warrior mine, a producer since 1904, located about 7 miles N. W. of Globe.

Geology: the Black Warrior property shows slightly altered schist, dacite tuff, diabase, and conglomerate, the greater part of the area being covered by schist, which is the oldest formation. The diabase occurs as intrusive dikes, and the dacite is a surface flow over both schist and diabase. The Black Warrior vein is a fault zone 30 to 60' wide, filled with crushed mineralized dacite for about 300', with a breccia of schist and some diabase below. The vein has a generally E.-W. trend, and W. pitch. The ore averages about 50 to 60' in width, though a width of 100' is known at a number of points. This property includes the Montgomery group, with the Montgomery and Dadeville claims, developed by tunnels of about 1,000' and 1,200' length, developing extensive bodies of copper silicates and hydrated copper oxides of excellent average value.

The Lost Gulch claims show a highly altered monzonite-porphyry covering the larger part of the area, with extensive outcrops of dacite and limestone and smaller ones of diabase, general geological conditions being much the same as at the Black Warrior.

Development: the Black Warrior mine is developed by the Winnie shaft, 500' from the western boundary, and tunnels of about 1,000' and 1,200' length, opening the mine to a depth of 300', with 5 levels spaced at 50' intervals. The mine has yielded a large tonnage of high-grade ore, giving assays of 6 to 25% copper, between the 200' and 300' levels. Considerable churn drilling was done, 1910-11, 1 hole in the vicinity of the Winnie shaft being sunk 506' in schist, showing mineralization, and a 580' drill hole proved the existence of chalcopyrite, disseminated in schist, though not of commercial value. The western portion of the property was tested without favorable results by churn drill, May, 1911.

Equipment: includes a steam plant, burning petroleum. Buildings include an assay office, engineering office, smithy, carpenter shop, several dwellings, and a 300-ton shipping bin. No further disclosures are available.

MIAMI-GLOBE DISTRICT, GILA COUNTY

ARIZONA BONANZA MINING & MILLING CO. **ARIZONA**

Mail returned unclaimed, March, 1919, from former address: Miami, Ariz.

Property: 10 claims, 5 miles N. E. of the Inspiration Consolidated, only slightly developed and said to carry ore assaying from 5-30% copper and $6 gold per ton. Company sold stock at 25c. per share to provide development funds in 1917.

ARIZONA-BUTTE CORPORATION. **ARIZONA**

Address: Columbia National Bank Bldg., Pittsburgh, Pa.

Officers: Wm. Schafer, pres.; E. R. Schafer, v. p.; Wm. Perry, sec.-treas., with C. S. Jamison, Jas M. Rae, A. C. Held, Jr., and J. H. Faught, directors.

Inc. April, 1917. **Cap.**, $1,000,000; $1 par. National Security Co., New York, transfer office.

Property: 15 claims, 300 acres, 8 miles west of Miami and 4 miles from the R. R., said to show numerous veins in granite, with pyrite, chalcopyrite, and bornite. Veins said to average about 5' in width.

Development: one vein has a 600' tunnel with a 240' winze—here the vein is said to be 23' wide and 700' lower is a tunnel 1,700' long which was expected to cut the vein within the next 100'.

Equipment: includes a 100-ton concentrator, which will need remodeling before being able to treat the several thousand tons of medium grade ore that the management claims is opened up.

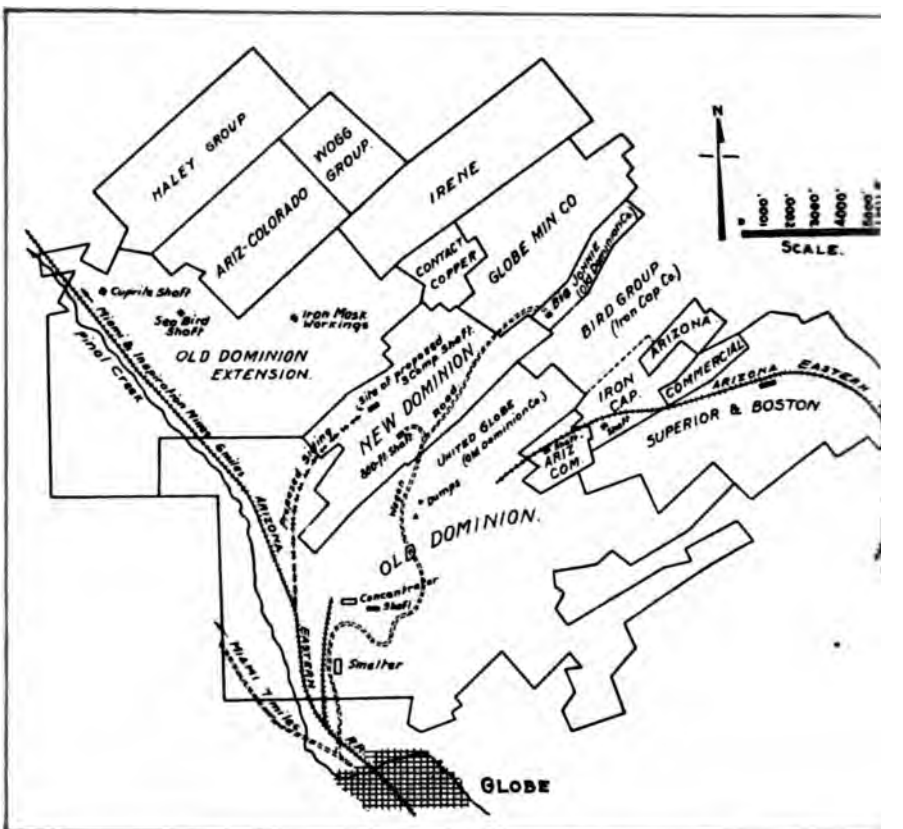
ARIZONA COMMERCIAL MINING CO. **ARIZONA**

Offices: 50 Congress St., Boston, Mass., and 188 Middle St., Portland, Me. Mine at Globe, Gila Co., Ariz.

Officers: Chas. S. Smith, pres.; Harry M. Stonemetz, v. p.; C. H. Altmiller, treas., with E. S. Goulston, G. T. Rice, Chas. Sumner Cook, clerk, and Wm. E. Chandler, directors; Robert R. Boyd, supt.

Inc. April 4, 1912, in Maine. **Cap.**, $1,500,000; $5 par; 265,000 issue Listed on Boston Stock Exchange. Annual meeting second Wednesday in Apr Company is successor of the Arizona Commercial C. Co., bondholders of t old company receiving 70 shares of new stock for each $500 bond held a the stockholders being privileged to subscribe, share for share, for fully-pa stock in the new company upon payment of $3 per share.

Accounts for year ending Dec. 31, 1917, showed cash and loans on han $398,051; supplies, $42,450; accounts receivable, $135,154; and accounts payabl $79,722. Net earnings were $464,750 in 1917. Balance surplus, Dec., 191 $2,713,563. In 1918, the revenue was $862,307; operating expenses, $560,78 dividends of $530,000, and depreciation and depletion, $188,277. Current asse were $785,796, and liabilities, $577,971.



PROPERTIES AT GLOBE, ARIZONA

Dividends: initial of 50c per share was paid Oct. 31, 1916; similar pay ments were made each quarter from April, 1917, to Oct., 1918, both inclusive none since. A special Red Cross dividend of 10c. a share, was paid July, 1917 Total disbursements to Jan. 1, 1919 were $4.10 per share, equal to $1,096,500.

Property: 11 claims, 3 fractional, in 2 groups, known as the Black Hawk and Copper Hill groups, separated by the Iron Cap mine of the Iron Cap Copper Co. Lands are at Copper Hill, 3 to 4 miles N. E. of Globe, lying just north

the Old Dominion, and adjoining the United Globe and Superior & Boston mines in Gila county. The Copper Hill group, 56 acres, carries the Old Dominion and Copper Hill veins for about 1,500'.

Ore: is a mixture of pyrite and chalcopyrite, contains 5% copper, 20% sulphur, 30% iron. All ore is shipped to the Old Dominion.

Development: in 1917 was confined to the Copper Hill mine, with 269' of level work and 565' of raises from the 8th to the 15th levels. In 1918, there was 6,729' of work done in this mine.

The working shaft at the Copper Hill mine, 1,600' deep, has extensive workings on the 10th, 12th, and 14th levels, along the Old Dominion vein, and ore has been extracted eastward until cut off by the Budget fault, ore being exposed along the bottom of the 14th level for 400'. The most important recent development includes the opening up of the orebody for 400' horizontally and 75' vertically on the 8th level, east of the fault where it is from 5' to 40' wide, averaging 5% copper; indications point to its extension downward to the 16th. Above the 13th level, a new vein of high-grade ore was opened in the hanging wall; it does not show on the 13th and continues some distance above the 12th level. In Sept., 1919, the new shaft was down to No. 5 level, with 2 shifts at work.

Future ore extraction will come from east of the fault, in the drifts driven on the 15th and 16th levels.

In Feb., 1919, company began two suits in Massachusetts against the Iron Cap Copper Co: (1) for $500,000 for ore alleged to have been illegally removed; and (2) for $150,000 for share of pumping expense. In Sept., the Supreme Court of Massachusetts sustained the pleas of the Iron Cap that suit must be brought in Arizona Courts. Immediately after this decision, Arizona Commercial brought the same suits under Massachusetts laws to be tried by a court and jury. In October, this company asked for an injunction in the Maine courts restraining Iron Cap from disposing of any of its assets until the suit was settled.

Arizona Commercial continued in 1919 to produce rock ore from its lower levels; the 15' level showing ore that averaged 12% copper for a distance of 30'. In November, 10' of 5% ore was cut on the 16th level.

The Black Hawk group, 97 acres, which carries the Black Hawk and Old Dominion veins for about 3,000', has a surface capping of low-grade iron ore, above a 25 to 50' vein, leached to considerable depth, followed by silicious ore, estimated to average about 4% copper, with excess of iron. There also is a hematite vein of 3 to 4' width giving assays of 4.5% copper, with small silver values.

Equipment: at Copper Hill shaft includes a 72' steel headgear, hoist, good for 1,500' driven by 175 h. p. motor; 500-gal. electric pump; 20,000 cu. ft. Sturtevant fan; and 300-ton ore bins.

The power smelter plant was remodeled in 1916; new equipment includes two 600 k. w. turbo-generators. All power used is generated at this plant, which is connected with the Copper Hill mine by a 6" pipe line for compressed air and an electric transmission line. On the 14th level two 500-gal. p. m. pumps, electrically driven, were installed, pumping all water from the Copper Hill mine to surface.

Production: in 1916 was 48,889 tons of ore, containing 4,178,474 lb. copper, 21,163 oz. silver and 302 oz. gold; and in 1917, 39,702 tons of ore, containing 3,860,949 lb. copper, 5,208 oz. silver and 374 oz. gold; and in 1918, 62,797 tons of ore, containing 6,076,303 lb. of copper, 15,981 oz. silver and 831 oz. gold. In 1919 the total yield was 7,500,000 lb. at cost of about 14 cents.

Opinion: "in proportion to its output this company has one of the largest showings of ore of any of the vein mines. The shaft is down to the 1,600' level and, indeed, in Dec., 1919, the crosscut on this level has encountered the orebody finding it well up to the average grade.

The "Budget" fault throws the ore up several hundred feet, so that east of this fault the ground is almost virgin. At present the company is mining about 6,000 tons per month. It is, however, sinking a new shaft, which will

have a capacity of 400 tons in six hours. With this the company should have difficulty in mining easily 10,000 tons per month.

It is estimated that there is in sight about 750,000 tons of ore, so that e on this larger rate of production there is some six years' supply of ore in sig At this rate of mining it should not be difficult to produce 12,000,000 pounds copper per year, as against a rate hitherto attained of around 8,500,000.

The relation between cost and price of copper production have been so up of recent years that it is difficult to take any definite basis for estimating earnin The ore, however, running 5½ to 6% is decidedly above the average of v mines and should make for a cost somewhat lower than the average. Witl normal spread between cost and price on a full production, it would not se unreasonable to figure on a profit of $2.50 to $3 per share."

ARIZONA-GLOBE COPPER CO. ARIZO

Office: 110 North First Ave., Phoenix, Ariz.

Officers and directors: P. J. Hickey, pres.; Harry Kay, v. p., with G M. Mickie of Phoenix; J. T. Brown, Globe; and J. P. Hickey, Jr., mine s Cap., $2,000,000; $1 par.

Property: the Cole & Goodwin mine located on N. fork of Mine Creek, 10 miles S. E. of Globe, held under lease and bond from P. J. Cole Globe (Cole Dev. Co. q. v.). Mine has a 470' shaft and about 600' of drifti Company reports 50,000 tons of ore in sight, averaging 4% to 19% copper w some gold and silver values.

In October, 1919, company was offering stock to the public at 50c. share, to procure funds for a mill.

Stock handled by Arizona Development Co., brokers, Mesa, Ariz.

Fully described in Vol. XIII of this book, p. 439.

ARIZONA NATIONAL COPPER CO. ARIZO

Idle. **Address:** 327 Pine St., Williamsport, Pa.

Officers: Thos. M. B. Hicks, pres.-treas.; C. S. Messerly, sec.; LeR Scholl, gen. supt.

Inc. Feb. 1, 1906, in Arizona. **Cap.**, $3,000,000; $10 par. Bonds $300,(at 5%.

Property: 14 claims, also a 15-acre mill site and 100 acres timber lan formerly known as the McNelly-Crowley property, on Pinto creek, west Miami, carrying contact veins between schist and granite, said to average in width and traced 785', showing considerable high-grade oxidized ores, incl ing chrysocolla and native copper, with some chalcopyrite and occasio bornite. The 80' ledge of decomposed schist is lightly impregnated with cop sulphides.

Development: by shafts and tunnels, with a total of 2,000' of workin Has steam power. No recent returns secured.

BARNEY COPPER CO. ARIZO

Absorbed with the Porphyry Copper Co. by Porphyry Consolidated Cop Co., which see.

COLE DEVELOPMENT CO. ARIZO

Office and mine Globe, Gila county, Ariz. P. J. Cole, pres.; M. L. Co Jr., sec.-treas.

Inc. Sept., 1909, in Arizona. **Cap.**, $300,000; $1 par; 151,000 issued. Co pany holdings reported under bond and lease to Arizona-Globe Copper C Nov., 1919.

Property: 17 claims, known as the Cole & Goodwin groups, 4 clai wide and 4 claims long, extending along Mineral creek, 3 miles south of Gibson mine and about 10 miles S. W. of Miami, the nearest available rail poi and 10 miles N. E. of Ray, but is separated from Ray by some extremely rugg country.

Geology: country rock is Pinal schist with diabase intrusions, carryi the Cole and Goodwin tanks, traceable about 2 miles, that cuts the scist diagonal This property carries fissure veins in schist, and also disseminated ores in schi

Development: by the 450' Cole incline shaft, with 5 drifts, cutti several bodies of low grade disseminated ore, and some high-grade from whi

regular shipments of 6% to 17% copper and $2 to $4 gold and silver were reported in 1917. There also are several short tunnels, there being a 135′ crosscut tunnel about one-half mile from the shaft, and a 480′ crosscut tunnel, 1,700′ west of the shaft, with portal 500′ vertically below the collar of the shaft.

Equipment: includes a 22 h. p. gasoline hoist. Examined by G. M. Butler in 1919.

COPPER & SILVER ZONE MINES **ARIZONA**

Claims sold to Globe Dominion Copper Co., which see.

COPPER SPRINGS MINING CO. **ARIZONA**

Office: Globe, Ariz.

Officers: Capt. E. Storer Tice, pres.; R. L. Springer, v. p.; E. F. Hiatt, sec.-treas., with Dr. W. H. Meler, B. G. Stewart and W. H. Hiatt, directors.

Inc. in Aug., 1916, in Arizona. Shares $1 par; 696,230 issued. Listed on Boston Curb. Exchange Trust Co., Boston, transfer agents. Fidelity Trust Co., Boston, registrar.

Property: 25 unpatented claims, about 500 acres on Mt. Madera, in the Schultz ranch section of the Pinal mountains, about 6½ miles from Miami, in a rough section of the country. Property is reached by wagon road.

Development: by 8 tunnels, aggregating about 1,400′. Work reported to show considerable leaching and some silicates of copper in the upper tunels. Nos. 5 and 6 tunnels are reported to have cut carbonates and sulphides of copper running from 1½% to 4%. A new tunnel is being driven to obtain a depth of 400′ with the expectation of getting sulphide ore.

Copper values are reported in nearly all of the tunnels but not in a very appreciable amount.

Property is a prospect promoted by Temple H. Fay & Co., of Boston.

CORDOVA COPPER CO. **ARIZONA**

Property taken by creditors who organized new company called Lecora Copper Co., which see.

DUQUESNE MINING CO. **ARIZONA**

Address: care of T. A. Luckhart, sec., DuBois, Pa. Mine near Globe Gila Co., Ariz. Geo. M. Luckhart, pres and mgr.

Inc. 1909 in Arizona. **Cap.**, $1,000,000; shares $1 par.

Property: 10 claims, in Gold gulch, about 3 miles south of the Arizona National and 15 miles west of Globe, in the Pinal mountains. Mine has a 10′ vein, carrying mainly silver-lead ore with copper expected at depth. Opened by 3 tunnels, 2 of 200′ and 300′, showing ore assaying well in gold. A 50′ shaft on the East End claim shows ore giving assays of 5% copper, 3 oz. silver and $4 gold per ton.

Equipment: includes a 25 h. p. gasoline hoist, and an oil engine. Only assessment work done in 1914-15.

Probably closed down since 1917.

GERMAN COPPER CO. **ARIZONA**

Idle. **Office:** Chas. H. Trotter, sec., 10 No. New Jersey St., Indianapolis, Ind. Mine at Globe, Ariz.

Officers: John H. Murdoch, pres.; Chas. H. Zollner, v. p.; John A. Hook, treas., with Wm. Elwarner, Jos. Lauler, Wm. Burnett, John I. Carson and J. B. McMurray, directors; P. H. Pernot, cons. engr.

Inc. March 25, 1911, in Arizona. **Cap.**, $3,000,000; $5 par; 142,373 issued; outstanding debt, $95,000. Annual meeting, second Tuesday in October. Company is successor, 1911, of the Arizona-Colorado Belt & Gold Mining & Milling Co.

Property: 14 claims, 270 acres, held by location in the Globe district of Arizona. Ore occurs in a large fissure vein cutting through diabase, quartzite, and limestone, and as contact ores between diabase and sedimentary rocks. Vein strikes N. E.-S. W., dips 55°, is reported as 9′ wide, proven to depth of 900′, and said to carry 2% copper, 2 oz. silver and slight gold values per ton, principally as chalcopyrite, on 800′ and 900′ levels. Ore developed above 800′ estimated at $125,000.

Development: by 863′ shaft, and a total of 3,000′ of underground work.

The 800′ level is said to block out 2,000 tons of ore with 18,000 tons of 2½% ore reasonably certain.

Equipment: includes 100 h. p. steam hoist, pump and 7-drill air compressor. Arizona-Eastern railroad is 1 mile from property, which is well located and has merit. Assessment work only being done at last accounts.

GIBSON CONSOLIDATED COPPER CO. **ARIZONA**

Main office: 505, 5th Ave., New York City. **Mine office:** Bellevue, Ariz.

Officers: Gen. Amasa P. Peake, v. p.; H. F. Bierce, managing director; P. P. Greer, treas., with F. F. Towle and E. J. Kaltenbach, directors.

Inc. May, 1917, in Delaware. **Cap.,** $1,000,000; $1 par; 820,000 issued. Columbia Trust Co., New York, registrar. Empire Trust Co., New York, transfer agents.

Property: 16 claims, 8 patented, 300 acres, about 8 miles W. of Globe, Gila county, with a good wagon-road connection, includes the Gibson mine which was opened by Messrs. Gibson and Henderson with capitalization of $90 cash and a team of horses and not only paid its way but earned good profits.

Worked in a very small way, by different owners, 1900 to 1906, when taken over by the Gibson Copper Co., and thereafter worked continuously until June, 1910. Mine was under lease and option to the Summit Copper Co., for 18 months, at $442,375, but reverted to owners, Jan., 1912, and was again operated under lease by Sultan & Wayne until August, 1913.

Geology: country rock is Pinal schist and granite carrying 3 approximately parallel fissure veins, having a N. E. strike. The Summit and Pasquale are the principal veins, the former vein, of 4 to 7′ width, traceable for the entire length of the property, a distance of 1¼ miles. The Summit and Pasquale veins are about 250′ apart, the Intermediate vein about 75′ E. of the Pasquale. Ore occurs in the Summit and Pasquale veins in well-defined shoots, pitching 50 to 65° S. the lenticular form of these shoots being in some cases due to strike faulting and movements. Ore is mainly massive chalcopyrite, with little bornite. Gangue is quartz with some calcite and small quantities of specular hematite and gypsum. Two veins show high-grade ore and some low grade ore has been developed in 5 veins. The McKinley vein, undeveloped, shows a strong outcrop.

Development: to 500′ depth by shafts and tunnels with 26,000′ of work. The Pasquale tunnel, driven on the Pasquale vein, is about 200′ below the collar of the incline shaft. The Reynolds tunnel is to intersect the vertical shaft at 1,800′ from the portal, at depth of 500′; the Toombs tunnel, 100′ vertically above and the Upper Toombs tunnel, 210′ above the Reynolds, are drifts on the Summit vein. Working shaft is an incline, 600′ deep, sunk on the Summit vein with 6 levels which show that the Summit vein runs N. 21° E., dips 56° N. W., and carries a seam of high-grade ore, the main pay streak carrying 6 to 15″ of chalcopyrite ore assaying 20 to 30% copper, throughout the various levels. The shaft has 5,915′ of workings on the Summit vein, besides drifts on the Pasquale and Intermediate vein, reached by crosscuts on the 3rd and 4th levels.

Development by the Summit Copper Co. was by a vertical 3-compartment shaft, sunk to a depth of 244′ by the Gibson Copper Co., and deepened by this company to 573′, this depth corresponding with the 7th level of the old incline shaft. About 4,000′ of new drifting and crosscutting, costing nearly $142,000, was done. The vertical shaft cuts the Pasquale vein at 165′, the Intermediate vein at 300′ and the Summit vein at 500′ depth.

The Pasquale vein differs from the Summit in that it cuts across the bedding of the schist, instead of following the bedding planes as does the Summit, having a strike of N. 20° E., with dip of 35 to 50°. Apparently the Pasquale vein is better defined, more continuous and stronger than the Summit, the fissure being of 5 to 10′ width, carrying a pay-streak, from a few inches to 3′ in width, ore assaying up to 33% copper. Ore occurs in the Pasquale vein in [illegible] pitching to the south, similar to the ore occurrence of the Summit.

The Intermediate vein, with drifts of 225′ length on the 3rd [illegible] has a strike of 12° E., with dip of 5.° N. W., and is [illegible]

firm walls and, as developed, is not of great importance, but has possibilities. The ground is heavy and treacherous, requiring timbering for practically every foot of drifting and concrete posts were used.

Ore reserves: estimated by new owners in 1918 at 469,000 tons of ore, containing 2.64% copper. This figure is in our opinion much too high as Messrs. Pritchett & Hamilton estimated the developed ore reserves, at the end of 1910, excluding all high-grade ore, and omitting probable ore between the 3rd and 4th levels on the Pasquale vein, as 33,011 tons of ore, averaging 4.36% copper, on the Summit vein; 17,062 tons of 3% copper ore in the Summit filling; 39,860 tons of 2% ore on the Summit dump and 8,578 tons of 6.51% copper ore developed in the Pasquale vein. The development by the Summit Copper Co. proved disappointing; irregular occurrence and insufficient tonnage failing to offset the high-grade ore extracted.

Equipment: at the incline shaft includes two 250 h. p. boilers, a 14x16" hoist and a 6-drill air compressor. The plant at the vertical shaft includes two 300 h. p. water-tube boilers, a 16x20" double-drum hoist, good for 1,000' depth and a 10-drill cross-compound air compressor, with a 132" smokestack of 42" diameter. The vertical shaft has pumps with a capacity of 192,000 gal. daily. A 300-ton mill started work in Aug., 1919.

Production: the gross value of ore produced by the Gibson Copper Co., 1906-09, has been estimated at $1,250,000. It was shipped to the Old Dominion smelter, a distance of about 18 miles, by 10-horse teams, and required careful selection, owing to the extremely high cost of transportation, returning better than 20% copper. 1917, produced 1,262,275 lb. copper, and 1918, 662,033 lb. Costs were high, as only 25% of the copper actually mined was sold. The low-grade ore will be treated when mill is operating, thus materially reducing costs.

GIBSON COPPER CO. **ARIZONA**

Fully described in Vol. XII of this book. Property sold May, 1917, to Gibson Cons. C. Co., which see.

GILA MONSTER MINING CO. **ARIZONA**

Address: W. H. Seamon, mgr., P. O. Box 561, Globe, Ariz.

Officers: W. E. Clark, pres.; Dr. J. L. Adams, v. p. Dr. J. Q. Grave, sec.-treas., with O. O. Clark, directors. Transfer office, Monroe, La.

Inc. 1917 in Arizona. **Cap.,** $1,000,000; $10 par; 40,000 outstanding.

Property: 16 claims, 300 acres, in Richmond Basin, 9 miles from Globe. Said to show a NE-SW contact vein between diorite and diabase, the ore running 40 oz. silver and 1% copper.

Development: by shaft and tunnel to a depth of 800' and 3,000' of workings.

Equipment: 40 ton cyanide plant. No production reported and believed to be idle.

GLOBE BULLION MINING CO. **ARIZONA**

Address: Globe, Ariz.

Inc. by P. J. Minck of New York, W. Buckland and G. B. Pert of Globe. H. Heidemann, supt.

Property: south of Miami, shows gold-bearing ore. Press reports state that the company's slogan was, "Pick your own samples and the company will pay for the assay." Caveat emptor. Mail returned unclaimed. Presumably idle.

GLOBE DOMINION COPPER CO. **ARIZONA**

Office. P. O. Box 432, Globe, Ariz.

Officers: H. W. Clark, pres.; M. S. Clarke, v. p.; T. A. Pascoe, treas.

Inc. in Arizona. **Cap.,** $1,500,000; $1 par; 1,213,108 outstanding.

Property: 25 claims, about 425 acres, in diabase area, 1 miles east of Globe, adjoining the Old Dominion on east and south, was originally worked for silver, lead and copper, found near the surface. Development has proven the existence of copper at depth and owners expect to encounter the extension of the Gladiator vein of the Old Dominion mine. Property was formerly known as the Copper and Silver Zone Mines, owned by W. R. Morris, El Paso, Texas.

Development: by the 103' Clark and 108' Faugh shafts on the Old Iro sides claim, from which ore shipped has returned 1.25 to 3.5% copper, $ to $236 silver, or an average of $21.60 per ton. Shipments from develo ment work near surface said to have been worth $16,000. Present compa has sunk the shaft to 800 level. Crosscuts to north and south have cut veins, not explored on account of lack of funds. Property was reported by Sydney H. Ball for Luke, Banks & Weeks, of 14 Wall St., who are r ported to be financing it.

Reported idle March, 1919.

GLOBE & LOST GULCH SILVER-COPPER MINES CO. ARIZON

Office: 1549 Logan St., Denver, Colo. Mine in Lost Gulch, Gila count Ariz. Mary E. Brooke, pres. and gen. mgr.; H. A. Wimbush, sec.

Inc. April 1, 1907, in Arizona. **Cap.**, $1,000,000; $1 par.

Property: 10 claims, patented, 180 acres, and other locations; also mill site at the head of Lost Gulch, 1½ miles N. of Inspiration and Mian Ariz., showing quartzite, granite and limestone, cut by porphyritic dikes.

Development: shows silver-lead ore in diabase, with indications th copper ore will come in at depth; also shows silver-chloride ore in grani and limestone, and copper carbonate ore in dacite. Presumably idle, ma returned unclaimed, March, 1918.

GLOBE-MIAMI COPPER CO. ARIZON

Address: D. F. Beggs, pres., 286 Fifth Ave., New York.

Officers: Victor Gilsey, sec.-treas., with F. W. Geiler, J. F. Daley, E. I Terry, directors.

Inc. 1917 in Delaware. **Cap.**, 200,000 shares; $1 par.

Property: 21 claims near Inspiration and Black Warrior ground i Globe-Miami district, Ariz., upon which $200,000 is said to have been spe in development and purchase. Some gold ore has been extracted.

All the literature available on the property is from a brokerage hous in New York. It is so profuse and tells so much about other propertie and so few facts about this, that it is suspicious. The property may hav a future, but it must be heavily burdened with too many metals, since th literature states there are copper, gold, silver, lead, tungsten, and molyb denum deposits on the claims.

GLOBE MINING CO. ARIZON

Globe, Gila Co., Ariz. Now the Moline & Arizona Copper Co., whic see.

INSPIRATION CONSOLIDATED COPPER CO. ARIZON

Office: 42 Broadway, New York. Mine at Miami, Ariz.

Officers: C. R. Kelley, pres.; W. D. Thornton and L. D. Ricketts, v. p.'s Joseph W. Allen, sec.-treas.; Evan J. Dudley, asst. sec.; W. S. Harpe asst. treas.; T. H. Donahue, gen. mgr.; Wm. B. Thompson, Wm. D. Thorn ton, Jos. W. Allen, Edmund C. Converse, William E. Corey, Charles A Corliss, L. D. Ricketts, William G. Rockefeller, John D. Ryan, Charles E Sabin, C. R. Kelley, Wm. R. Wraith, B. B. Thayer and Albert H. Wiggi directors. D. A. Welch, purch. agt. Guaranty Trust Co., New York, an Old Colony Trust Co., Boston, transfer agents; Bankers' Trust Co., Ne York, and National Shawmut Bank, Boston, registrars.

Inc. Dec. 18, 1911, in Maine. **Cap.**, $30,000,000; $20 par; issued and ou standing Dec. 31, 1918, 1,181,967 shares. All bonds have been retired. An nual meeting fourth Monday in April. Listed on New York and Bosto Exchanges.

Comparative General Balance Sheet, years ending Dec. 31:

Assets—

	Prop. & Equip.	Supplies	Cop. on hand	Oth. Current	Total
1918.....	$26,355,613	$2,180,333	$2,978,099	$14,214,507	$45,728,5
1917.....	25,465,242	1,932,383	.....	17,229,047	44,626,6
1916.....	24,858,094	1,133,633	.....	15,792,586	41,784,3
1915.....	25,293,529	622,276	1,115,960	411,281	27,443,0
1914.....	22,166,764	439,880	.....	2,641,219	25,247,8

Liabilities—

	Capital Stock	Bonds	Current	Surplus	Reserves	Total
1918..	$23,639,340	.....	$5,489,095	$12,784,433	$3,815,689	$45,728,556
1917..	23,639,340	.....	4,678,484	14,011,005	2,297,843	44,626,672
1916..	23,639,340	.....*	4,182,003	12,681,501	1,281,469	41,784,314
1915..	18,419,500	6,544,500	1,878,983	600,062	.....	27,443,046
1914..	14,459,160	10,500,000	288,703	.....	.....	25,247,863

*All retired, 1917.

Comparative Income Account, years ending Dec. 31:

	1918	1917	1916
Copper sales	$17,516,323	$21,242,217	$33,496,343
Other income	290,063	177,144	.....
Receipts	$17,806,386	$21,419,361	$33,496,343
Expenses—Mining	$3,743,032	$2,933,877	$3,335,889
Reduction and Trans. Ore	4,673,143	3,702,224	4,590,398
Refng., Sellg. & Trans. Metal	2,323,404	1,716,352	2,459,345
Adm. and Fed. Taxes	1,065,743	1,236,176	(a)629,823
Depreciation	750,000	750,000	750,000
Copper on hand—beginning	.....	.....	1,101,399
Total	$12,555,322	$10,338,629	$12,866,854
Profit:	$5,251,064	$11,080,732	$20,629,489
Coper on hand—December 31	2,978,099	.....	.....
Total income	8,229,163	11,080,732	20,629,489
Dividends	9,455,736	9,751,227	8,548,051
Surplus	(b)1,226,573	1,329,505	12,081,438
Previous surplus	14,011,005	12,681,500	600,062
Profit and loss surplus	$12,784,432	$14,011,005	$12,681,500

(a) Includes $151,034 interest paid, (b) deficit.

Dividends: $5.25 in 1916; $8.25 in 1917; $8 in 1918; $6.50 in 1919; and $1.50 in 1920, payable January 20.

Net earning per share: $0.65 in 1915; $17.45 in 1916; $9.37 in 1917; $6.96 in 1918.

Company took over properties owned by the Inspiration Copper Co. and the Live Oak Development Co., paying for same in stock. In May, 1912, the mill and camp site of the Black Warrior copper mine was purchased from the Warrior Copper Co. for $175,000. Early in 1914 the property of the New Keystone Copper Co., lying between the Inspiration and Live Oak groups, 219 acres, was purchased for $795,940, payable in 39,797 shares of stock at $20 per share, 9 shares of New Keystone for 1 share Inspiration.

Property: the holdings of the company are as follows: mining lands, 1,870 acres; mill-site, tailing disposal, water supply, etc., total 4,216 acres, 6 to 10 miles W. of Globe, Ariz.

To provide a supply of oil, purchased jointly with the Anaconda Copper Company in 1918, 160 acres of oil land in Bakersfield district, California, organizing the Arizona Oil Company. **Cap.,** $2,500,000; shares, $100 par; issued 16,320 shares. Inspiration owns 50% of the stock issued at a cost of $74,168.

Geology: property carries about 1½ miles of the strike of a mineralized belt of Pinal schist, much crushed, altered and silicified by contact action, due to the intrusion of the great mass of granite forming the hills to the S. W., the shattering having allowed the free circulation of secondarily

enriching solutions. The oxidized zone shows carbonates, occasionally commercial tenor, as in the Clipper tunnel, but ore occurs mainly in secondary form as disseminated chalcocite, forming an enriched zone of commercial ore of 50 to 575′ in thickness, estimated by the management average 180′, with an average of 90 to 100′ of overburden, underlaid by primary zone of cupriferous pyrite below commercial tenor. About 40% of the values occur in small fissures and veinlets and along the jointing planes and planes of schistosity, copper being mainly in the form of flakes and grains of chalcocite, the balance of about 60% of ore values being disseminated through the gangue of friable Pinal schist, with some quartz. The mineralization also extends into the granite-porphyry contact, about 10 to 15% of the ore developed in the Colorado orebody being in granite. The cupriferous schist is faulted, just east of the Woodson orebody, by the Bulldog fault zone, of about 300′ width.

The Live Oak group of 14 claims, 200 acres, is about 1½ miles W of Miami, at the western end of the Maimi ore belt and separated from the Inspiration group by the New Keystone group. The geological conditions are similar to those of the Maimi belt generally, save that much of the surface is covered by leached white granite, showing brilliant, green stained outcrops of far more attractive appearance than any other part of the belt. This granite is underlain by schists carrying the ore, but part of the orebody is in granite.

The mine was originally opened on a flat dipping vein, 5 to 12′ thick carrying high-grade chrysocolla ore, from which shipments running 17 and 18% were made for several years. Much of this material was quartzose and valuable as a gemstone. The vein ended at water level in a mass of low grade chalcocite ore similar to that of the Miami mine. Orebody was developed by tunnel work and drilling by the Live Oak Development Co. by over 50 drill-holes with 20,000′ of drilling and 5,000′ of underground work. This work blocked out a body of disseminated ore 1,400′ long, 75 to 200′ deep beneath a capping of oxidized material averaging 435′ thick. The orebody as developed averaged 114′ thick and contained 15,000,000 tons of 2.11% copper ore.

The New Keystone Group has about 60 acres underlain by Pinal schist covered in part by a sheet of granite porphyry, 25′ to 200′ thick. A strong fisure vein crossing the property was mined by the old Keystone Copper Co., the vein being 12′ thick with a paystreak averaging 15″, from which shipments of 19 to 22% copper and 2 to 5 oz. silver per ton were made for some years. Mine yielded, according to report, about $1,000,000. The New Keystone Copper Co. explored and opened up a deposit of disseminated glance ore similar to that of the Miami mine.

Development: by the new company consisted in blocking out this ore body by underground workings and churn drilling. The Keystone shaft is 330′ deep and at the time the company was absorbed by the Inspiration Cons. Copper Co., had a total of 14,886′ of workings. Churn drilling along 200′ squares was discontinued June, 1912, after company had put down a number of holes with an aggregate of 21,947′ of work. Development blocked out 2,516,000 tons of ore, which sampling showed to have an average of 2.25% copper.

Development under the present company has been of a dual nature, including both extensive underground openings, and churn-drill borings along the same general system as followed in the development of the Ray and Chino mines. Underground work in 1918 amounted to 14.88 miles; total workings to Dec. 31, totaled 127.85 miles, in addition to 29⅛ miles churn drilling. Stoping operations have destroyed 63.9 miles of workings to the end of 1918, so the present openings are 63.95 miles.

The Inspiration orebody is being worked by 2 main tramming levels at 326′ and 450′ in depth respectively. The Live Oak orebody is accessible through the Live Oak shafts, but all ore is hauled through the main

haulage-tunnel, 6,600′ long, connecting with the bottom level of the Inspiration shafts.

Ore is mined by the so-called Ohio system, locally termed the "Finger Raise" system, undercutting and caving in blocks of about 70′ vertical dimension; the broken and caved ore is drawn off through a system of inclined raises delivering to the haulage-ways below; these raises have a sufficient number of branches immediately below the caved area to reduce the interval between the heads of the raises that tap the caved ore to a minimum of about 8′. The ore is carried in trains of 5-ton cars by air locomotives to the working shafts, where it is delivered to one set of double concrete bins underground holding 3,700 tons and hoisted to surface through 2 shafts, delivering to a bin of 2,000 tons capacity located between the shafts. Skip loading and hoisting is automatically controlled. Ore extraction is entirely confined to these 2 cement and steel-lined shafts, 585′ deep and 107′ apart, in Webster gulch, on the north side of the mountain, while men and supplies are lowered and water pumped at the Incline, or Supply shaft on the opposite, or Miami side of the mountain. The 2 shafts are operated from the same hoist house, but have entirely independent units, capable of handling 1,000 tons per hour. The total lift is 630′. The ore is hoisted in skips, passed through crushers and put in 25,000-ton storage bins. From these bins it is carried over the company's 1.6-mile railroad, with 3% grade, to the mill at the old Black Warrior townsite.

Ore extraction: 1916 was a complete operating year, mining confined almost entirely to the Inspiration ground. The output was 5,353,880 tons, averaging 1.548% copper. The greatest day's output was 21,289 tons. The average output of ore per shifts work was 17.46 tons. The area undercut was 18.4 acres. The cost of mining was 60.7c per ton.

From the time the ore is dumped from the chutes into the mine cars no manual labor is required, all operations being entirely mechanical.

The company owns its own railroad of 4½ miles standard-gauge track, connecting the mine with the mill and the mill with the smelter of the International Smelting Co.'s Miami plant, where concentrates are smelted.

The mine and mill are connected with both the U. S. Reclamation hydro-electric plant at Roosevelt and with the company's own steam plant, consisting of three 6,000 k. w. turbo-generator units.

Ore reserves:

	Jan. 1, 1916	Mined in 1916	Mined in 1917	Mined in 1918	Jan. 1, 1919
Tons.....	97,143,000	5,353,880	3,914,742	5,139,132	82,725,246
Copper.....	1.63%				

No attempt was made during 1918 to develop additional ore. There are about 20,000 tons of oxide ore, upon which experiments are being made by leaching, with encouraging results.

Equipment: the surface and underground plant is capable of handling 20,000 tons of ore daily. A feature at the main shafts is the electric automatic hoists; coarse-crushing station, ore bins, and tramway to mill. The treatment plant, designed by H. K. Burch, consists of 20 sections, each one with rated capacity of 900 tons per day, making a total of 18,000 tons per day.

The scheme of treatment, stated in general terms, is as follows: at the mine—crushing ore to 4″, maximum size in gyratory crushers, crushing this ore to 1½″ maximum size by Symons disc-crushers. At the mill—crushing product from the Symons disc-crushers in Marcy ball-mills to pass 28-mesh screen, treatment of this product in flotation machines with separation of flotation tailing into sand and slime. Sand is treated on concentration tables and the slime retreated in flotation machines. Concentrates are dewatered in the filter plant.

While plans were for a 7,500-ton mill to cover 8 acres, adoption of th flotation process has permitted doubling originally planned capacity with space of 3 acres. As a result of this compactness, elimination of elabora classification and some crushing, the costs of the combined oil flotatic and water concentration in 1916 were 50.385c per ton. Mill is equipped wi Minerals Separation and Callow flotation machines, also one designed Rudolf Gahl, formerly metallurgist. Coal tar is the chief component the frothing mixture. The first unit of the mill went into operation Ju 29, 1915, the 18th in Feb., 1916, and the 20th a year later. The first o was caved underground and actual mining started July 25, 1915.

By Aug., 1919, a 35-ton leaching plant had been erected to try th method of treatment on the carbonate and silicate ores.

Production.

	1918	1917	1916
Ore treated, tons	5,110,101	3,891,075	5,316,3
Average per day, tons	14,172	12,884.4	14,8
Mill feed, per cent copper	1.361	1.388	1.5
Tailings, per cent copper	0.380	0.355	0.3
Extraction, per cent	72.99	75.34	74.8
Concentrates, per cent copper	30.398	29.27	30.6
Water per ton ore, gallons	310	348	1,1
Steel balls, used per ton ore, lb	1.82	1.82	1.7
Flotation oil, used per ton ore, lb. (coal tar 1.2 lb.)	1.35	1.32	1.2
Cost per ton milling, cents	.....	.....	50.3
Refined copper for years, lb	98,540,041	80.566.982	120.772,6
Cost per lb. of copper, cents	11.259	10.439	8.6
Cost per ton of ore	.....	.....	$1.9

In 1917, production was decreased by the I. W. W. strike which caus a shut down of the property early in July. Work was resumed in the m Sept. 1, but production was slow in returning to normal. For 12 mon of 1919 the output was 77,500,000 lbs., about 60% of capacity.

A profit of $20,629,489 for the first complete year's work gives a go idea of future possibilities, although sales of copper realized over 25c per against an average of about 15c over a period of normal years. Even at t latter figure, and costs at 11¼c per lb., profits should be made on the norm output, which is at the rate of 10,000,000 lb. monthly. The cost of copper 1918 increased only 0.82c over the 1917 cost, while operating costs of m mining companies almost doubled. The company has not added to its reserves for two years, but they are sufficient to maintain normal operati for 17 years.

Opinion: Company is exceptionally well managed and shares are excellent investment at current 1919 prices.

INSPIRATION EXTENSION COPPER CO. ARIZO

Address: F. O. Augustin, 433 Broome St., New York City. Wm. Correa, pres.; A. L. Rosengarten, v. p.

Inc. Feb. 11, 1913, in Delaware. **Cap.,** $1,000,000, increased to $1,500,(in 1915; $5 par; all issued. Annual meeting February 11th. Compan holdings are under bond and lease to the Castle Dome Development Co., Broadway, New York, which owns 97% of this company's stock, 1919.

Property: 95 acres, patented, in the Miami district, partially surround by claims of the Inspiration Cons. Copper Co., underlain by schist, loca altered, said to show a deposit of low-grade copper ore. Also 29 clai unpatented, about 500 acres, on Porphyry Mountain, about 5 miles W. the first group and adjoining the Continental mine of the Old Domin Copper Co. This group shows disseminated ore in granite, said to be riched near an intrusion of diabase. Development to date consists pr cipally of tunnels, all above water level.

Development: of the Miami tract includes a 500′ shaft disclosing primary sulphides.

Equipment: includes a 35 h. p. gasoline hoist good for 500′, with various buildings. Extensive drilling of ground planned for 1919.

INSPIRATION-MIAMI COPPER CO. **ARIZONA**

Addresses: care Mr. Birger Lie, 141 Broadway, New York City, or 611 Delta Bldg., Los Angeles, Calif. Mine address: Geo. W. Danehy, mgr., P. O. Box 759, Miami, Ariz.

Property: several detached groups of claims, mostly 4 miles north of Miami, includes (1) Pat Sullivan group comprising the Lookout claims No. 1 to 15; (2) McGinnis group, 16 claims, and 2 Sullivan claims; (3) Sutton group of 4 claims; (4) seven fractional claims lying immediately north of the main shaft of the Inspiration Copper Co. and the Warrior shaft. Also (5) 2 groups of claims near the Louis d'Or Mining Company's drill holes.

Claims said to cover an area of monzonite porphyry, 2,000′ to 4,000′ wide, lying between schist to the southeast and diabase on the N. W.

A shaft 140′ deep is said to be in mineralized granite averaging 1.25% copper.

Examined by S. T. Godbe, E. M. of Los Angeles.

INSPIRATION MIAMI EXTENSION COPPER CO. **ARIZONA**

Address: Birger Lie, 141 Broadway, New York City and 611 Delta Bldg., Los Angeles, Calif.

Property: 5 patented claims 4 miles north of Miami said to show bornite ore, in 65′ shaft. The tract covers part of a monzonite zone 2,000′ to 4,000′ wide, with diabase on one side and schist on the other.

INSPIRATION NEEDLES COPPER CO. **ARIZONA**

Office: P. O. Box 1056, Miami, Ariz.

Officers: D. R. Williamson, pres.; Wm. Phillips, v. p.; F. W. Hamm, sec.; A. D. Williamson, treas., with Geo. J. Stoneman, directors.

Inc. Jan. 4, 1912, in Ariz. **Cap.,** $2,000,000; $1 par; issued 1,465,213. Security Transfer & Registrar Co., New York, transfer agent and registrar. Listed on Boston and New York Curbs. Annual meeting first Monday in February.

Property: 42 claims, 740 acres, 3 miles from Miami, Ariz., adjoins Southwestern Miami on the W., lies 1 mile S. W. of Inspiration Cons. property. Surface shows Gila conglomerate, Pinal schist and Schultze granite formation.

Development: the result of assessment work, consists of a number of shafts, none over 100′ in depth, and tunnels, none over 200′ in length.

August, 1916, two churn-drills operating at holes No. 1, 1,000′ deep, and No. 2, 551′ deep. Both holes were in Pinal schist, the last 100′ of No. 1 was in leached schist, showing small amounts of native copper.

Examined by J. H. Dockweiler (Crocker Bldg., San Francisco, Calif.) in June, 1916.

Hoping to resume drilling, stopped Feb., 1917, on account of fuel shortage.

IRON CAP COPPER CO. **ARIZONA**

Office: 50 Congress St., Boston, Mass. Mine at Copper Hill, Gila County, Ariz.

Officers: Frank P. Knight, pres.; J. Judson Dean, v. p.; R. H. Knight, sec.-treas.; F. A. Woodward, supt.; with Alvin T. Baldwin, directors; David Cole, cons. erect. engr.

Inc. Feb. 7, 1911, in Maine. **Cap.,** $2,000,000; $10 par; 50,000 preferred and 150,000 common. 146,079 outstanding. Stock listed on Boston Curb. Annual meeting, third Tuesday in March.

Bonds: $500,000, 8%, 20-year, dated Oct. 1, 1918. State Street Trust Co., trustee and transfer agent. Federal Trust Co., registrar.

Dividends: 25c monthly during 1918, with 50c extra June 29; total to Feb. 15, 1920, $6.45 per share on common: $1.22½ on preferred.

Company reports for year ended Dec. 31, 1918. surplus, $334,170; cash accounts receivable stocks and bonds total $835,404. No debts save out standing bonds.

Property: the Iron Cap and Bird groups at Globe, 20 patented claims dividing two Arizona Commercial groups and adjoining the Old Dominion property. Also 7 claims in Lone Star district, Arizona.

Geology: claims show shale and quartzite cut by diorite at depth traversed by a fissure vein running N. E. and S. W., and dipping at 70°.

Development: by 1,181′ Williams shaft, with levels at 660′, 765′, 868′ 968′ and 1,068′. Vein is opened for about 1,000′ in length. The Iron Cap shaft is 1,126′ deep, with levels at 800′, 920′, 1,020′ and 1,120′. Vein is opened for about 1,400′ from that shaft. Reserves include over 300,000 tons of 4½% milling ore.

Litigation: in Feb., 1919, the Arizona Commercial Mining Co. brought two suits against the Iron Cap (1) alleging wrongful extraction of ore, and (2) for a share of pumping expense. This was brought in the State of Massachusetts, but in September, the Supreme Court of that State refused to hear the charges, on the plea of Iron Cap, and directed that they be heard by a court in Arizona. Arizona Commercial immediately brought suit again under Massachusetts laws to be tried by court and jury, and also brought suit in the courts of Maine asking an injunction against Iron Cap from disposing of any of its assets until a settlement was made.

Equipment: 2 double-drum hoists, 2,200 cu. ft. and 3,600 cu. ft. air compressors, and and 750 h. p. boiler plant, power-line to the Inspiration Cons. plant, 600-ton concentrator being built, crushing plant, etc.

Production: during 1918, shipped 57,291 tons of smelting ore to custom smelters, 27,399 tons concentrating ore to Old Dominion mill. Production was 9,441,000 lb. copper, and 153,585 oz. silver. In Aug., 1919, the output was 83 cars of ore, returning $65,479, of which $26,479 was profit. In September, ore was started to the Inspiration mill at the rate of 200 tons daily. In October, mine produced 660,600 lb. copper and 10,300 oz. silver, with net profit of $55,631.

Smelting ore contains from 1 to 6 oz. silver, 4 to 11% copper. Concentrating ore runs from 0.5 to 0.7 oz. silver, with about 3% copper.

The future of this property appears to be good.

LECORA COPPER CO. **ARIZONA**

Idle. **Office:** 500 Lonsdale Bldg., Duluth, Minn. **Mine office:** Globe, Gila county, Ariz. David Fairchild, treas. The Cordova Copper Co., the old company, was taken over by its creditors and renamed.

Property: 21 claims, aggregating 270 acres, north of the Old Dominion mine and west of the Arizona Commercial.

Development: by the 1,225′ three-compartment Gem shaft with extensive crosscuts on the 1,100′ and 1,200′ levels, cutting the Gem and Future veins which have shown a little ore occasionally, but nothing of commercial size.

Shipments made from a vein 5 to 8′ wide on the 1,200′ level, averaged 3.35% copper, 33% iron, 35% sulphur, with $1.30 in gold and silver.

Equipment: includes hoist and 12-drill air compressor. Management has struggled faithfully to make a mine, both east and west of Globe. No recent information received.

LOUIS d'OR GOLD MINING CO. **ARIZONA**

Reorganized 1916 as Louis d'Or Mng. & Mlg. Co., which see.

LOUIS d'OR MINING & MILLING CO. **ARIZONA**

Is a reorganization of the Louis d'Or Gold Mining Co., which company was practically a reconstruction of the Lost Gulch United Mines Co. Controlled by Baldwin Syndicate.

Address: P. O. Box 995, Miami, Ariz. **Office:** 732 Monadnock Block, Chicago, Ill.

Officers. L. W. Whitmer, pres.; G. M. Eggleston, v. p.; G. O. Swarts, sec.; G. P. Baldwin, treas.; with Theo. A. Steller, Chas. E. Hart (supt.), O. M. Gale and J. W. Bennett, directors.

Inc. Nov. 29, 1916, in Ariz. **Cap.**, $3,000,000; $1 par; 1,168,195 issued. Assets, May, 1917, $35,000. Annual meeting 2nd Monday in December.

Property: 17 claims, partly fractional, 292 acres, in 2 contiguous groups, about 2 miles north of the mouth of Lost Gulch, and 3 miles from a railway. Claims show monzonite-porphyry, diorite and granite, carrying 4 fissure veins, of which 3, of 4′ estimated average width, are more or less developed, the mines as a whole having about 8,500′ of workings, mostly on the Badger and Bonanza claims.

The **Badger** mine has a vein of 3 to 6′ width, developed by a 145′ shaft, somewhat wet, carrying ore said to average about $7 per ton in values, with occasional shoots of $17 to $30 per ton, and a 400′ tunnel showing a vein of 3 to 6′ width, averaging about $7 per ton. Equipment includes a 15 h. p. gasoline hoist, good for 400′ depth.

The **Bonanza** mine has a 1,050′ tunnel. The **Cedar Tree** mine carries mainly argentiferous and auriferous galena, with a little copper and zinc. The Tiger or main vein is entirely auriferous, is developed by a 350′ tunnel to 110′, and is said to carry values of from $3 to $90 per ton. All ores are sulphide.

Shipments: of surface ore averaged 6 oz. silver and 1 oz. gold, with lead and silver. Development by winze sunk from the tunnel on the vein.

Equipment: the mill, of wood, completed Feb., 1910, has 10 stamps, a 9x10″ Gates crusher, 2 Wilfley tables, 2 Frue vanners and a Pierce amalgamator; power equipment includes two 80 h. p. water-tube boilers and a 150 h. p. Corliss engine, 40 h. p. steam plant and compressor, installed 1915.

Company is churn drilling 300 acres of adjoining ground 1½ miles north of the Inspiration Consolidated at Miami, and has contracted to settle for each 20 acres as they are drilled and according to conditions underground; monthly payments, however, being made on property.

Examination of the Louis d'Or in 1916 by Chas. E. Hart, led to above purchase, his report stating that the west side of the property was in "copper porphyry" with good surface indications of copper sulphides occurring at 500′ to 600′ in depth.

Churn and diamond-drilling has been under way for two years, putting down three holes, 660, 1,177, and 885′ deep, respectively. These are at the southwest, the northeast, and northwest ends of the property. A fourth hole was being drilled July, 1919, in the center of the northeastern section. On June 29, it was down 170′, showing a commercial ore from a depth of 35 feet.

The property has been a failure as a gold mine, but possibly has a chance of making good as a "porphyry copper."

MIAMI CONSOLIDATED MINES CO. **ARIZONA**

Mail returned unclaimed, June, 1919, from Miami and Globe, Ariz.

Office: 110 Nassau St., New York, and 1050 Old South Bldg., Boston, Mass.

Officers: J. S. Cook, pres.; J. A. Pinyan, J. H. Thomson, Theo. Phillips, C. J. Davis, Irva Linley, J. B. Kendall, A. E. Gilmore and E. G. Schulze, directors; J. H. Dockweiler, cons. engr.

Inc. 1916 in Arizona. **Cap.**, $2,500,000; shares $1 par; 1,336,000 issued. Security Transfer & Registrar Co., New York, registrar.

Property: about 1,200 acres S. of and adjoining Inspiration Consolidated, Southwestern Miami, and Inspiration Needles properties at Miami, Ariz. Originally held by 19 different owners. In 1915, prospectors shipped 272 tons of 2.6 to 5% copper ore, in 1916, 100 tons of rich ore, and previously 500 tons of 3 to 6% ore, all coming from two well-defined areas; north-central and southern. Prospectus was modest enough to inspire confidence.

Development: churn-drilling under way in 1918. No. 1 hole in May, 1917, was down about 1,000′ and is said to have passed through sulphide ore at 420′; No. 2 found sulphides at 585′, this ore understood to be an extension of the Live Oak orebody of the Inspiration Co. No. 3 hole reported to have struck chalcocite ore.

Property warrants further drilling to determine extent of orebody.

MIAMI COPPER CO. **ARIZON**

Office: 61 Broadway, New York. **Mine office:** Miami, Gila county, Ari

Officers: Adolph Lewisohn, pres.; J. Parke Channing, v. p.; Sam . Lewisohn, treas.; with J. H. Susmann, Wm. H. Nichols, Walter T. Rosen, S. Rosenstamm, E. H. Westlake, F. W. Estabrook, B. Hochschild and The L. Herrmann, directors; Herman Cook, sec.; F. W. Maclennan, mgr.; F. V Solomon, mill supt.; R. B. Yerxa, asst mill supt.; W. F. Williams, chi clerk; Arthur Stonham, auditor.

Inc. Nov. 30, 1907, in Delaware. **Cap.**, $3,000,000; shares $5 par; i creased Nov., 1909, to $3,500,000, and again increased Aug., 1910, to $4,00 000; issued, $3,735,570. Of this last increase in capitalization, 60,000 shar were offered to stockholders at $18 per share. Of the issued stock, 300,0 shares were given, Nov., 1907, in payment for lands; 200,000 shares we issued April, 1908, at $5 per share; 100,000 shares were issued Aug., 1908. $10 per share; 60,000 shares were issued Aug., 1910, at $18 per share, ar of the balance, 88,236 shares were set aside for conversion of bonds, ar 52,886 shares remain unissued. Debentures, $1,500,000 first-mortgage 10-ye 6% gold bonds have been retired.

The company is controlled, through stock ownership, by the Gener Development Co. Mechanics & Metals National Bank, New York, and O Colony Trust Co., Boston, registrars; Bankers Trust Co., New York, ar American Trust Co., Boston, transfer agts. Shares are listed on the Ne York and Boston Stock Exchanges. Annual meeting, third Wednesday April.

Comparative General Balance Sheet:

Assets:

	Property & Equip.	Devel.	Metal on Hand	Other Current	Stock Invest.	Total
1918....	$25,207,559	$825,688	$2,897,773	$1,624,294	$5,103,920	$35,659,2
1917....	25,279,255	946,418	1,721,784	2,589,688	1,929,354	32,466,4
1916....	4,582,483	1,207,071	5,419,056	1,893,412	100,000	13,202,0
1915....	4,593,765	1,416,994	3,017,566	299,163	100,000	9,427,4
1914....	4,465,743	1,535,208	966,489	471,712	100,000	7,539,1

Liabilities:

	Capital Stock	Res. for Mine Depl.	Capital Surplus(a)	Acc'ts. Pay	P. & L. Acct.	Total
1918....	$3,735,570	$6,433,002	$18,672,204	$2,478,894	$4,338,564	$35,659,2
1917....	3,735,570	4,160,165	18,672,204	1,187,565	4,710,995	32,466,4
1916....	3,735,570	423,588	1,995,412	831,816	6,215,636	13,202,0
1915....	3,735,570	.....	1,995,412	521,161	3,175,345	9,427,4

(a) Premium on shares, less expense of issue.

Dividends: started in 1912, were paid regularly until Oct., 1914; resum in May, 1915, at rate of 50c, and increased 25c each quarter since: $1 per share in 1912; $2.00 in 1913; $1.50 in 1914; $2.25 in 1915; $5.75 in 191 $8.50 in 1917; $4.50 in 1918; $2.50 in 1919. Shareholders have received ov $16,000,000 in the last 4 years. On February 16, 1920, 50c is payable.

Property: 222 acres, mining claims, patented, 555 acres held for t mill and power plant and 345 acres for water rights, in the Miami district, miles west of Globe.

Geology: claims show an area of silicified schist at and near a conta with a great intrusive body of granite, known as Schultze granite. Tl altered schist belt averages about 1,200' in width and has a generally E.-V direction. The granite merges into granite porphyry at its borders, ar this and offshoots, or dikes of the granite in the schist, are mineraliz along the ore belt. This is seen in a dike with E.-W. strike, of 40 to 6 width, mineralized in the same manner as the schist.

The schistose area is netted with contraction fractures and later fissureing due to metasomatic changes of volume, accompanying mineralization and alteration. The ore belt is marked by silicification and intense alteration of the schist, a change that fades out into natural gray schist a few hundred yards north of the Miami and Inspiration mines. The ore zone is oxidized and leached to an average depth of 210′, this part containing small seams and veinlets of oxidized ore. Below this leached belt a few feet of mixed ore is succeeded by the zone of disseminated glance, a rather soft, much altered rock, specked with tiny glance grains and films.

Mining methods: the mine contains two separate orebodies known as the Main and Captain. In the former, topslicing produces 3,000 tons per day; in the latter, which consists of lower-grade ore, a system of shrinkage stoping with undercutting and caving of the pillars is used. The production by this method is also approximately 3,000 tons per day.

In the topslicing methods, haulage levels are laid out 150′ apart vertically, with drifts spaced 50′ apart horizontally, and along these drifts, raises to the slicing levels are spaced 50′ apart. One sub-level 50′ above the haulage level is installed for the purpose of distributing air from the fans through the raises to the various slices. The slices are mined in blocks 250′ square and 10′ high. Each block is a unit in itself, being served by its own supply raise and manway. The extreme horizontal dimensions of this orebody are 1,000′x750′.

The Captain orebody is about 350′ thick with extreme horizontal dimensions of approximately 500′ square. This is developed by a haulage level below the orebody, and hand tramming levels at suitable vertical intervals above the haulage level in the orebody. The hand tramming level consists of drifts 25′ apart, with drawing off chutes spaced along them at intervals of 6¼′ apart on the alternate sides of the drifts, thus tapping the orebody at intervals of 12½′ apart in all directions. The ore is soft, and caving is induced by putting up narrow shrinkage stopes at right angles to the drawing off drifts, and subsequently caving the pillars between them by undercutting. The ore is drawn off from the chutes uniformly and trammed in 20 cu. ft. cars and dumped through raises to the haulage level, where it is transported to the shaft in trains made up of 30 cars of 3.3 tons capacity, by 6-ton electric trolley locomotives.

Development: by extensive underground operations, supplemented by churn drilling. Up to the end of 1918 drill holes of 640′ average depth had been drilled to the number of 117. Drill-holes were put down at the corners of 200′ squares. Drill borings in the vicinity of the mine have shown commercial ore to at least 115′ additional depth below the 720′ level of the mine.

The mine is operated through a 4-compartment shaft, with a main hoist capable of hauling 10,000 tons of ore per day, and an auxiliary hoist for hauling timber and supplies. These hoists are operated from their own boiler plant using oil as fuel. California crude oil is used for fuel for which storage capacity for 1,000,000 gals. is provided.

A new shaft, No. 5, similar in size to No. 4, the present main working shaft, has recently been sunk to a depth of 930′ so as to safeguard the continuous operation of the mine and to facilitate the segregation of the ore into two classes; it will also provide a haulage level and ore pocket for the deepest ore at present known to exist on the property. This shaft has been concreted.

Development: work in 1918 amounted to 14,872′, as compared with 25,476′ in 1917, and 42,118′ in 1916. Total amount of underground workings at close of 1916 amounted to 290,678′.

Ore reserves: Jan. 1, 1919, figured at 12,570,000 tons of 2.38% sulphide ore and 36,000,000 tons of 1.06% sulphide ore. In addition there are 6,000,000 tons partly developed mixed sulphide and oxide ore of an approximate grade of 2% copper. These figures are reliable, because of the unusually thorough manner in which the ore has been developed and blocked

out and the well-known conservatism of the management. A very larg part of this ore is actually blocked out underground, and the estimate average percentage is based upon thousands of careful assays, made o samples taken at 5' intervals, throughout the workings. It is probable tha further development of the mine will develop more or less additional ore possibly above what is considered the present payable limits.

Ore situation: at the beginning of 1916, the manager reported 18,140,00 tons of 2.4% ore. During the last three years there has been mine 5.616,000 tons of ore assaying slightly over 2% in copper. In 1918, the ton nage amounted to 2,134,520; at the 1918 rate of output there is a 6 year supply of ore, exclusive of the low grade sulphide, and the mixed sulphid and oxide ore, which is not much of an asset unless the company ca make a high recovery, and at a smaller cost per ton, than now prevail Granted an 80% recovery on the 1% ore, or, 16 lb. copper and 20c woul give a gross value of $3.20 per ton, but in 1918 the cost of copper in concen trate on board cars at Miami was $2.417 per ton of ore. However, the com pany's technical staff may work out a method to treat this ore at a profit

Power generation: the power house contains four 600 h. p. water tub boilers, one 530 h. p. water tube boiler, and two additional boilers, eac of 610 h. p. capacity. The power house also contains two 4,000 cu. ft. steam driven air compressors and three 1,000 k. w 4-cylinder triple expansion steam driven electric generators, and two independent steam driven condensers The installation of two 4,000 k. w. steam turbo-generators, each with it individual condenser, has just been completed, so that the capacity of th power plant is 6,000 k. w. with one turbine and one reserve reciprocating engine.

The main shaft has 2 Nordberg hoists, the larger for raising ore hav in 2 drums of 10' diameter with 55" face, capable of handling 1,000' o 1⅜" rope. An auxiliary hoist has 16x16" cylinders with a drum of 8' diameter and 6' face for hoisting the man cage. The ore hoist raises tw 7½-ton skips which are dumped directly into the pockets of the crushe building.

The crusher building, at No. 4 shaft, of 6,000 tons daily capacity, has Chalmers-Williams crushers, breaking ore to 1¼" size, the product being fed through two 4x10' trommels to four 62x18" rolls that crush oversize to half-inch cubes. Ore then goes by belt conveyor, Miami type, heavy duty Traylor, to the mill bins.

In 1919, a new shaft-house, head frame, and 250 h. p. motor geared hoist was installed at No. 5 shaft.

The concentrator, originally designed by H. Kenyon Burch, with initial capacity of 2,000 tons daily, since increased by remodeling to 6,000 tons daily is on a hillside south of the ore deposit, permitting gravity handling, and with a large acreage nearby, available for tailings. The mill building is of steel and stands on concrete foundations and in interior construction steel and concrete are used almost exclusively.

Ore treatment: in the crusher building ore is reduced by gyratory crushers and rolls to pass a ¾" hole, and is then delivered by belt conveyors, equipped with automatic weighing device, to bins behind the mill, with a total capacity of about 10,000 tons.

The mill proper is divided into six sections described as follows: from the bins, ore is carried by belt conveyor to an 8'x36" Hardinge mill loaded with 4" balls. The product of this mill passes to a Dorr classifier, where the finished product made up to this point is separated. The oversize from this classifier is divided between two 8'x30" Hardinge mills loaded with 2" balls, each operating in closed circuit with a Dorr classifier, and in these, the reduction of the entire feed to finished size (minus 48-mesh) is completed. The ore-pulp is then subjected to treatment by flotation in pneumatic flotation cells, which are a modification of the original Callow design. These cells are fitted with air bottoms covered with a porous

medium through which is admitted air for aeration of the pulp. The total area of air bottoms in one section is 539 sq. ft. Air is supplied by a Root's blower with a capacity of 5,000 cu. ft. of air per minute at 6-lb. pressure, driven by a 150 h. p. motor. After flotation, the sand contained in the flotation tailing is subjected to treatment on Deister sand and slime tables. Concentrates pass through tunnels to the concentrate handling plant. The original plant consisted of round tanks with filter bottoms subjected to vacuum, but this is no longer used, and concentrates are now prepared for shipment by filtering. This plant consists of four Dorr thickeners 60′ diam. by 12′ depth, from which the thickened product passes to three 12′ Oliver filters. From these the concentrates are delivered by belt conveyor direct to railroad cars.

The above description represents the latest flow-sheet adopted for the plant. Concentrates produced in the mill assay about 42% copper, and are being shipped to the International smelter at Miami.

Experiments on the treatment of the oxidized ore are being carried out a 100-ton test plant: results have been encouraging, though not definite.

Water supply for the mill comes from the Old Dominion mine at Globe, and from two 16″ wells equipped with centrifugal pumps, at the lower end of the Miami wash. Here is the main pumping plant, equipped with two Nordberg pumps of a capacity of 1,250 gal. per minute each. Water is delivered to the mill through a 14″ pipe to two steel storage tanks with a capacity of 500,000 gal. each.

Buildings include machine shop, warehouses, steel change house, store, boarding house, bunkhouse and upwards of 150 frame dwellings for employes, all lighted by electricity. There is a substantial office building, erected at a cost of $15,000, a club house and recreation hall, and a hospital owned jointly with the Inspiration Consolidated Copper Co.

Early in 1917 a Y. M. C. A. building was erected in the town of Miami at a cost of $85,000. This is operated by the Industrial Branch of the Y. M. C. A., and membership is open to all residents of the district.

Mine is served by an extension of the Arizona Eastern railroad from Globe to Miami.

Production: begun March, 1911—

	Tons	Oper. Cost p. Ton			%	%	% Cu. in	Lb. Cu. Rec. per T. Ore	Net Prod. Lbs. Cu.(a)	Cost Cents per Lb.	Selling Price Cents
	Treated	Mine	Mill	Total	Cu.	Rec.	Cncts.				
1918....	2,182,941	$1.360	$0.722	$2.417	2.026	71.15	40.147	28.82	58,407,563	14.833	25.195
1917....	1,640,206	1.206	.691	2.284	2.032	69.25	43.040	28.15	45,868,699	12.51	29.150
1916....	1,542,017	1.119	.589	1,987	2.07	73.88	42.492	30.58	58,518,331	9.523	24.465
1915....	1,348,122	1,016	.579	1.878	2.17	75.17	41.91	32.66	41,882,059	8.765	17.331
1914....	1,896,633	1,188	.499	1.959	2.28	69.96	39.31	31.96	38,296,010	9.204	13.349
1913....	1,058,784	1.603	.572	2.465	2.30	71.06	38.09	32.68	32,867,606	10.609	15.240
1912....	1,040,744	1.203	.659	2.042	2.89	69.89	37.02	33.21	32,832,609	9.588	16.582
1911	445,036	1.213	.627	2.011	2.48	73.37	40.36	36.39	15,885,783	9.103	18.08

(a) Smelter returns.

The 1919 total was about 52,000,000 lb.

Production was lessened by the 1917 strike which started July 2; the property was closed down for seven weeks and after resuming work normal production was not reached until the end of the year. I. W. W. and Union recognition were the basic troubles.

In 1914 the Minerals Separation Co. brought suit against the company for infringement of patent, and in the final decision given in 1917 by the U. S. Circuit Court on appeal, Miami was declared to have infringed the M. S. patents. An accounting was in progress in 1919. It is said that the process now used is entirely different from that employed when the suit was started, yet in November, Minerals Separation had started further suit for alleged continued infringement.

The Miami is a property of demonstrated worth and the management is thoroughly experienced and capable. Company is particularly free in giving information concerning all operations.

MIAMI DEVELOPMENT CO. **ARIZONA**

Office: Miami, Ariz.

Incorporators: R. H. Granville, P. Kimburg, G. T. Coleman, C. F Kelly.

Inc. May, 1918. **Cap.,** $1,000,000, 50c par.

Holdings unknown, and letters returned unclaimed. 1919.

MIAMI MERGER CO. **ARIZONA**

R. C. Ellwood, pres., Miami, Ariz.

Inc. 1916, in Arizona. **Cap.,** $2,500,000; $1 par.

Property: 1,350 acres of land "controlled" by the company. So far a we know, no work of any consequence was ever done on this property promoters efforts being confined to selling worthless stock at high price to the innocent speculator or investor. The market was created throug the manipulations of Harry Lefkovitz, who also handled Miami Con Mines Co. and Inspiration Needles. Mr. Lefkovitz who has changed hi name to Lefko, was arrested in Los Angeles, Dec., 1918, by the Federa authorities, put on trial, in New York and convicted Dec., 1919.

This company has been a rank fraud from start to finish.

MIAMI MINING & MILLING CO. **ARIZONA**

Address: Box 764, Globe, Ariz.

Officers: P. R. McDowell, pres.-treas.; N. W. Tanner, sec.-mgr.

Inc. in Ariz. **Cap.,** $1,000,000; $1 par.

Property: 50 acres in the Globe district, Pinal Mountains, is said t show 8 veins, containing gold, silver and lead.

Development: by crosscut tunnel.

Equipment: 50 h. p. air-compressor installed in 1918. The 250-ton mi of the Arizona Butte was purchased from W. J. Porter, of Globe, July 1919.

A prospect, conservatively worked.

MIAMI MOTHER LODE MINING CO. **ARIZONA**

Address: Miami, Ariz.

Officers: W. Schafer, pres.; F. W. Solomon, v. p.; G. D. Barclay, sec treas., with A. Reid, E. Schafer, H. W. Faust and H. E. Gragge, director

Inc. in Arizona. **Cap.,** $5,000,000; shares 50c par.

Property: consolidated claims of Manitou and other companies, total ing 1,100 acres, in Miami district, Ariz.

Development: by 325' shaft said to have cut 18" vein on the 200' lev and disclosed several lenses of ore in other workings.

No recent returns, presumably idle.

MIAMI NEEDLES COPPER CO. **ARIZONA**

Idle and probably dead. **Last address:** Globe, Ariz.

Officers. D. R. Williamson, pres.; F. Beston, v. p.; F. W. Ham, sec treas., with Geo. J. Stoneman, directors.

Inc. 1912. **Cap.,** $500,000; $5 par.

Property: 11 claims on Needle mountain, about 5 miles west of Miam slightly developed.

Is apparently succeeded by Inspiration Needles Copper Co., which se

MOLINE & ARIZONA COPPER CO. **ARIZONA**

Formerly the Globe Mining Co.

Office: Moline, Ill. **Mine office:** Globe, Ariz.

Officers: B. F. Baker, pres.; F. J. Harper, v.-p.; P. J. McHugh, sec R. C. Schallberg, treas., with J. F. Heckman, F. B. Walker, G. A. Schal berg, directors.

Inc. 1918 in Arizona. **Cap.,** $2,000,000; $1 par; 860,000 outstanding.

Property: 21 claims, patented, 335 acres, 2½ miles north of Glob shows granite-porphyry, syenite, quartzite and diorite, carrying fissur veins in diorite of 2 to 100' width, with gossans giving assays of 2 to 6% copper, 4 to 30 oz. silver and $2 to $28 gold per ton. The Mineral Far

group includes the Vacey-Constance mine, worked 1886 for silver, and said to have produced upwards of $100,000 worth of ore under former ownership, this group having upwards of 20 old pits and shafts, of 10 to 165' depth. The Mineral Farm group shows altered sedimentary and igneous rocks, with iron dikes and a complex fissure system. The Mineral Farm vein, of about 4' width, gives assays of 4.8% copper and up to 132 oz. silver and $7.44 gold per ton, and the group also shows a 20' vein, said to sample 2% copper, 9% zinc, 2 oz. silver and $4.96 gold per ton, which seems excessive. Developed by 400' vertical shaft, short tunnels, etc. The Eagle Pass group has a 215' two-compartment shaft, between 2 iron outcrops.

Equipment: includes a 60 h. p. boiler 10"x14" hoist and air compressor. There are 6 mine buildings. Examined by F. Tovote, J. T. Bickel.

NEW DOMINION COPPER CO. **ARIZONA**

Office: 25 Broad St., New York City. **Mine office:** Globe, Ariz.

Officers: E. W. Mitchell, pres.; P. M. King, v. p.; A. G. Bisgood, sec.-treas., with R. E. Vandruff, directors.

Inc. in Arizona. **Cap.,** $2,000,000; $1 par; 1,110,000 outstanding.

Property: 21 patented claims and fractions about 1½ miles from the Arizona and Eastern Railroad terminal at Globe, adjoins the Old Dominion property on the north and the Iron Cap and Big Johnnie to the south and east.

Geology: similar to that of the Old Dominion ground, where the principal oxidized ore is cuprite. The ore occurs in lodes or veins, as masses in limestone, and as an irregular mineralization of shattered rocks. Some sulphide ore has been found along a fault-vein on the 450' level. The limestone area, according to the geologic map of the U. S. G. S., is much greater than that of the Superior and Boston, but slightly less than that of the Old Dominion. There are 9 veins showing on the surface. Although there is ore in paying quantities in the workings, no large orebody has been blocked-out, though surface ores show high silver value and copper up to 21%. The engineers report that big orebodies may be expected at 1,300' in depth. The former operator shipped several carloads in 1916, averaging 8.31% copper.

History: several shallow shafts were sunk and considerable silver ore shipped in the early seventies and eighties. In 1906, the property was developed to the 800' level by the Globe Consolidated, which was forced to shut-down by the panic of 1907, when the property reverted to the original owners. The New Dominion then bought the ground and has done considerable development.

Development: by 825' shaft, with various levels. This is to be deepened to 1,400', and crosscuts driven to explore the veins at that depth. Several thousand tons of commercial ore were mined from the two veins, cut on the 800' level, the product going to the Old Dominion smelter. Company has no pumping expense, as the Old Dominion mine is working on the 1,800' level, and drains the ground.

Equipment: includes a modern machine-shop, 400 h. p. steam plant, compressor, and all necessary machinery to do development planned for 1920. There are also several large houses for quartering the men.

NEW DOMINION MINES CO. **ARIZONA**

Idle and no record of recent operations available. Described in Vol. XIII.

NORTH DOMINION C. MNG. & DEV. CO. **ARIZONA**

Office: Hamil Bldg., Globe, Ariz. Mine at Radium Station, 3½ miles from Globe, Gila county., Ariz.

Officers: L. L. Lichtfield, pres.-act. treas.; A. Billard, v. p.-act. sec.; with Wm. Richards, W. H. Mercer and C. S. James, directors.

Inc. July 31, 1916, in Arizona. **Cap.,** $5,000,000; 2,750,000 issued.

Property: 42 claims, about 800 acres, mostly on the east side of Pin creek, 3 miles north of Globe. The area is outside of the Globe distri proper and is several miles from the producing mines of the Globe ar Miami districts. Company claimed that it had spent $20,000 on developme to Dec., 1917.

Geology: claims said to show diabase and diorite cut by a mothe lode and offshoots from it. This lode is reported to be 20 to 80′ wide ar to carry oxidized ores of copper with some vanadium as well as silv and gold values.

Development: consists of 12 prospect shafts from 20 to 115′ deep ar 6 crosscut tunnels, the total results of 12 years' work, according to co pany's prospectus.

A report by J. E. Hurd, states "there is not in the whole district property capable of producing a greater quantity of ore rich in the metal as the N. D. C. M. & S. Corp., which with careful management can be ma to furnish work for several thousand people and to pay yearly very lar dividends for a great number of years on the large and rich bodies of o known to exist."

Such statements are not only humorous, but in our opinion are gro exaggerations and not warranted by the limited development work do to date.

Two carloads of ore reported to have averaged 8½ % copper in 1917.

Mail returned from Globe in 1919. In Aug., 1919, 36 claims of proper were advertised for Sheriff's sale to cover a judgment of $2,405 obtain against company.

NORTHWEST INSPIRATION COPPER CO. ARIZON

Address: A. H. Hammond, mgr., Miami, Ariz.

Officers. L. J. Overlock, pres.; C. E. Lucas, v. p.; A. H. Hammon sec.-treas., with J. P. Glass, J. D. Houston and A. C. McKillop, directo

Inc. Jan. 31, 1916, in Arizona. **Cap.,** $1,500,000; shares $1 par; no assessable; 750,000 in escrow until 300,000 are sold.

Property: 23 claims, 483 acres, at Miami, Ariz., adjoining Inspirati Consolidated Copper Co. for about 4,500′ on the north, and less th half a claim from the Black Warrior mine on the west. Examined Carl Triechka and A. H. Hammond.

Claims reported to show a deposit of disseminated copper ore schist. At last accounts a shaft was being sunk 500′, to cut the Bla Warrior and Black Copper veins at depth. No recent information. P sumably idle.

OLD DOMINION CO. ARIZON

Office: 50 Congress St., Boston. **Mine and works office:** Globe, G county, Ariz.

Officers: Chas. S. Smtih, pres.; Walter Douglas, v. p.; with Clevela H. Dodge, A. C. James, E. H. Ferry, and J. Waldo Smith, directo Wm. M. Bradley, clerk; Chas. H. Altmiller, asst. clerk-treas.; John McNa comptroller; W. G. McBride, gen. mgr.; I. H. Barkdall, mine supt.; H. Colley, smelter supt.

Inc. Jan. 15, 1904, in Maine. **Cap.,** $8,750,000; $25 par; $7,426,775 issu and fully paid. Annual meeting last Wednesday in March. Stock listed Boston and New York Stock Exchanges.

Assets: 31st Dec., 1918, $20,298,550, including mines $13,019,253; pl and equipment, $3,966,961; supplies and prepaid expenses, $521,225; met on hand, $2,345,841; accounts receivable, $177,569; cash and securiti $262,702.

Liabilities: include capital stock $7,426,775; accounts payable and pa $2,677,768; reserves for depletion, $3,116,161; reserves for depre $2,990,044; surplus account, $4,087,801.

Comparative operating report shows:

	1918	1917
Sales copper, gold, silver	$5,731,082	$8,595,443
Miscellaneous earnings	.....	39,728
Total earnings	5,731,082	8,635,171
Cost copper, gold, silver, sold	4,441,178	6,084,371
Gen'l and admn. expenses	142,825	174,290
Operating profit	1,147,079	2,376,509
Depreciation	325,042	319,875
Depletion	304,195	263,852
State and Federal taxes	216,080	571,517
Net profits	301,762	1,221,265

Dividends: 50c in 1905 and 1906; $1 in 1907; 50c in 1908; $1.50 in 1909; 1910 and 1911; $14 in 1912; $5 in 1913; $4 in 1914; $5 in 1915; $12 in 1916; $8 in 1917; $4 in 1918; a total of $14,405,260. Quarterly dividend due in March, 1919, was indefinitely postponed on account of metal market conditions.

The company is carrying 5 months production of copper. Stockholders have always shared in its profits, the company maintaining a surplus sufficient only to provide comfortably for current requirements, so that the passing of the dividend at a time when copper was selling close to 15c per pound was a business like procedure on the part of the management.

The company was formerly a securities-holding corporation only, organized to promote the operations of the Old Dominion Copper Mining & Smelting Co. and United Globe Mines, but early in 1917 it acquired all the assets of the Old Dominion Copper M. & S. Co. of New Jersey, subject to its liabilities, paying $10,000,000 in cash, and also acquired all of the assets of the United Globe Mines, except one claim valued at $5,000, subject to its liabilities, at a valuation of $4,995.000. This company previously held about 96% of the capital stock of the N. J. company, and all of the capital stock of the U. G. Mines. By this purchase the Old Dominion C. M. & S. Co. and the U. G. mines were eliminated as separate operating organizations and the charter of the Old Dominion C. M. & S. Co. was surrendered. This merger eliminated duplication of office work and also double taxation on the same income.

Property: formerly owned by O. D. C. M. & S. Co., 38 mining claims and fractions, 5 millsite claims, and 4 placer mining claims, all patented; included in these is the Old Dominion mine at Globe; the Old Dominion and Keystone claims, 3½ miles north of Globe and the Continental mine at the head of Webster gulch, about 18 miles west of Globe; also the Chicago & New York group of 60 acres and the Geneva mine. The property formerly owned by United Globe Mines, consisted of 60 claims and 4 mill sites, lying west of the Old Dominion group, including the Grey Buckeye and Buffalo claims.

Geology: at the Old Dominion mine, the principal ore zone occurs along a big fault vein having a N.-E. strike with sharp easterly dip. The hanging wall is limestone and quartzite, with footwall of diabase of more recent age, faulting evidently occurring both before and after the intrusion of the diabase. The ore favors the hanging wall, but also occurs in lenses along the bedding planes of the limestone and in shattered quartzite, the largest lens yet developed being 60x100x200' in size. The oxidized ores are mainly cuprite, associated with a little malachite and chrysocolla, in a gangue of iron oxides and quartz.

Sulphide ores first appear at a depth of about 350', as chalcocite, with [illegible] of pyrite and quartz, the lower workings also showing chalcopyrite. [illegible] more or less argentiferous, and, as a rule, are highly silicious, [illegible] lime and iron fluxes in smelting.

Development: in 1918 totaled 22,163' compared with 24,321' in 1917. "A shaft was sunk but 5', but will be sunk to the 20th level as rapidly as possible. By August, 1919, it had been enlarged to 5 compartments between No. 18 and 19 levels, and its depth was 70' below No. 19. Little work of importance was done above the 14th level; on the 1½ level near B shaft some small bodies of smelting ore were opened up. On the lower levels the greater part of the work was confined to the 16th, 17th and 18th levels east and the 17th and 18th levels west; the winze on the west side was sunk from the 18th to 20th level and a little drifting and crosscutting done on the 19th and 20th levels. Considerable work was done on the 18th level west but what ore was discovered was very irregular and did not extend far above the 18th level. The developments on the east side of the mine particularly on the 17th and 18th levels may be considered highly satisfactory, a feature of this lower east side development is the maintenance of good copper content in the ore. The fact that Arizona Commercial a little farther east has developed rich ore on its lower levels promises well for further work on the O. D. east side. Development of the U. G. ground is mainly through the workings of the Old Dominion. The Kingdon and the Grey are the operating shafts. Production from this property is included in that of the Old Dominion Co.

The production of copper from direct smelting ores has decreased very seriously during the last two years, due to a large extent to the disappointing developments in the smelting ore zone between the 18th and 16th levels west. Not only has the tonnage of smelting ore developed in that period been small, but the copper content of the ore has been below the average of that mined on the west side of the mine during the past six years. Of this much reduced smelting ore production in 1918 the greater part came from the 15th, 16th and 18th levels west. A small amount of ore was mined on the 9th, 10th, 11th and 12th levels, a small tonnage came from the 14th level and practically nothing from the 14th level west. In August, 1919, a crosscut from the A shaft on No. 18 level had passed through 1 of 5% ore; this is considered to be an important development.

The east side produced most of the concentrating ore for the year. Only a small amount of ore was produced above the 12th level. The 14th level produced 20,000 tons. The 15th level was a small producer. The 16th level gave the largest ore production from any one level. The 17th level east produced a satisfactory tonnage of ore, practically all of which was of smelting grade, the vein here is wide and fairly regular. This level is counted upon as an important future producer. On the 18th level work was mainly development; this produced considerable ore.

No important changes have been made in mining methods and the heavy wet ground on the west side is still worked by square sets and filling while the more solid ground on the east side of the mine is stoped by cut and fill without timber.

The "A" shaft, or main working shaft, on the eastern side of Pinal creek, in the west section of the mine, is connected with the principal workings by underground trolley lines, including a line to handle the ore of the Gladiator mine, which has yielded a notable quantity of smelting ore, and large quantities of concentrating ore. "A" shaft has 5 compartments, equipped for skip hoisting, 2 with cages for lowering men and supplies and 1 for air and steamlines, water columns and electric cables. Ore and waste, hoisted to surface, is handled in skips.

Pump shaft was lined with concrete from 10th level to surface in 191

Equipment at "A" shaft includes a steel engine house, built 1910, having a 17"x31"x48" Nordberg compound hoist, good for 2,000' depth.

"B" shaft, on the eastern side of Pinal creek, bottomed on the 14th level, has 4 compartments. "C" shaft has a 100,000 cu. ft. fan for ventilation, and is bottomed on the 14th level. "D" shaft, 300' deep, is located on the western side of Pinal creek, about 2,000' west of the most westerly pr

vious workings. The "K" shaft, 1,400′ deep, also has a ventilating fan. The Transit shaft is about ⅛ mile east of "A." The Kingdon (1,200′) and Grey shafts, main working shafts of the United Globe Company, are connected with the 1,200′ level of the O. D. mine. The Grey shaft has a 75 h. p. electric hoist. Property has a number of smaller shafts and several tunnels, not in present use.

Pumping: the mine is very wet, the daily average amount of water pumped being 3,730,000 gal. in 1918. The company sells part of the water pumped to the Miami C. Co., but receipts from this source reimburse it only to a slight extent for the pumping expense.

The mine is equipped with pumps of about 20,000,000 gals. capacity daily, these including a 1,500-gal. pump on the 10th level, having a 12" water column, discharging 30′ above the collar of the shaft into a launder on a trestle leading to a storage tank, whence water is drawn for use of the mill and smelter. There are 4 Nordberg steam pumps on the 12th level, having a rated capacity of 8,000,000 gals. per day, with 4 Gould electric pumps, 2 on the 10th and 2 on the 14th levels. On the 18th level there are two 1,200 gals. per minute quintuplex electric pumps. New centrifugal pumps were added, 1916, driven by power generated by a Diesel engine. An electrical centrifugal pump was added in 1918.

Early in 1916 drilling in Pinal creek proved the existence of a badly broken and porous area under the creek near the mine workings. Management has been grouting this ground with slime from the mill, thus reducing flood-water entering the mine from this point. Up to 1918 a total of 2,015′ of holes was drilled in the creek bed, and 23,000 tons of slimes run into this area through the holes.

Mill and smelter: the mine, mill and smelter are connected by a private railway, equipped with a locomotive and 50-ton ore cars.

A new crusher plant and sampling mill were erected in 1913. Capacity is 150 tons per hour. In 1914 a 600-ton concentrator, using a 300-ton flotation plant to extract copper from the slime, was completed. The old 300-ton concentration mill, erected 1909, will be maintained as a reserve for test purposes.

The smelter does custom work, and was formerly an extensive purchaser of sulphide ores for fluxing the oxidized ores of the Old Dominion and United Globe mines, but these mines developed large quantities of sulphides in the lower workings. In June, 1919, custom ore being smelted was from the Arizona Commercial.

The smelter has 8 double storage bins, holding 1,000 tons of coke, limestone and ore. Mixing, weighing and charging are done automatically, requiring a force of only 4 men. There are 5 blast-furnaces, 3 being 44"x198" at the tuyeres, and the other 2 being 44"x231", set tandem, with settlers between, charged automatically from side-dumping cars. The furnaces have a nominal capacity of about 2,400 tons daily, but on furnace is held on reserve. Fuel is New Mexico coke. The smelter is served by an electric locomotive and three 3,000-lb. tilting cars for charging, with a steam locomotive and dump-cars for slags.

In the converter department acid converting was abandoned in January, 1913, and one stand of the basic converter type has handled all of the production since that time. The basic converter has been particularly successful at the Old Dominion plant. A shell removed in 1915 from the stand had been there for 30 months without patching and had during that time produced over 70,000,000 lbs. of copper. Shells are handled by a 40-ton electric traveling crane. The converters take 50% matte, and turn out blister copper of 99.5% copper with small silver values.

The power plant at the smelter includes a 2,300 k. w. generator and two 750 k. w. generators, direct-connected to horizontal low-pressure steam turbines, utilizing exhaust steam. All machinery, except hoists and compressors, is actuated electrically. There is a 30-drill compound air com-

pressor, with intercooler and water-jacketed air cylinders, and a complet electric light plant; a 5,000 cu. ft. air compressor has also been installed Furnace blast is supplied by Connersville blowers of 45,000 cu. ft. per minut aggregate capacity and an 18,000 cu. ft. air compressor furnishes converte blast. Fuel oil is used for the boilers.

Production: smelter production is larger than mine production becaus the smelter treats a considerable amount of custom ore.

	Tons Extr.	% Cu.	Tons Conc.	% Cu.	Tons Charge Smelt.	Costs per Ton Mng.	Conc.	Sm.	Lb. Fine Cu. Prod.	Cost p. Lb. Cts.	Rec'd p. L Cts.
1919.....	267,450	....	.....	....	366,450	....	.....	.....	28,500,000	.....	....
1918.....	230,451	4.52	226,998	3.90	165,026	*	.....	.....	33,878,158	*	25.0
1917.....	199,888	4.97	199,575	3.78	198,548	$8.08	$1.254	$3.134	32,365,795	.....	25.8
1916.....	152,059	5.88	254,213	3.89	271,367	6.48	1.14	2.79	40,776,611	11.69	26.8
1915.....	115,459	6.56	178,046	4.34	106,549	5.51	1.21	2.75	27,736,148	8.90	18.0
1914.....	129,813	7.44	151,893	4.67	207,595	5.20	0.96	2.67	30,210,361	8.22	13.7
1913.....	169,961	5.88	150,203	3.70	300,926	4.78	0.88	2.63	30,572,863	9.70	15.2
1912.....	201,181	4.67	166,870	3.77	306,086	4.55	0.75	2.30	27,853,243	10.34	16.4
1911.....	174,246	5.84	140,230	3.99	231,003	4.18	1.01	2.57	26,482,019	9.15	12.3

* Costs not published.

Production in 1918 included 5,071 oz. gold and 184,981 oz. silver, and 5,000 oz. and 127,000 oz. respectively, in 1919.

Monthly production compares as follows (in lbs.).

	1919	1918	1917	1916	1915
January	2,812,000	3,400,000	3,000,000	3,121,000	1,745,000
February	2,360,000	2,841,000	2,695,000	2,823,000	2,074,000
March	2,574,000	2,872,000	3,335,000	3,277,000	603,000
April	2,389,000	2,814,000	3,516,000	3,290,000	1,338,000
May	2,564,000	3,239,000	4,430,000	3,405,000	2,868,000
June	2,015,500	3,368,000	3,965,000	3,843,000	2,744,000
July	1,629,000	2,533,000	.....	3,852,000	3,199,000
August	1,937,000	2,064,500	888,000	3,600,000	2,843,000
September	2,460,000	2,292,000	2,270,000	3,011,000	2,538,000
October	2,365,000	2,373,000	1,623,000	3,200,000	2,970,000
November	2,261,400	2,101,000	2,844,000	3,650,000	2,443,000
December	2,534,000	2,686,000	3,368,000	3,270,000	2,495,000

Mine was closed down from July to September, 1917, owing to labor strikes.

Ore reserves in the Old Dominion property are usually sufficient for at least 2 years' production at the normal rate. It is not advisable to have reserves for a longer period than this as it is too expensive to keep the ground open. Ore has been found continuously and consecutively on all levels down to the 18th, 1,400' level, and company has found no difficulty in opening ore as required. Indications are that production will increase in the future rather than decrease. Management is exceptionally capable and efficient.

OLD DOMINION EXTENSION COPPER CO. ARIZONA

Office: Globe, Ariz. Walter Harris, Maud Meeth, and E. S. Davis, incorporators.

Inc. April, 1917, in Arizona. **Cap.**, $1,000,000; $5 par. Company formed to acquire mines, ore, and do a general mining business. No recent information on hand.

OLD DOMINION EXTENSION MNG. DEV. CO. ARIZONA

Mail returned from former office, at Globe, and also from Miami, Ariz.

Officers: J. F. Chisholm, pres.; R. G. Thomas, v. p.; L. M. Greenstein, sec.-treas.; all of Miami, Ariz., with W. P. Geary, F. Gill and A. R. Malone, directors.

Inc. 1916 in Ariz. **Cap.**, $5,000,000; shares $5 par; 474,000 in treasury. 226,000 shares given for property were reported in escrow for an unstated length of time.

Property: 600 acres, adjoining and dovetailed into Old Dominion C. Co. ground, at Globe, Gila county. Diamond drilling was started, July, 1917, to cut the Sea-Bird vein at about 800′ in depth.

Development: by tunnels and several shafts, one 125′ deep, sunk in quartzite and entering limestone. A 200′ drift along the quartzite limestone displacement was reported to show several pockets of ore and an average sample of the black oxide of manganese found showed 13 oz. silver.

Is a prospect. Presumably idle.

OLD DOMINION COPPER & SMELTING CO. **ARIZONA**

Fully described in Vol. XIII. See Old Dominion Co.

PORPHYRY CONSOLIDATED COPPER CO. **ARIZONA**

Formerly Barney Copper Co. **Address:** Box 1419, Globe, Ariz.

Officers: J. D. Coplen, pres.; J. B. Coplen v. p.-gen. mgr.; K. W. Holbert sec.-asst. treas.; E. T. Wilder treas.-asst. sec., with Thomas Wight, directors.

Inc. 1919 in Arizona. **Cap.,** $5,000,000; $1 par; offered at 40c per share, October, 1919. On June 2, 1919, Barney shareholders decided to re-organize under the new name. Each share issued by the Barney was exchanged for 3½ shares in the Porphyry Consolidated, and each share of Porphyry Copper was exchanged for 1⅝ shares of Porphyry Consolidated.

Property: 35 claims, 454 acres in the Barney and 113 acres in the Porphyry, 3½ miles N. W. of Miami, Gila county, main shaft being 400′ from Inspiration Consolidated ground.

Development: Barney in Jan., 1912, an option on property was given to the General Development Co. for $600,000. This company put down 2 holes, one at the bottom of the 400′ shaft passed out of schist and into diacite and at 1,030′ into granite porphyry. This drill-hole encountered an artesian flow at 960′, which is a valuable asset of the company. The General Dev. Co. soon after relinquished its option. Drill-hole No. 2 was discontinued at 600′ without disclosing ore. The Barney Co. claims to have put down two holes, one of which passed through 20′ of ore, about 1.2% copper, before being lost. Second hole was also lost at depth of 640′ before striking ore.

Prophyry—a 775′ shaft is said to have passed through 60′ of carbonate and 85′ of chalcocite. Workings total 2,000′. A winze sunk 225′ below the 650′ level by Sept., 1919, said to have been in ore all the way. The Van Dyke shaft was then 300′ deep.

Equipment: pipe-line, telephone-line, and dwellings; 50 h. p. engine, hoist and compressor, etc.

Disseminated ore has been found, but its extent and average value is still to be determined. Is a promising, though embryonic "porphyry" copper.

PORPHYRY COPPER CO. **ARIZONA**

Absorbed by Porphyry Consolidated Copper Co., which see.

RADIUM MINES CO. **ARIZONA**

Address: W. H. Mercer, mgr., Globe, Ariz.

Property: 60 claims, 4 miles north of the Old Dominion mine, Globe, said to show vanadium ore in a vein or mineralized fault zone in diabase. The ore shows galena associated with iron oxide and manganese; vanadanite occurs as crystalline incrustations around other minerals, but has not yet been found in commercial quantities.

No recent information.

SOUTHWESTERN MIAMI DEVELOPMENT CO. **ARIZONA**

Office: 85 Devonshire St., Boston, Mass **Mine office:** Globe, Ariz.

Officers: Geo. F. Ruez, pres.; L. A. Thulin, sec.; W. S. Rooney, treas., with R. H. Gross, T. S. Dee, D. T. Kennedy, J. H. Blodgett and A. H. Moir, directors; F. W. Hoar, gen. mgr.

Inc. June 24, 1911, in Arizona. **Cap.,** $500,000, increased Feb., 1912, from $250,000; $5 par; issued 15,000 fully paid shares and 85,000 assessable shares;

$3.25 paid in. Assessment of $1 was called, payable July 9, 1919; previ assessment was 25c, payable Jan. 12, 1914. The first annual report, dated D 31, 1912, gave receipts since organization as $276,084 and disbursements as $197, of which $65,944 was payments on options, leaving a balance of $78,922. Sha are listed on the Boston Curb. Boston Safe Deposit & Trust Co., registrar.

Property: 17 claims, 4 patented, adjoining the Inspiration Consolida holdings, in the Miami district, 8 miles west of Globe, shows silicified sch mineralized at and near the contact with granite-porphyry, the orebody be an extension of the porphyry deposit opened in the Inspiration and Miami pr erties. Ore occurs as chalcocite disseminated in schist.

Development: by churn drilling, along the same lines followed by big neighbors, Miami and Inspiration. Eighteen holes have been drilled, av aging about 1,200′ deep and the total footage amounting to about 20,000. (developed is estimated at 3,000,000 tons of 1.25% copper. The company been inactive for two years, being tied up in litigation to oust trespassers. April, 1919, the company was given authority by the court to clear its prope of all trespassers.

In addition to its mining property it acquired leases in 1919 on 800 ac oil lands in Northern Texas. It was to drill this land that the assessment w called; this will furnish $92,000; in addition there is $30,000 in the treasu By October, drilling was soon to be started.

SUPERIOR & BOSTON COPPER CO. ARIZON

Offices. 50 Congress St., Boston, Mass.; and Globe, Gila county, A

Officers: T. R. Drummond, pres.; John F. Barry, sec.-treas.; with J. Hardon, W. F. Fitzgerald and Garret Mott, directors. E. G. Deane, mgr.: C. Botsford, geologist.

Inc. Nov. 23, 1906, in Arizona. **Cap.,** $6,500,000; was originally $1,50 000, increased Sept. 5, 1908, to $2,000,000; April 22, 1909, to $2,500,000; J 25, 1911, to $3,000,000; Sept. 30, 1911, to present amount; shares $10 par; $3 paid in; issued 297,827. Company has levied 9 assessments, last one of $1 Au 1919. Listed on Boston Stock Exchange. State Street Trust Co., Bost registrar; Boston Safe Deposit & Trust Co., transfer agent. Annual meeti first Monday in December.

Comparative Financial Statement: fiscal year ending Sept. 30—

	Ore Sales	Calls & Sundries	Balance Oct. 1 Prev.	Total	Total Expend.	Balar Oct
1918.....	$246,158	$106,332	$141,577	$494,078	364,703	$129.3
1917.....	340,198	42,344	176,107	559,649	418,071	141.5
1916.....	40,501(a)	243,030	29,529	313,060	136,953	176.1
1915.....	54,530(b)	19,108	59,285	132,923	103,394	29.5
1914.....	291,515	1,720	75,268	368,503	309,218	59.2
1913.....	153,436	268,503	81,382	503,321	428,052	75.2

(a) Lessees produced $167,212 additional. (b) Lessees produced $42.1 additional.

Property: 51 claims, 785 acres, 28 claims, 388 acres, patented. T Globe & Arizona tract of 22 claims was bought for $320,000, an adjoining gro of 21 claims was bought for $46,000, and the Collins-Doyle group of 5 claims w bought for $150,416.35, giving a total cost of $516,416.35 for lands. The Colli Doyle group, added, 1909, adjoins the former holdings on the north, carry the extension of the Old Dominion fault, and being well located with respect the Great Eastern vein. The property is a compact tract next east of t Arizona Commercial, and east of the Old Dominion. Lands are about 4,0 above sea level, and about 800′ above Pinal creek, at Globe. The property carr both limestone and iron ore for fluxes. It is reached by the Arizona Commer and Arizona Eastern railways, both connecting with the main line at Globe.

In 1917 the Telfair group of 12 claims, 200 acres, adjoining the Superi Boston, was acquired for $7,000 cash and 14,000 shares. The ground is va as it is considered to have the extension of the Old Dominion vein.

Geology: the property shows diabase cutting through about 600′ of quartzite with interbedded shale and Globe limestone. Copper ore occurs in veins filling fault fissures. There are 2 dominant fault-belts, one series including from north to south, the Old Dominion, Great Eastern or Black Hawk, Limestone, Quo Vadis, Black Oxide and Iron King fault veins, intersected at nearly right angles, by other faults of later age, apparently but slightly mineralized. Three of the veins—Great Eastern, Limestone and Black Oxide have all produced considerable ore in the past. The upper portion of the Old Dominion vein has been faulted 200′ to 700′ to the N. and wherever opened, is barren of copper. The supposition is it has never been mineralized. Later development may show the Quo Vadis to be the faulted continuation of the Great Eastern; there is a possibility that both are merely the eastern extension of the Old Dominion vein. The average strike of the faults is N. 70° E., with average dip of 60° N.

Development: by 4 shafts, the McGaw, Great Eastern, Limestone and Gardner, and 1 tunnel. Underground workings total about 35,000′. New work during year ending Sept. 30, 1918, amounted to 1,904′. The Great Eastern 444′ vertical shaft being poorly located, was replaced by the McGaw shaft, to the north.

The McGaw shaft is 1,400′ deep, with 3 compartments. The 10th level opened at 970′ corresponds with the 10th level of the Arizona Commercial mine, next west. This shaft lies 900′ north of the old shaft and is sunk between the Old Dominion fault on the north and the Great Eastern vein on the south, and is planned to intersect the Great Eastern vein at depth. This is the main working shaft of the mine and does the ore hoisting for the entire property.

One of the main hindrances to mining in the past has been water, also the largest item of expense.

The Great Eastern vein on the 6th level in the McGaw shaft, showed an ore shoot 25′ to 30′ wide, proven for a distance of over 800′. The 8th level exposed this vein for over 400′ and also showed the zone of oxidation to continue to this depth. The 10th level discloses the first sulphide ore encountered in the McGaw workings of the mine, but the 12th level shows little or no copper in this vein, as far as developed. The vein matter is heavily stained with iron, highly siliceous and, when commercial, carries about 7% copper.

The Old Dominion vein is tapped by crosscuts from the McGaw shaft, on the 4th, 6th and 10th levels, where it shows only oxidized material, quite thoroughly leached, carrying slight silver values, but with promise of copper ore at greater depth.

The 318′ Limestone shaft showed a 4′ footwall paystreak of commercial ore on the 300′ level; has not been operated for several years.

The Gardner 3-compartment vertical shaft at the southern end of the property, on the Black Oxide vein, is 435′ deep; mine is now idle. The Black Oxide vein apparently is a continuation of the Buckeye fault, on which the Old Dominion has opened mines on the Buckeye, Carrie and True Blue claims.

The 1,054′ Black Oxide tunnel has its portal about 1,000′ S. W. of the Limestone shaft, and cut the Black Oxide vein at 670′, giving a 400′ back drifts in this level showing a vein carrying micaceous hematite, with small quantities of copper, and a little shoot of smelting ore. Indications are favorable to the existence of good bodies of high-grade sulphide ore at greater depth. The Black Oxide is 280′ east of the True Blue mine of the Old Dominion, from which lessees shipped small quantities of high-grade ore for several years.

The Iron King vein, parallel with the other 4 faults of the property, shows good gossan, and has an old 70′ shaft, in leached vein material similar to that in the other faults, at similar depth.

In 1918, exploration work was mainly in eastern part of mine on the 800′ and 1,000′ levels. Above the 800′ level a body of oxide ore was found, in places wide and assaying about 6% copper.

Equipment: includes hoists at each shaft, aggregating 1,260-h. p. The power plant at the McGaw shaft, has four 250 h. p. water tube boilers, a 5-ton

hoist good for 1,600', and a 1,200 cu. ft. cross-compound air compressor, with auxiliary compressor at another shaft. The mine has three 1,000-gal. pum

The company owns numerous buildings, including well-equipped mach shop, smithy, carpenter shop, office, change house, and warehouse, with a nu ber of dwellings for employees. Buildings are lighted by electricity. Fuel mainly petroleum, with 5,000-gal. and 12,000-gal. storage tanks.

Production: was begun Feb., 1908, and to end of 1910 amounted 27,126 tons ore, yielding 3,846,402 lb. copper and 94,698 oz. silver, all fr the Great Eastern vein above the 6th level with the exception of about tons extracted by lessees from the Black Oxide workings. Known ore reser being exhausted, production was suspended Aug., 1910, to March, 1913, wh shipments were again resumed, curtailed in 1914 and resumed March 15, 1915.

Output in the year ended Sept. 30, 1918, was 22,751 tons of ore assaying 3.8 copper and 4 oz. silver per ton, compared with 17,146 tons (assay not give the previous year. Copper production totalled 1,676,446 lb. Cost of copper s and delivered was 22.81c per lb., with average price received of 22.42c.

As a result of recent geologic examination by C. W. Botsford it appe that no effort had, up to 1919, been made to find the Old Dominion vein, chief producer of the district, so it has been determined to locate the extens of the lower part of this vein, which lies somewhere under the Great East vein, upon which all previous work had been done. This exploratory work w be done by diamond drilling from the 12th level. On the 8th level a cross is being driven south to cut the various veins and the 10th and 12th levels w be continued eastward. Good ore was opened in the 400' footwall vein in O 1919.

The company has made courageous efforts to make a mine and it is hop that the new development work undertaken will open up the reserves of sulphi ore which have been sought for so long, for it is upon finding these that fi success depends. Extensive development was very encouraging and contin throughout 1919. Costs have been lowered, and collection of long overdue asse ments has helped out company's finances.

SUPERIOR & GLOBE COPPER CO. ARIZON

Idle for several years. **Office:** 3 Calumet State Bank, Calumet, Mi

Officers: John Daniell, pres.; Fred Smith, v.-p.; Chas. Chynoweth, se Joseph W. Selden, treas., and Hon. Norman W. Haire, directors.

Inc. Dec., 1908, in Arizona. **Cap.,** $3,000,000; shares $10 par; issu $2,450,000, in 15,000 shares of full paid stock and 230,000 shares of stock $1 pa Property is fully paid for; lands were bought for $75,000 cash and 15,000 sha of full paid stock. Listed on Boston Curb. First National Bank, Calumet, reg trar. Annual meeting, third Monday in November.

Property: 13 claims, 250 acres, include the Magnet group of 12 clai adjoining the Mineral Farm group of the Globe Mining Co., and 1 fractio claim, of several acres. The property, 2 miles N. E. of Globe, is in the easte portion of the Globe district, lying N. of the Arizona & Michigan and N. E. and adjoining the Globe Mining Co. and the Yuma mine of the Old Dominio latter carrying the Yuma-Big Johnnie-O'Dougherty fault. The outcrop of t Yuma fault, on the Superior & Globe lands, shows an iron gossan carryi copper stains for about 3,000'.

Development: by several old shafts of 50 to 60' depth, said to have be sunk for gold ore. Present owner has sunk 680' vertical shaft in the hangi of the Yuma fault, on Copper Trust No. 2 claim, about ¼ mile from t Superior and Boston mine. The shaft cuts a 5' vein carrying iron with copp stains and has about 1,100' of workings on the 650' level, the N. crosscut 5 long showing 2 veins. The Yuma vein, cut at 235' from the shaft, has 320' drifting, with an 85' winze and a 17' crosscut to the vein from the bottom of t winze. The vein shows merely iron and manganese, with copper stains a small silver contents. In the N. crosscut, 487' from the shaft, a second vein w cut showing a width of 20' and a 38' drift thereon showed material similar that in the other vein, neither carrying commercial values. The S. crosscut the 650' level was driven 233' in hard diabase, developing nothing of value.

Diamond drilling was begun in June, 1910, a 350′ horizontal and a 957′ vertical hole being bored from the bottom of the shaft. This work was continued until early 1912, but developed nothing of importance.

Equipment: includes a 100 h. p. gasoline plant having a 60 h. p. hoist good for 1,000′ and a 3-drill gasoline air compressor. There are 5 buildings, including carpenter shop, engine house, office and dwelling.

UNITED GLOBE MINES **ARIZONA**

See Old Dominion Co.

VAN DYKE COPPER CO. **ARIZONA**

Address: E. R. Rice, mgr., Miami, Ariz.

Officers: C. W. Van Dyke, pres.; with H. A. Smith, mgr.; W. E. Loomis, Wm. E. Brooks, L. D. Van Dyke and C. B. Loomis, all of Miami, directors.

Inc. Aug., 1916, in Arizona. **Cap.,** $5,000,000; 50c. par.

Property: 1687 acres, 417 patented, adjoins Miami and Inspiration on S. E.

Development: drilling was started in fall of 1916 and owing to war conditions, was discontinued early in 1918. 2,500′ of drilling said to have disclosed 40′ of ore averaging 7% copper. In May, 1919, a 2-compartment shaft was started to develop this ore. On Sept. 1, shaft was down 310′. It will be sunk to 1,300′ before lateral work is started.

Equipment: includes 3-churn-drilling outfits, 25 h. p. hoist, and 10 by 10 air-compressor.

GRAHAM COUNTY.

ARIZONA SYNDICATE MINING & DEVELOPMENT CO. **ARIZONA**

Address: T. D. Derry, sec., Ray, Ariz.

Officers: E. Hunt, pres.; Ernest van de Vord, v. p.; L. E. Troxel, treas.; Thos. D. Derry, sec.

Inc. Jan., 1918, in Arizona. **Cap.,** $500,000; $1 par.

Reported to have a silver property near Geronimo, Graham county, and a manganese property in Coconino county, both being only prospects.

ATLAS COPPER CO. **ARIZONA**

Address: Safford, Graham county, Ariz.

Inc. 1917 in Arizona. **Cap.,** $1,000,000; $1 par. Is a reorganization of the San Juan Copper Co.

Property: the San Juan mines, 13 claims, 260 acres, in the Lone Star district, Graham county, 8 miles N. of Safford. Ore occurs in granitic porphyry traversing diorite and is said to average 3.6% copper, with gold and silver values. Developed by 330′ main shaft, 750′ of drifting, and 2,500′ of diamond drilling, and equipped with hoist, compressor, churn-drills, and pump.

Shipments in 1916 to Douglas and El Paso smelters said to have netted the company $50,000. No output during 1917 and 1918.

Property closed mid-1919, and company in bankruptcy.

COPPER REEF CONSOLIDATED MINES **ARIZONA**

Office: Wm. A. Griffith, sec., 1409 Park Bldg., Pittsburgh, Pa.

Inc. Feb. 19, 1910, in Arizona. **Cap.,** $5,000,000; $5 par; issued 632,000 shares. Union Trust Co., Pittsburgh, transfer agent. Annual meeting, first Monday in February.

Property: 125 claims, 2,800 acres, including 600-acre mill site, in the Stanley Butte district, Graham county, 12 miles S. W. of San Carlos, on the Arizona & Eastern Railroad from Bowie to Miami.

Claims are on the western slope of a high mountain ridge whose eastern face shows granite overlaid by 600′ of quartzite by limestone, while the western slope is plated with massively bedded gray limestone. On the claims the carboniferous rocks are cut by numerous fractures carrying small replacement bodies of silicious copper ore. The rocks dip down the slope at 35°, and most of the orebodies are either in gash veins or occur along fractures, conformable to the bedding. In the many older pits and shallow shafts, the narrow gash veins were not over 2′ wide and the ore pinched out at 20 to 30′ in depth.

Development: said to aggregate 1 mile, is mainly by main 1,600′ tunne but includes the 800′ North Star and 125′ Jessie shafts. The manager estimate in 1914, 80,000 tons developed by 3,600′ of work, which is a liberal estimate. Ore average about 5.4% copper and 68% silica, the copper being partly in the forn of chalcopyrite and bornite, mixed with chrysocolla, malachite and azurite, et Management claimed average value of 8.65% copper with varying gold an silver up to $12 per ton.

Equipment: includes two 40 h. p. gasoline hoists, 4-drill air compresso and all necessary mine buildings.

Production: early in 1919, one shipment of 17 tons netted $1,050, an another of 30 tons netted $1,575. Ore awaiting shipment was valued at over $4,00

Operations suspended end of 1915. Secretary wrote, March, 1916, that com pany is quite satisfied with its property and the existing conditions, and re quested no publicity in the Handbook. Investors take notice.

Early in 1919, Kirby Thomas examined the property, reporting that th company had entered an orebody which will yield more than enough net cas to return every dollar of the $300,000 already invested by the company. Ther are also three other orebodies close by of the same general character and exten In July, 1919, it was proposed to raise $30,000 for additional development, an bring mine to the producing stage.

GERONIMO MINING CO. **ARIZONA**

Address: Miami, Ariz.

Inc. in Arizona, 1916. **Cap.,** $3,000,000; $1 par.

Incorporators: N. C. Bandy, D. J. Shea and A. M. Cobb, of Miami J. W. Sterling, cons. engr.; R. F. Fitzgerrells, gen. mgr.

Property: at Geronimo, Graham county. Churn-drilling for coppe ore was started in 1916, one hole cutting 4½% ore at 85′.

This is one of the many companies launched during the boom in 1916. Presumably idle.

GOLD BUTTES MINING & MILLING CO. **ARIZONA**

Jos. and Daniel Fraser, incorporators, Duncan, Ariz.

Inc. Dec., 1915, in Arizona, to operate the New Strike gold property near Twin Peaks. Ore contains gold and is developed for 800′.

Believed to be idle.

GRAND REEF MINE **ARIZONA**

Address: R. V. Dey, owner, 28 W. 88th St., New York.

Property: 14 claims patented, in the Aravaipa district, Graham county

Ore occurs in fissure veins between granite and porphyry, said to aver age 3½% copper, 24% lead, 12 oz. silver and $2.30 gold per ton. Developed b 7,500′ of workings in which superintendent estimates 175,000 tons of ore blocke out.

Equipment: includes steam hoist and 7-drill air compressor.

Property worked under lease by Laurel Canyon Mng. Co. in 1915-16 an shipped 1 to 2 cars of concentrates per week to El Paso smelter.

No recent returns.

HOME COPPER CO. **ARIZONA**

Address: Morenci, Graham county, Ariz.

Officers: H. J. Degener, pres.; W. A. Leonard, v. p.; W. P. Gee, sec. treas.

Inc. April, 1901.

Property: 35 claims, 700 acres, in 2 groups, also a mill-site on Eagl river. Promoters were unable to inspire confidence and could not raise enoug money to prospect the property sufficiently to prove if it has merit. Not "wild cat," but a mistake. See Vol. XI, Copper Handbook.

INSPIRATION CENTRAL MINING CO. **ARIZONA**

Address: J. A. Karlson, Safford, Ariz.; and R. H. Dymond, Geronimo Arizona.

Officers and directors: W. E. Tester, pres.; J. A. Karlson, v. p.; C. B Yett, sec.-treas.

Inc. Sept. 28, 1916, in Arizona. **Cap.**, $1,000,000; 50c par; 800,000 issued. Annual meeting second Monday in February.

Property: 43 unpatented claims about 14 miles west of Geronimo, in the Turnbull and Santa Terressa Mountains, Black Rock district, Graham county.

Geology: vein occurs at contact of schist, porphyry, and limestone, dipping 85° S. Ore in streaks, is from 2 to 10' wide, and contains copper carbonates and sulphides. Average assay is 10% copper, with silver and gold.

Development: by 250' and 150' tunnels. Workings total 500' to depth of 400'. On Turnbull property a 20" vein of high-grade copper-silver ore was reported in 1919. Reserves recently estimated as 7,000 tons, are now given as 10,000 tons, in a body blocked out by 500' of workings. In June, 1919, of 2 lots of ore sent to smelter, one assayed 27% copper and 17 oz. silver, the other 7% copper and 4.3 oz. silver.

Expenses in 1916 amounted to $10,000 and $15,000 in 1918. Ore is hauled to Geronimo on the Arizona Eastern line, thence to smelters at Globe or Miami.

A prospect whose possibilities are being exaggerated.

LONE STAR CONSOLIDATED COPPER CO. **ARIZONA**

Officers: Hon. Wm. H. Powers, pres., 209 Washington St., Boston, Mass.; Henry H. Folsom, sec.; A. G. Smith, treas. Chas. B. Spaulding, supt., at last accounts.

Inc. Aug. 6, 1906, in Maine. **Cap.**, $5,000,000; shares $10 par, practically as successor of Maravilla Copper Co.

Company controls the Mineral Mountain Copper Co., through ownership of a two-thirds share interest, and controls, through majority stock ownership, the Chase Creek Copper Co.

Property: 32 claims, includes the Little Clara mine, developed by tunnel and shaft, and the Lone Star mine, in the Gila Mountains, 10 miles N. of Solomonville, having a 900' shaft, said to show a 5' vein of sulphide ore carrying 8 to 10% copper, with fair silver values and a little gold. The shaft also shows stringers of ore giving assays of 5 to 20% copper. Equipped with compressor and drills. Idle several years.

NEW YORK-ARIZONA GOLD & COPPER CO. **ARIZONA**

Address: Morenci, Graham Co., Ariz.

Officers: A. L. York, pres.; J. F. Cleaveland, v. p.; C. E. Tyler, sec.-treas.; John C. Molder, gen. mgr.; J. R. Wester, supt., at last accounts.

Inc. April 15, 1907, in Arizona. **Cap.**, $900,000; shares $1 par.

Property: 30 claims, unpatented, 600 acres, and a 150-acre mill site, 4 miles west of Morenci, in the Copper Mountain district. Includes the Buzzard Shadow and adjacent groups. Claims show quartzite, shale and limestone cut by porphyry, with contact deposits, having orebodies, more or less developed, said to range from 10" to 4' in width.

Development: by tunnels, 100', 450' and 600' long and the Lillian tunnel, 1,800', claimed to show a vein carrying several ore shoots. There are 5 shafts, including the 260' Argentine shaft, said to show copper sulphides; the 80' Louise shaft, reported to cut an 8" vein showing ore assaying up to 15% copper, 180 oz. silver and $20 gold per ton, and the 72' Jensen shaft near the Louise. The Buzzard Shadow group, at the eastern end of the property, shows a 2 to 4' vein carrying auriferous and argentiferous copper ore.

Equipment: includes a 15 h. p. gasoline hoist, 4 Nissen stamps and a tube-mill.

Idle since 1917.

ARIZONA-CELTIC COPPER CO. **ARIZONA**

Out of business. Property formerly owned by the Arizona Morenci Copper Co. See Vol. XIII.

ARIZONA CONSOLIDATED COPPER MINES, LTD. **ARIZONA**

Office: H. S. Blake, sec., Throgmorton House, Copthall Ave., London, E. C. 2, Eng. **Mine office:** Clifton, Ariz. Hon. H. A. Stanhope and W. M. Steward, directors.

Inc. June 17, 1899, in Great Britain. **Cap.**, £150,000 £1 par; issued £135,007, which was paid to the Continental Finance Syndicate, Ltd., 1909, for

property, and £10,000 cash working capital. Balance sheet, Nov., 1918, show cash, £520; loans at call, £732; expenditures, £9,818; liabilities, £1,0

Property: 120 acres, known as the Scioto, Lowland and Chillicot mines, in the Copper Mountain district, Clifton, Greenlee county, adjacent to Arizona Copper Co. and the Detroit Copper Co. Location includes a mill-site the San Francisco river. The claims are said to show a vein 2½′ to 8′ and places 30′ wide, proven for 3,500′. Company also owns 8 claims at Armste Mont., showing copper.

Development: at the Clifton properties by 3 adits; No. 1 in ore f 55′; No. 2, 110′; No. 3, 100′. Operations reported resumed April, 1917.

ARIZONA-MAYFLOWER COPPER CO. ARIZON

Office: Duncan, Ariz.

Property sold May, 1917, at Sheriff's sale to Krakauer, Zork & Moye, Paso, Texas. Operated under agreement with owners by S. D. Conley, Dunc Arizona.

Inc. 1916, in Mass. **Cap.,** $1,000,000; $1 par.

Property: 40 claims, in the Mayflower district, Greenlee county, Arizo and Steeple Rock district, Grant county, New Mexico. Ore occurs as sulphid and oxides in fissure veins, 7′ to 10′ wide, dip 55° S. W., course S. E.-N. W., w dacite foot and limestone hanging wall; reported to average 5 oz. silver, 2.5 copper and 9 oz. silver, 7% copper, with $2.50 gold per ton. Developed to depth of 100′ by 3 shafts and equipped with compressor, drills, gasoline engi and hoist.

ASH PEAK EXTENSION MINING CO. ARIZON

Address: J. Horgan, Duncan, Ariz.

Inc. 1917, in Arizona.

Property: 14 claims, unpatented, in the Clifton district, said to sho good gold-silver values at surface. Presumably idle.

ASH PEAK MINES CO. ARIZON

Address: Charles Starr, mgr., Duncan, Ariz.

Property: claims in the Duncan section below Clifton, said to sho good gold and silver. Shipments were made in 1918.

Under lease and option 1916-17 to the International Mines Development C but option was relinquished. Under bond to the Goldfield Consolidated, 1918-19 and about 50 men employed vigorously prospecting and developing the mi Ore contains gold, silver and lead. Main shaft 800′ deep. The 100-ton cyani mill will be moved from the Aurora Cons. property, Aurora, Nev., to the mi

CHASE CREEK COPPER CO. ARIZON

No recent returns secured.

Mine office: Clifton, Greenlee Co., Ariz.

Officers: Clarence K. McCornick, pres.; H. G. Smith, treas.; S. S. Cam bell, mgr.; Isaac N. Stevens, supt.

Cap., $5,000,000.

Property: 52 claims, 1,040 acres, 8 miles west of Clifton, having a 2,30 tunnel, 6x8′, on lands adjoining the Longfellow mine, cutting the Longfell orebody, of concentrating grade, at a distance of 493′, having a back of abo 900′, showing low-grade sulphide copper ore. Tunnel practically reaches t Coronado Railroad, permitting advantageous shipments.

CUPRITE COPPER CO. ARIZON

Mine near Clifton, Greenlee county, Ariz.

Officers: N. W. Lord, pres.; Isaac N. Stevens, v. p.-mgr.; L. B. Kauf man, sec.; Geo. B. Kauffman, treas.; Frank A. Ray, engr., with Frank B. Lain directors.

Inc. March, 1904, in Arizona. **Cap.,** $1,000,000; $1 par.

Property: 26 claims, 490 acres, in the Copper Mountain district, opene by shafts of 30′ and 320′ and tunnels of 150′ and 260′. The leached zone carri isolated pockets of rich ore. Company also owns about 2,000 linear feet of stro hematitic outcrops, ranging 5 to 100′ in width. Property considered promisin but company inactive since 1916; awaiting developments on adjacent properties.

EAGLE GOLD & COPPER MINING CO. ARIZON

Address: care W. J. Riley, First National Bank, Clifton, Ariz. Min

near Morenci, Greenlee county, Ariz.

Officers: Wm. M. McCoy, pres.-mgr.; E. C. Bunker, v. p.; E. V. Horton, sec.; W. J. Riley, treas.; H. A. Collins, gen. mgr.

Inc. in Arizona. **Cap.**, $1,000,000; $1 par.

Dividend of 2½c per share reported paid during 1917.

Property: formerly known as the Gold Belt 30 claims, 4 miles N. W. of Morenci, carries veins with copper, lead and gold ores, developed by a 40′ shaft on 1½′ vein of rich silver lead ore.

Equipment: includes 5-stamp gold mill.

After 5 years of idleness, property was reported active, June, 1917, and to have shipped 300 tons of ore monthly to the Clifton and Douglas smelters. Ore said to contain 17% copper and 8% manganese per ton.

STARGO SILVER BELT MNG. CO. **ARIZONA**

Company owned by the old Stargo silver mine, near Morenci. Reported in 1919 that mining property had been sold to M. J. Harmon and associates, who plan building a cyanide plant.

CLIFTON-MORENCI DISTRICT, GREENLEE COUNTY

AMERICAN CELTIC COPPER CO. **ARIZONA**

Out of business. See Vol. XIII for description.

ARIZONA COPPER CO., LTD. (THE) **ARIZONA**

Head office: 44 Charlotte Sq., Edinburgh, Scotland. **Mine and works office:** Clifton, Greenlee, Ariz.

Board of directors: G. Readman, chairman; W. A. Carter, Young J. Pentland, Alex. McNab, F. L. MacLeod, H. A. Rose, T. E. Salveson, and Sir David Paulin; William Exley Miller, sec.; Norman Carmichael, gen. mgr.; R. W. MacFarlane, act. supt.; P. B. Scotland, supt. of mines; Arthur Crowfoot, supt. of mill; J. G. Cooper, cashier and purch. agent.

Inc. August 5, 1884, in Great Britain. (For early financial details see Copper Handbook, Vol. XI, 1914, p. 72.)

Cap., authorized, £755,000; issued £703,984 10s as follows: 160,000 "A" preference shares of 5s each, all uncalled but £7,480 10s paid in advance of calls; £316,530 preference stock; £379,974 ordinary shares (1,519,896 shares of 5s each fully paid). Profits are divided thus: 10% cumulative dividends on "A" preference less 5% interest on amount uncalled and unpaid; 7% cumulative dividends on preference stock; balance to ordinary shares.

Funded Debt: 5% terminable debentures, reported to have been redeemed Dec., 1918. Fiscal year ends on September 30.

Dividends: on ordinary shares for recent years have been as follows: 1 6d in 1913; 2s 9d in 1914; 1s 9d in 1915; 4s in 1916; 4s 9d in 1917, and 3s in 1918.

Balance sheet for 1916-17 showed a profit of £317,717, after setting aside £137,805 for redemption of debentures, paying preferred dividends, transferring £50,000 to reserve (now £678,731), and £255,000 to reserve (now £613,563) for contingent liabilities. Ordinary shares received a total of £303,979. There was £13,737 carried forward.

For half year ended Mar. 31, 1918, after allowing for the above items, profit was £130,836. Ordinary shares received £113,992. Balance forward was £30,581.

Property: about 4,000 acres in the mineral belt of Clifton-Morenci district. Principal producing mines: Humboldt, Clay, Longfellow, Coronado, King, Metcalf and Boulder, others in reserve or process of development. Produces about 4,500 tons of concentrating ore and about 175 tons of direct smelting ore daily. Concentrating ore is chalcocite, disseminated in porphyry, carrying about 4% copper. Top-slicing is principal mining method used. Metcalf mining division supplies concentrator at Clifton. Morenci and Coronado divisions supply concentrator at Morenci. All mines connected by electric haulage to main hoisting shaft at concentrator, except Metcalf, which is connected by 36″ gauge steam road (Coronado R. R.) to Clifton.

In June, 1919, the Shannon Copper Co's property of 17 claims, mill a smelter were acquired. These are in the same district.

Electric haulage operated by 21 6-ton locomotives, used singly, and two-u and three-unit. Coronado-Morenci ore tram consists of 36 10-ton cars haul by three-unit locomotive over track of 20" gauge of 50 lb. rails.

Longfellow division: principal mines, Humboldt, Clay and Longfello Orebodies disseminated chalcocite in porphyry dikes and faulted or brecciat areas. Mining conducted principally through adits at present. There are working levels and 2 shafts. Commercial ore proven to depth of 900' belo surface. Concentrates transported by gravity incline 2,515' long to Corona R. R., thence 6.1 miles to smelter, 2.2 miles below Clifton.

Metcalf division: principal mines, King and Metcalf. Other small producers. King mine produces disseminated chalcocite ore from faulted are in porphyry and granite. Metcalf mine yields oxide ore from deposits in lim stone and shale and small porphyry dikes. Ores transported by gravity inclin to bins on Coronado R. R. and treated at the Clifton concentrator. Outlyi mines served by cable tramways. Ores mined by open-pit and shrinkage unde ground methods. Equipment for drilling 16 holes, from 1,000' to 1,500' dee now on property.

Coronado division: principal mines, Coronado and Horseshoe. Pyram mine in development stage. Orebodies disseminated chalcocite and surface oxi ore in porphyry dike filling fault fissure in granite. Developed by 5 shaf (deepest 1,100') and nine levels, adit level 9,400' long, 1,100' below surface, a is part of electric haulage system to concentrator at Morenci. The Corona shaft was gutted by fire Aug., 1917, but has been re-timbered.

At the Clay mine further development work opened up a large but ve low-grade orebody, not yet being mined. The Pyramid mine has 2,000' of wo on the 6th level, and the 1,100' or Coronado adit level. In the Coronado vein, t oreshoot is bottomed between the 7th and 11th levels, but ore reserves have be maintained by additional ore developed east of the Matilda shaft.

The Horseshoe orebody is now an important producer, connected with t main haulage, or 1,100' level. In the King mine, a shoot of 8-10% ore, 10' thi and 200' long, was found in the pyritic vein on the 3rd level.

The incline top-slicing method of mining at the Coronado was described W. G. Scott in a paper for the A. I. M. E., February, 1918.

Prospecting with churn-drills was started in 1918 to determine charact of ground east of the Coronado adit, 6,000' being drilled.

The reduction works consist of two concentrating plants, No. 4 mill at Clift with 500 tons daily capacity; and No. 6 mill at Morenci, with 4,000 tons da capacity. A 100-ton experimental mill for the treatment of low-grade ores w erected at Morenci. Both concentrating plants have been equipped with t Callow system of pneumatic flotation, with the necessary thickener and filt equipment for handling the flotation concentrate. An addition of 8 Dorr pu thickeners has been made to the water reclaiming equipment; tables have r placed jigs, and a dust-catching system has been installed in crushing depa ment at No. 6 plant.

Recent improvements include 12 Allen cones for de-watering and re-grin ing mill feed; 12 Dorr classifiers, Dorr thickeners, and 8 Callow cells.

The new smelting plant, started early in 1914, is situated 2 miles belo Clifton, on the east bank of the San Francisco river. This plant is entirely steel, brick and concrete, and consists of a receiving bin system with a capacity 1,000 tons of ore and 1,500 tons of concentrates, a crushing, grinding a sampling plant, and a bedding plant with a storage capacity of 20,000 tons f mixing and storing the ores and concentrates, supplementary bunker bins bei provided for the fettling ores, converter ores and fluxes.

The mixed charge is fed to the roasting plant, consisting of eight 7-hear Herreshoff air-coled roasters, equipped for firing with coal if needed. T roaster gases pass through a large dust chamber to a central stack, and t roaster charge and dust to the reverberatory plant, consisting of 3 oil-fir furnaces 22x100' (2 operating). The waste gases from this plant pass throu a set of six 712 h. p. Stirling boilers, which, with 5 oil-fired boilers, supp

the steam necessary to operate the power plant. The matte is tapped into ladles handled by 40-ton cranes for treatment in the converter plant, which consists of 4 stands with 5 shells of the Great Falls type converter, 12′ in diameter. The bullion produced is cast in pigs for shipment on two straight-line casting machines. Both the reverberatories and the converters are provided with suitable dust chambers, the gases ultimately discharging into a common stack. The plant is served by both standard and narrow gauge railroad, in addition to electrified industrial tracks, and is equipped throughout with belt conveyors for the transportation of material.

The power plant is housed in a brick-steel concrete structure, and consists of 3 General Electric turbines of 2,000 k.w., three 10,000 cu. ft. Nordberg blowing engines for converter air, and a compressor for high-pressure air; the auxiliary pumps, motors, generators, transformers, condensers, cooling towers, spray ponds, etc., necessary for operations. The plant supplies all power needed at the smelter and also, through a 13,200-volt transmission line 10 miles long, the power needed for the town of Clifton, the concentrators and mines.

Well-equipped machine, blacksmith, boiler, tin, carpenter and electrical shops are maintained, as well as a large warehouse and brick shed.

Miscellaneous enterprises operated by the company include foundry, machine shop, saw-mill, a 30-ton ice plant and town lighting plant. The company also has general merchandise stores at Clifton, Morenci, and Metcalf.

Production: for fiscal years ending September 30: 1907, 27,404,349 lb.; 1908, 33,980,291 lb.; 1909, 32,017,487 lb.; 1910, 32,161,205 lb.; 1911, 34,569,019 lb.; 1912, 38,150,000 lb.; 1913, 34,230,000 lb.; 1914, 38,942,455 lb.; 1915, 37,416,010 lb.; 1916, 34,100,000 lb. (operations suspended by strike five months) 1917, 42,480,000 lb.; 1918, 40,468,000 lb. In 1919, due to general curtailment, the output was 32,900,000 lb.

CORONADO MINING CO. — ARIZONA

Clifton, Greenlee county, Ariz.

Inc. July 12, 1902, in Maine. **Cap.**, $1,000,000; shares $1 par. Is controlled through ownership of a stock interest of about 53%, by the Shannon Copper Co., the remainder of the stock is held principally by Phelps Dodge Corp. Officers and management are the same as those of the Shannon Copper Co.

Property: 30 claims, 400 acres, patented, near Metcalf, adjoins the mines of the Detroit Copper Mining Co. and the Coronado mine of the Arizona Copper Co., Ltd. Mine has a 2-compartment shaft, on the Garnet claim, showing some ore on the 200′ level; also several shallow shafts and short tunnels.

Idle since 1916.

DETROIT COPPER MINING CO. OF ARIZONA — ARIZONA

Fully described under title of Phelps Dodge Corporation.

LESZYNSKY COPPER MINE — ARIZONA

Address: J. Leszynsky, owner, 32 Broadway, New York City. Mine address: Clifton, Ariz. John Christy, lessee.

Property: 38 claims, 24 patented, in Morenci-Metcalf district, Greenlee county, showing a deposit of low-grade disseminated copper ore, said to average 2½%, with between 2 and 3 million tons developed by shafts and mine workings. Plan erecting 250-ton concentrator.

LONGFELLOW EXTENSION COPPER MINING CO. — ARIZONA

Address: Clifton, Arizona.

Officers: C. H. Thompson, pres.; W. J. Riley, v. p.; I. N. Thompson, sec.

Property: 38 claims on Chase creek, near Clifton, developed by 400′ tunnel with still some distance to go, to be under the mineralized copper ledge showing at surface.

NEW ENGLAND & CLIFTON COPPER CO. — ARIZONA

Sold to Phelps Dodge interests. Described in Copper Handbook, Vol. XI.

P. D. EXTENSION COPPER CO. — ARIZONA

Mail returned from Morenci, Ariz., marked "out of business." Described in Vol. XIII.

SHANNON COPPER CO. — ARIZONA

Office: 67 Milk St., Boston, Mass.

Officers: Nathan L. Amster, pres.; H. N. Stonemetz, v. p.; Chas. Jeffers, sec.-treas., with Kenneth McNeil, Wm. A. Paine, M. W. Cole, C. J. M Gilravy, J. B. Beaty and David A. Ellis, directors. J. W. Bennie, gen. mgr.

Inc. Nov. 13, 1899, in Delaware. **Cap.**, $3,000,000; shares $10 par, i creased July, 1909, to $3,300,000; issued, $3,000,000, with $300,000 held in t treasury. **Bonds:** $600,000 at 7% were retired 1911; the company guarante an issue of $600,000 of 6% bonds, authorized May, 1909, by the Shannon-Arizo Railway Co., reduced to about $87,000 at time Metcalf properties were sold Arizona Copper Co. Shares are listed on the Boston Stock Exchange. Nation Shawmut Bank, Boston, registrar; Boston Safe Deposit & Trust Co., transf agent. Annual meeting, third Wednesday in March.

In 1918 receipts from sales of copper, gold and silver amounted $2,254,774; expenses totaled $2,532,357, leaving a deficit for the year $277,583.

On February 28, 1919, current assets amounted to $422,231, of whic $8,930 was cash and $296,718 unsold copper carried at 15c per lb. Curre liabilities totaled $447,370, leaving $25,139, an excess of liabilities.

The Arizona Copper Co., May 14, 1919, took over the Clifton-Metca properties of the Shannon, including mines, reduction works, railroads an other property. Sale ratified by shareholders, Oct., 1919. Price said t be $600,000. With this money company will pay off outstanding bonds Shannon Ariz. Ry. Co., will clean up its floating debt and have remainin $400,000 and no debts. The Metcalf mines had been idle for some tim the ore having declined in grade until it could not be profitably treated.

The company retains its other property, the Copper Belle mine Gleeson, Ariz., and the Yaeger Canyon properties, 8 miles S. W. of Jerom The Yaeger mine was closed down in March, 1919, to wait for a bett demand for copper; the mine is opened to the 1300′ level and is said t have cost $75,000; an additional $125,000 was spent on development. It i doubted whether this sum can be recovered from the ore developed. Th Copper Belle mine is described under Leonard Copper Co., which is the sub sidiary company holding title to the mine.

Production: in 1918 amounted to 9,627,987 lb. copper, 2,466 oz. gold an 77,314 oz. silver. Of the copper production, 7,164,918 lbs. were sold a 22.10c per lb.

STEVENS COPPER MINING CO. **ARIZONA**

Office: No. 1 Broadway, New York. **Mine office.** Clifton, Greenle county, Ariz.

Officers: Fred Enos, pres.; W. Rowland Cox, v. p.; Geo. H. Kent, sec treas.; Robt. McCart, Jr., resident mgr.

Property: 39 claims, patented, 780 acres, about 2 miles from Metcal Ariz., shows granite overlaid by Cambrian quartzite and Silurian lime stone, with much faulting and intrusive porphyritic dikes, with orebodie near the fault lines. Some of the claims have produced copper ore, whic was shipped to the Shannon smelter. Property being worked by lessees.

MARICOPA COUNTY

ABE LINCOLN MINING CO. **ARIZONA**

Address: E. W. Getter, Los Angeles, Calif.

Officers: G. W. Platner, pres.; V. P. Unitt, v. p.; W. H. Dudley, v. p. E. W. Getter, sec.-treas., with W. H. Wood, A. E. Mack, J. H. Bulla, W F. Denny and R. McPhail, directors. C. E. Nathorst, mgr.

Property: in Hassayampa district, Wickenburg, Maricopa county, near the Monte Cristo, Silver Bar and Eagle mines.

Development: by shaft recently completed to the 700′ level, where the vein is reported to be 27′ wide. Assays gave 12% copper, 12 oz. silver, $5 gold per ton. In the tunnel being driven to connect with shaft the vein is stated to be 10′ wide with high copper content, 12 oz. silver and $10 gold per ton. Other lower-grade veins exist.

Equipment: includes 50 h. p. hoist, 5-drill compressor.

Reported in January, 1919, shipping high-grade chalcopyrite ore from tunnel. Reserves claimed to be sufficient for 200 tons daily output for some time.

APACHE CHIEF MINING CO. **ARIZONA**

The secretary, W. G. Lentz, 218 National Bank of Arizona Bldg., Phoenix, Ariz., reported in Oct., 1919, that company had not kept up its corporation tax and was probably dead. See Vol. XIII.

ARIZONA CACTILONE COPPER CO. **ARIZONA**

Mail returned unclaimed 1919, from former address.

Officers: J. G. Hardin, pres.; S. C. Kingsbury, v. p.-gen. mgr.; I. J. Lipson, 2nd v. p.; C. D. Montgomery, sec.-treas.

Inc. Feb. 8, 1917, in Arizona. **Cap.** $3,000,000; $1 par; 400,000 sold at 25c each.

Property. 21 claims of the Slocum Copper Co., in Maricopa county, 22 miles N. of Phoenix. Ground was examined by C. H. James in May, 1917, who recommended expenditure of $30,000 to $50,000 in exploration.

Geology: main formations exposed are a more or less schistose pre-Cambrian granite and an altered diabase, the latter intruded by 2 prominent iron-stained quartz dikes showing a little copper carbonate and pyrite; Ore consists of copper and iron minerals in a diabase porphyry.

Development: by shafts 106′ and 200′ deep, midway between the quartz dikes. No important zone of secondary enrichment is expected.

ARIZONA DIXIE COPPER CO. **ARIZONA**

Officrs: R. J. Schultz, pres.; J. W. Ambrose, v. p.; F. H. Larson, sec.-treas., all of Phoenix, Ariz.

Inc. 1917 in Ariz. **Cap.,** $1,500,000; 25c par.

Property: 13 claims, 25 miles S. W. of Hassayampa, developed by 80′ shaft and 40′ drift, said to show a 5′ vein carrying ore that assays 4% copper, with gold and silver values. Plan to pump out water from shaft and sink.

ARIZONA LEAD & COPPER CO. **ARIZONA**

Mail returned unclaimed, March, 1919, from Wickenburg, Ariz., and from Edw. E. Northrup, pres. and mgr., El Paso, Texas.

ARIZONA SAMPLING & REDUCTION CO. **ARIZONA**

Geo. M. White, mgr.; L. N. Butler, sec.-treas. Operates a reduction plant at Wickenburg, handling mainly custom ores, also developing the Copper Hill mine in Copper Basin (which see) and the James Jackson mine near Kingman.

BALLARD GROUP **ARIZONA**

Address: F. C. Bolen, 312 E. Van Buren St., Phoenix, Ariz.

Property: 7 miles south of Palo Verde station, on the Arizona Eastern Line, Maricopa county, a few miles north of Rawley mine.

Examined by D. C. Nicholson in June, 1919, who says that the formation consists of altered schist, of ancient origin and much decomposed. Three immense "bars" of red oxidized silicious porphyry which run through the ground from north to south, seem to be favorable for prospecting. Secondary enrichment is expected at depth, as the rock at surface has been leached. Drilling is suggested.

Development: by open-cuts and two 30′ shafts. In most of the trenches the ore exposed is said to carry from 3.8 to 31.35% copper.

BLACK ROCK (LTD) MINING & MILLING CO. **ARIZONA**

Mail returned unclaimed, March, 1919, from former address: Constellation, Ariz. Inc. in 1910 in Arizona.

Property: 3 patented claims, about 12 miles east of Wickenburg. Developed by 360′ shaft, drifts and crosscuts, on a vein from which some ore is reported to have been extracted.

Equipment: includes hoist and 2 Huntington mills.

BUCKHORN & BOULDER MINING CO. **ARIZOI**

Officers: H. L. Chandler, pres.; P. E. Fuller, v. p.; R. F. Palmer, s treas. A. J. Peters, John Cummard, W. L. Sirrine, B. B. Moeur, directors.

Inc. 1917, in Arizona. **Cap.,** $1,000,000; $1 par; 550,000 issued.

Property: located on the west end of Superstition mountain, 20 mi northeast of Mesa, Maricopa county; idle for about 20 years; was watered and examined during 1917. Reported to be a porphyry ledge, wide on the 80' level. assaying 9.9% copper, $4.50 gold per ton. Footw is granite. A parallel porphyry ledge is 200' to the east. Shaft is 180' d with 200' of drifts and crosscuts. The ore is carbonate, changing to s phides on the 180' level.

CALUMET & CORNELIA DEVELOPMENT CO. **ARIZOI**

Mail returned unclaimed, March, 1919, from former office Natio Bank of Arizona Bldg., Phoeniz, Ariz.

Cap., $1,000,000; $1 par; in treasury, 740,000 shares.

Property: 370 acres, 25 miles from Phoenix. Shaft 50' deep said show carbonate and oxide ores averaging 6.7% along a contact vein schistose rocks cut by intrusive dykes. Reported on by R. W. Hollis.

Unfavorably regarded; presumably idle.

CARMELITA MINING & MILLING CO. **ARIZON**

Office: 142 W. Washington St., Phoenix, Ariz.

Officers: P. P. Parker, pres.; M. S. Weyant, v. p.; J. A. Marr, se treas., with H. J. McCoy and J. H. Williams, directors. Geo. Waymi superintendent.

Inc. in Arizona. **Cap.,** $350,000; $1 par; 30,782 outstanding.

Property: 17 claims, 340 acres, in the Harqua Hala mountains, Ma copa county, 14 miles from Wenden, said to carry a body of free milli ore, from 2 to 8' wide and assaying $17 per ton. Shaft 200' deep with 1 crosscut to vein. Claimed 3,000 tons of $15 milling ore on the dump. D ing 1918, built small mill, using tables and flotation process, and install compressor, air drills and gasoline hoist.

CARNEY MINING CO. **ARIZON**

Mail returned unclaimed, Sept., 1918.

P. G. Carney, pres. and business mgr., Mesa, Maricopa county, Ar Homer Davidson, supt.

Property: the Royal Gorge mine, shows a veins with gold-copper o

Development: by 800' tunnel and 100' shaft.

Equipment: includes gasoline engine and air compressor. Planned erect cyanide mill in 1917.

Presumably idle.

DRAGON MINING & DEVELOPMENT CO. **ARIZON**

Address: Wickenburg, Ariz.

Officers: J. G. Scarborough, pres.; F. L. LaForce, v. p.; E. P. Trui sec.; H. Hertz, treas.

Property: 248 acres in Wickenburg district, Ariz. In May, 1918, sha was 250' deep with 1,000' of workings. The ore is said to contain gol silver, and vanadium.

Equipment, includes 25 h. p. gas engine and hoist, compressor, 60 h. Commercial gas engine. No. 2 Cameron pump, and a 50-ton mill bei erected in 1919.

EMPRESS COPPER MINING CO. **ARIZON**

Mail addressed to C. K. Hartley, supt., Wickenburg, Ariz., returned u claimed. J. P. Hutchinson, pres., Phoenix, Ariz.

Company formed, 1917, to reopen and work the old Swallow mine, miles east of Wickenburg, in the Castle Creek district. Developed by 4 shaft. Vein said to be 6' wide, assaying $15 gold and 13% copper. Equi ped with 25 h. p. hoist, 70 h. p. engine and electric pump. Shipment of tons of copper-gold ore made in April, 1917. Presumably idle.

GILA COUNTY CINNABAR MINING CO. **ARIZONA**

Mail returned unclaimed from Phoenix, Ariz. Owns quicksilver claims in the Sunflower mining district, Mazatzal mountains, Maricopa county, 30 miles from Phoenix. Ores occur in ancient schists, and consist of cinnabar and an opaline silica.

Erected a 30-ton furnace for recovery of metal. Geology described by Ransome, U. S. Geological Survey, Bull. No. 620, pp. 111-128, 1915.

GOLD BAR MINES CO. **ARIZONA**

Address: F. A. Muller, pres., Wickenburg, Ariz.

Property: 34 claims of the Interior Mining & Trust Co., 15 miles N. E. of Wickenburg. Developed by 750′ shaft. At 300′ ore is gold-copper, at 500′ copper sulphides beginning to appear.

Equipment: includes 12 Nissen stamps of 100-ton daily capacity

GOLDEN REEF MINES CO. **ARIZONA**

Address: Col. J. N. Seger, pres., Phoenix, Ariz.

Property: the "Boyer" gold claims, 35 miles north of Phoenix. Slightly developed claims, said to have 4 quartz veins, 4′ wide. Assays reported up to $200 free milling gold per ton, average about $10.

GRAND TRAVERSE & ARIZONA MINING CO. **ARIZONA**

Idle since 1910.

Office: Manistee, Mich. Mine near Cave Creek, Maricopa Co., Ariz. Owns 3 patented claims. Fully described Vol. X, Copper Handbook.

HARRIS COPPER CO. **ARIZONA**

Offices: Findlay, Ohio, and 319 Van Nuys Bldg., Los Angeles, Cal.

Officers: C. C. Harris, of Findlay, Ohio, pres., treas., gen. mgr. and purch. agt.; W. J. Martin, v. p.-mine supt.; Harry W. Moore, sec.; preceding officers, W. J. Sease, Los Angeles, and Fred F. Harris, San Jose, directors.

Inc. July 10, 1910, in Arizona. **Cap.**, $1,000,000; shares $1 par; non-assessable; issued, $710,001. Annual meeting, second Tuesday in January.

Property: 34 claims, 550 acres, in the Tip Top district, about 50 miles north of Phoenix and 30 miles east of Wickenburg, on the Agua Fria river, at the mouth of Black Canyon creek. Claims, partly purchased with stock and partly located by the company, show schists cut by diabase intrusions. The company's map shows 2 groups of claims, the Cascadilla, or western, being in part 3,000′ wide and 1,200′ long; the group covers 3 veins running north and south. Development is meagre; one shaft in diabase and 2 tunnels with an aggregate of 800′ of work, costing $9,000.

The Copper Reef, or east group, covers 2 veins, 1 alongside the Agua Fria river claimed to be an extension of the vein mined by the Kay Copper Co. Company claims 1,000 tons of $15 ore blocked out, which is reasonable. One vein said to be 500′ wide and another 90′ in width, the observers evidently considering altered schist to be vein matter.

The president of the company writes the editor as follows: "We insist that the report speaks the truth quoted as we make the report to you, and if any establishment is placed on the wording of our report, it must conform in meaning to give the information that can be construed from the wording that we give."

The property may have a great outcrop and it may contain copper in commercial quantities, but we defy any mining engineer to find out what the company does have on its property, from the report issued by the management and reprinted as a gem of humor in the "Mining & Scientific Press." and in part reproduced herewith. "COPPER—A red, ductile, tenacious, malleable metal of great and varied use, originally called brass of cypress, copper sand, alacaunte, C group of minerals, mostly soft, included C. suprite, malaconite, malachite, cheesylite, chrycopyrite, olivnite, etc Black C ore, malaconite, gray C ore, Chalcocite, C Purite, yellow C ore, variety Chalcopyrite, the common ore.

"The formation of the Harris Copper Co. have blended with the iro lime and porphyry with quartz. Many of the above minerals, but mo especially the commoner forms with oxides condensed formation on th top with the iron and lime, with a great amount of carbon and sulphur i the schist formation, with an amalgamated condition of the various mi eralizations where gold and silver predominates. The schist in the low rocks, I am led to believe from the geological lay of the uplift that is no held and owned by the Harris Copper Co., there is beneath the surface this great iron-capped ledge a great body of copper ore." Enough said.

Despite the unfavorable impression created by the company's literatur it is understood that the property has genuine merit, has orebodies, an with cheaper transportation will make a good mine. Part of property r ported leased to Wilson Foster of Los Angeles in 1914 for ten years; lesse is required to spend $20,000 and company to receive 15% of gross outpu

Information circulars sent to company in 1919 were not returned, s probably little or nothing is being done.

HAUXHURST MINE ARIZON

Jas. Hauxhurst, owner and mgr., at last accounts.

Property: 900 acres, in the Big Horn mountains; about 65 miles W of Phoenix and 27 miles S. W. of Wickenburg. Mine formerly owned b the Hauxhurst Copper Co., was under bond for about 3 years to the Unite States Copper Mines, Inc., which forfeited same, 1909; leased to F. C. Als dorf, 1913, but relinquished. See Vol. XI, Copper Handbook.

KAY COPPER CO. ARIZON

Officers: Geo. W. Long, pres.-gen. mgr.; S. J. Tribolet, Phoenix., Ariz v. p. Harry Kay, sec.; R. E. Moore, Valley Bank, Phoenix, treas, with Frank R Ross, directors.

Cap., $2,000,000; $1 par; approximately 1,150,000 shares issued.

Property: 40 claims, with townsite of 600 acres, 1,300 acres in all, in cludes the Starkweather mine on the Agua Fria river, at the mouth of Blac Canyon creek, 50 miles N. of Phoenix, and some 9 miles from Cave creek. Fo the past 8 years the property has been held by S. J. Tribolet, who spent abou $70,000 in opening it to a depth of 350'. A strong copper vein in schist was fol lowed down from the surface, and levels opened at 50' intervals, ore being mine and shipped, reported to assay from 10 to 16% copper with some gold and silve The ore is chalcopyrite. Recently Geo. W. Long and the Yawkey Estate o Detroit acquired control and continued development to the 600' level. The mai oreshoot is reported to be 5' wide on the 200' level, 18' on the 350', 30' wide an 110' long on the 500' level, and 35' wide on the 600' level; and that 200' of driftin has not reached the limit of the ore. Over 2,000' N. of the main shaft, the mai ore-bearing zone has been prospected further into the hanging wall by No. shaft, 200' deep, that is said to have opened another body of shipping ore, siz not known at present, with reported assays as high as 22% copper and $3.50 i gold and silver. This shaft will be sunk to the 400' level. Diamond drillin has been in progress for several weeks and is said to have shown other orebodie N. of the main shaft.

Present work has not disclosed the possibilities of the property. Tentativ plans include an expenditure of $800,000 on a 1,000' vertical shaft 600' W. o present incline shaft, extensive development, and a 1,000-ton mill.

L. & N. GROUP ARIZONA

Owned by Christopher Martin, et al.

Property: 7 claims, about 7,500' along the Gila county belt, in the Sun flower mining district, Maricopa Co., Ariz., shows stringers of quartz and cin nabar. Development work and prospecting was in progress in 1917. A furnac with 1 retort was built in 1914, and 2 flasks of quicksilver were shipped March 1915. Geology fully described U. S. G. S. Bull. 620-F (1915). No recent reports but believed to be idle in 1919.

MARICOPA MINES CO. NEVADA-ARIZONA

Office: B. of L. E. Bldg., Cleveland, Ohio. Earl G. Hill, agt., Austin,

Nev. Mine offices: Morristown, Maricopa Co., Ariz., and Austin, Lander county, Nev. In process of reorganization, March, 1916.

Property: 33 claims, 611 acres, along the north contact of the Austin mineral belt. Principal property, 17 claims, at Austin, Nevada, shows four fissure veins in quartzite, ranging from 3′ to 20′ in width, traceable 1,400′, and said to carry average values of about 4% copper, 50 oz. silver and $2.80 gold per ton.

Development: by 4 shafts, deepest 800′, and 5 tunnels, 2 longest being 2,000′ and 830′, with total underground openings of about 12,000′.

Equipment: includes 2 small steam hoists and an air compressor at the Arizona property and a 75 h. p. gasoline hoist, 2 air compressors, machine shop, and necessary mine buildings on the Nevada property.

The 100-ton concentrator, in New York canyon, near Austin, has a Blake crusher, 2 rolls, 9 Card tables, 6 slime tables and a small cyanide plant.

The Prosperity group, 16 claims, in the Wickenburg district, Arizona, shows granite and limestone, the ore occurring in fissure veins in porphyry. Six known veins of 8 to 30′ width, developed by about 1,800′ of workings. Ore is mainly chalcocite.

No recent information is at hand. Letters returned unclaimed, June, 1919.

MARS CONSOLIDATED CO. **ARIZONA**

Probably dead. **Address:** care F. J. Webber, Colorado Springs, Colo. Company is the successor of the Heckley Gold & Copper Mining Co.

Property: 13 claims, in 3 groups, on Copper Hill, in the Black Rock district, 6 miles N. E. of Wickenburg, Maricopa Co., Arizona, shows 3 veins of 6′, 10′ and 25′ claimed average width, developed by a 268′ tunnel, said to carry ore assaying up to 28% copper. Letters unanswered.

MENDOTA MINING CO. **ARIZONA**

Reported to have purchased the property of the Yorba Mining Co., in the Harqua Hala Mountains, Maricopa county.

MONARCH MINING & SMELTING CO. **ARIZONA**

Address. Wickenburg, Ariz.

Officers: W. O. Donovan, Vidalia, Ga., chairman; J. H. Mulholland, pres. and gen mgr.; Jas. R. Vaughan, v. p.; J. B. Everidge, v. p.; J. H. Mulkey, sec.-treas.; officers are directors. A. D. Akin, cons. engr.

Inc. Aug., 1904, in Ariz. **Cap.**, $1,000,000; increased to $1,500,000 in 1913 and to $3,000,000 in 1914.

Bonds: $100,000 1st mtge., issued 1913; $57,400 outstanding. Assets of company given as $62,523 over liabilities, Jan., 1915.

Property: 6 claims, patented, 100 acres, known as the Ryland or Three Black Buttes group, in the Black Rock or White Picacho district, 9 miles S. E. of Wickenburg, shows diorite and schist carrying oxidized ores changing at shallow depth to chalcopyrite and occasional bornite, said to assay 2 to 20% copper and estimated by management to average 1 to 3 oz. silver and $3 to $15 gold per ton.

Development: several shallow shafts and tunnels of 600 and 300′, with about 1,500′ of underground workings and several thousand feet of surface trenching.

Equipment: includes a 50 h. p. distillate engine, 5x8″ Rumsey triplex pump, and a 4-drill Sullivan compressor. There are about 26 buildings, all owned by the company. Water is taken from the Hassayampa river through 7 miles of 4″ pipe-line.

Development has proved surface ores to be badly broken, not continuous and occurring in pockets. Former management counted on raising funds for deep development by milling surface ores, but with wet concentration process used in 100-ton mill, major part of oxides and carbonates was lost in the tailing. Mill was therefore closed down after trial run.

Presumably idle.

ORO GRANDE MINES CO. **ARIZONA**

Office: Clinton, Ia. Mine near Wickenburg, Maricopa county, Arizona.

Officers: at last accounts, G. E. Lamb, pres. and treas.; Geo. B. Upton, v. p. and gen. mgr.; F. W. Ellis, sec., and T. G. Norris, directors.

Inc. 1901 in Arizona. **Cap.**, $3.000,000; shares $10 par; non-assessable issued $2,500,000. Is a close corporation, controlled by 6 shareholders. Annu meeting, second Tuesday in January.

Property: 9 claims, patented, 161 acres, in the Black Rock district Maricopa Co., shows contact deposits, between diorite and hornblende schis The ore under development with strike of N. 27° E. and vertical dip, is estimate by management as 170′ wide, traceable 4,400′, and carries oxidized ores, borni and chalcocite, with gold values.

Development: by shafts of 320′, 100′ and 100′, with about 8,000′ workings, reported to have blocked out 980,000 tons of ore.

Equipment: includes a 55 h. p. gasoline plant at the mine, with a 1 h. p. hoist and 5-drill Sullivan air-compressor.

The 50-ton mill has ten 1,050-lb. stamps with a 40 h. p. gasoline engine water is pumped, for milling, from Box canyon on the Hassayampa river.

The manager reports a saving by straight amalgamation of 99% of assay value and having made 60-day mill-runs with a total cost of $1.87 per ton, fo mining, milling, pumping, and all expenses, which is interesting, if true. Id since 1907.

PARADISE GOLD MINING CO. **ARIZONA**

Address: Box 1095, Phoenix, Ariz. F. Obermuller, v. p.-mgr.; Jos. I Obermuller, cons. engr.

Property: 6 mining claims and 3 mill; sites in Paradise Valley minin district, Maricopa county, 23 miles from Phoenix, said to have 2 parallel vein about 300′ apart, traceable at surface for 3,000′, 45′ wide at depth of 100′ an averaging about $5 in gold. Sinking shaft to 200′ level in 1917. Stock offere to the public at 25c., Feb., 1917. No later information, presumably idle.

RED MT. CONS. COPPER MINES CO., INC. **ARIZONA**

Address: Central Bldg., Phoenix, Ariz., and 99 Grand St., Brooklyn New York.

Officers: C. E. Meyers, pres.-mgr.; Jas. H. Sullivan, v.-p.; C. W. Caulk ins, sec., Brooklyn; F. Brose, treas., with E. J. Widness, J. S. Smith, W. A Anderson, J. L. Anderson and G. M. Barklay, directors.

Inc. April, 1917, in Ariz. **Cap.**, $5,000,000; $1 par; issued 1,194,500 share Manager reports $25,000 spent in 1918 on development and machinery.

Property: 21 unpatented claims in Dixie district, about 35 miles N. W of Phoenix, said to show gold, silver and copper ore. Development: shallo shaft, less than 100′, and 2 tunnels, total length about 400′.

Equipment: includes a 50 h. p. hoist, and a compressor.

New York Curb papers in Sept., 1918, and Feb., 1919, had write-ups on th stock-selling methods employed by a certain "wild-cat mining stock promotio house," claiming that this firm peddled out stock at 50c. a share until it foun its rightful level at "nothing a share." The papers stated that none of th officers of the Red Mt. Cons. Copper Mines Co. had anything to do with th issuance of and sale of the company's stock by the promotion house.

RED ROVER COPPER CO. **ARIZONA**

Reorganized, 1917, as Red Rover Mining Co., which see.

RED ROVER MINING CO. **ARIZONA**

Address: care of B. A. Gillespie, mgr., Phoenix, Maricopa Co., Ariz. I a reorganization of the Red Rover Copper Co.

Lands: 12 claims, known as the Red Rover Group, 12 miles north o Camp Creek and 50 miles N. E. of Phoenix, the nearest rail point.

Development: by 10,000′ of underground workings, including a 200′ tun nel and a 500′ incline shaft, showing a 10 to 16′ orebody between limestone an porphyry, carrying a 3′ paystreak estimated to average 10% copper, 6 to 60 o silver.

The Red Rover mine, discovered 1882, has shipped from shallow working about $200,000 worth of high-grade ore, running about 15 to 25% copper, wit value mainly in silver chloride. 1 carload of 20 tons netting $41,000, with n allowance made for copper content.

Production: for 1913-14 was 440 tons of ore. Has been steadily developing since 1918, with about 25 men employed. Is a meritorious development proposition.

ROOSEVELT LAKE COPPER CO. **ARIZONA**

Mail returned in 1919 from former address at 17 E. Adams Street, Phoenix, Arizona.

Officers: R. H. Williams, pres.; A. J. Matthews, v. p.; W. E. Laird, sec.; C. E. Ashley, treas., with C. H. Prather and J. R. Murdock, directors.

Inc. in Arizona. **Cap.**, $1,000,000; shares $1 par; 400,000 issued.

Property: the Humdinger and Orocobre claims in the Mazatzal mountains, 20 miles from the Roosevelt dam, and the Virginia claims, 9 miles from Phoenix, Ariz. One claim said to have ore worth $1,000,000 on hand.

Development: by tunnels; churn-drilling contemplated.

Extravagant statements have been published about this company's possibilities, a full-page advertisement including this gem: "In this vast treasure-house—in vaults of porphyry and quartz, with walls of adamant—what wealth awaits the drill and blast, only the most active imagination can conceive." At last report company had sold its Roosevelt Lake property and was to use the cash to develop the claims near Phoenix.

ROWLEY COPPER MINES CO **ARIZONA**

Office: Kansas City, Mo. **Mine office:** Gila Bend, Maricopa Co., Ariz.

Officers: E. D. Lysle, pres., Leavenworth, Kan.; C. D. French, v. p.-treas., Kansas City, Mo.; J. T. McRuer, sec., with Jas. O. Goodwin, and D. Rowley, directors.

Inc. June, 1909, in Arizona. Cap. $10,000,000; $1 par; fully paid and non-assessable.

Property: 6 claims, patents pending, 124 acres, about 28 miles N. W. of Gila Bend, and 65 miles S. W. of Phoenix, Ariz.

Development: by two incline shafts 200′ and 256′ deep, the latter 32′ below water-level, with about 700′ of crosscuts and drifts and a 234′ vertical shaft. Said to have exposed 3 strong veins of copper-gold and silver-lead ore.

Equipment: includes 2 steam boilers, 200 h. p. oil engine, 2 compressors, one 300′ and one 1,000′ hoist. Also five storage oil tanks, ore trailers, etc.

Transportation is by 30-ton caterpillar 75 h. p. tractor owned by the company.

Property was bought for $20,000 cash and 1,000,000 shares in 1909. Reported in 1918, that wulfenite had been found and a small mill had been built to treat it. In June, 1919, an attempt was being made to sell stock at 10c. per share. Prospectus, states Mr. C. J. Price of Topeka, Kansas, a mining engineer of wide experience in both the U. S. and South Africa reports: "Your property has all the ingredients and requisites for the making of a big copper mine."

SAN CARLOS MINING CO. **ARIZONA**

Address: D. Rowley, Gila Bend, Ariz.

Officers: Dora Rowley, pres.; J. C. Rowley, v. p.; Daisy Rowley, sec.-treas.; also directors.

Inc. Oct., 1914, in Arizona. **Cap.**, $1,500,000; shares $1 par, non-assessable: 500,000 issued. Expenditures in 1916, about $2,500.

Property: 11 claims, 220 acres, 18 miles W. and 7 miles N. of Gila Bend, Ariz., said to show contact fissures in rhyolite. Orebody is 8 to 12′ thick. Shoots are from 2 to 36″ wide and ore carries copper, gold and silver. Ground is considered to contain extensions of the Rowley veins.

Development: incline shaft to 238′ depth. An East crosscut was to be driven to main contact. No information for 3 years past.

Edwin Walters, J. F. Price, and others have examined the property.

SLOCUM COPPER CO. **ARIZONA**

Succeeded by the Arizona Cactilone Copper Co., which see.

STURDY GOLD MINING CO. **ARIZONA**

Officers: John Sturdy, pres.-treas., 91 Creighton Road, Crafton, Pa.; E. W. McKay, v. p.; N. Sturdy, sec. and mgr., with H. Q. Turner and Albert Martin, directors.

Inc. June 16, 1915, in Arizona. **Cap.**, $750,000; shares $1 par; outstanding $500,000. Annual meeting, second Thursday in January.

Property: 6 claims, 100 acres, in the Winifred mining district, 16 miles N. of Phoenix, formerly owned by Fortuna Gold & Copper Co., described in Copper Handbook, Vol. XI. Was acquired by present management at sheriff's sale. Claims are said to show six parallel quartz veins in granite, averaging 4' in width and carrying gold and silver ore.

Development: two 125' vertical shafts, with 1,200' of workings. Claims to have 6,000 tons ore blocked out, average grade $10 per ton.

Equipment: includes a 6 h. p. Fairbanks-Morse gasoline hoist, and a 25-ton mill.

TOMBOY MINES **ARIZONA**

Address: Bruce Hobbs, sec., 29 Otis St., Boston, Mass.

Presumably idle. Described in Vol. XIII.

VULTURE MINES CO. **ARIZONA**

Address: Wickenburg, Ariz.

Officers: Robt. Mackay, pres.; F. W. Rockwell, v. p.; R. T. Sewall, sec., Boston; A. McLean, treas., with F. M. Kimbark, E. I. Marvell, J. B. Sullivan, Jr., directors; Spencer Hutchinson, cons. engr.

Cap., 600,000 shares; par $5; all issued. No bonded indebtedness. 33 Congress St., Boston, Mass., transfer office. R. T. Sewall, registrar. Annual meeting, June 1.

Property: 31 claims, 11 patented, 618 acres, 15 miles S. W. of Wickenburg.

Geology: quartz vein in schist contains gold, with some galena and pyrite, dips 37° and strikes N. 85° E. Pay ore occurs in shoots, the main ore-body being 35' by 300'.

Development: mine is worked by back stoping and waste filling through two inclined shafts 765' and 595' deep. Greatest depth of workings, 1,239'; linear extent, 25,000'.

Equipment: includes Ottumwa hoist; gas and steam engine; Sullivan compressor; Cameron pump; 700' tramway; 125-ton stamp mill with concentrating machinery.

Production: treated in 1912 was 19,689 tons; in 1913, 33,174; in 1914, 36,348; in 1915, 29,968 tons. No recent financial statement has been made. For ten months, 1913, ore averaged $20.54 per ton; recovery, $17.40 per ton; total value, $429,416.

Presumably idle, as no information has been sent us.

WOODBURY COPPER CO. **ARIZONA**

Reported in July, 1916, that H. Cavanaugh and associates of Seattle, Wash., had purchased the property for $200,000 and that work would be begun on the claims. No later returns.

YOUNG MINES CO., LTD. **ARIZONA**

Office: 413 Fleming Bldg., Phoenix, Ariz.

Officers: Geo. U. Young, pres.-gen. mgr.; E. C. Moore, v. p.; G. H. Cunningham, sec.-treas., with Frank H. Parker and W. S. Goldsworthy, directors. G. R. Tingle, supt.

Inc. 1910 in Arizona. **Cap.,** $1,500,000; $1 par; outstanding, 20.000. Annual meeting in June.

Property: the Mammoth group, 12 claims, about 220 acres, 20 miles E. of Mesa, Maricopa county, contains a large disseminated low-grade orebody, said to carry sufficient free milling gold for mining on a large scale by steam shovel or caving. Low-grade dump is said to average $4.50 per ton.

Development: includes 3 shafts, 150', 320' and 445' deep and about 3,000' of laterals.

Equipment: includes 3 steam hoists, 3 pumps, small compressor, a 20-stamp, 60-ton mill, buildings, etc.

The president reported that: "Property may also be worked on a 350-ton basis on high-grade ore on a 6 to 8-year supply now developed, in addition to 20 years' operation on 1,000 tons per day basis according to engineers' estimates on hand." What was done about it is not known.

MOHAVE COUNTY

AMERICAN FLAG SILVER MINING CO. **ARIZONA**

Office: Kingman, Ariz.

Officers: H. K. Le Claire, pres.; W. C. Rannels, v. p.; Albert J. Rigalli, sec.-treas.

Cap., $1,000,000; par 50 cents. Seeking permission to sell 350,000 shares at 10c. 1,000,000 shares were paid for the property and for organization purposes.

Property. 7 claims, in Maynard district, Mohave county. Reported to have produced rich silver ore in past; idle for about 30 years. Some high grade ruby silver ore has been extracted recently by prospectors.

ARIZONA AMERICAN COPPER CO. **ARIZONA**

B. MasMasters, principal owner, 135 Broadway, New York.

Inc. 1918. in Ariz. **Cap.,** $1,000,000; $1 par; 250,000 shares in treasury. About $400,000 is said to have been spent on the property.

Property: 3 claims, unpatented, 60 shares, located in Mohave county, 75 miles easterly from the St. Thomas, Nevada, terminus of a branch of the Los Angeles and Salt Lake R. R., and 25 miles N. of Peach Springs, Ariz.

Geology: sandstone in flat beds total 450′ thick, underlain by limestone and cut by fissure veins. An "iron dike" cuts formation 150′ from shaft and extends for 2 miles. Ore, both sulphide and oxide, occurs in bunches, 6-8′ thick. A 3′ vein shows ore with 7% copper, 36 oz. silver, and 37% zinc. There are two orebodies, 250′ apart.

Development: by several tunnels and a 70° incline shaft, 218′ deep, with 3 levels.

ARIZONA BASE ORES MINING & MILLING CO. **ARIZONA**

Letter returned unclaimed March, 1919, from former address: c/o C. R. Harris, Kingman, Ariz.

Inc. 1917, in Ariz. **Cap.,** $100,000; 10 cts. par.

Property: in the Wallapai Mtns., Mohave county.

ARIZONA-BUTTE MINES CO. **ARIZONA**

Office: Kingman, Ariz. **Officers:** H. M. Crowther, pres.-mgr.; J. E. Leeper, sec.-treas.

Inc. Feb., 1916, in Arizona. **Cap.,** $150,000; 10 cts. par.

Property: 27 claims, 17 patented, 250 acres; includes the Banner mine and five other one-time producers, 10 miles south of Chloride.

Development: by the 2,300′ Banner tunnel, driving a new 7,500′ tunnel, for which money was secured in July, 1919. The De la Fontaine mine in the Chloride district is opened to depth of 400′ by incline shaft.

Ore: mainly silver-lead, occurs in 8′ vein said to average $15 per ton.

Equipment: 200-ton mill, reported to make a saving of from 75-95% at an average milling cost of 65c. per ton.

Production: totaled $350,000 to end of 1916. In May, 1919, daily shipments were being made.

ARIZONA CHLORIDE MINING CO. **ARIZONA**

Officers: John B. Hughes, pres.-treas.; Edw. B. Hughes, v. p.; I. M. Thompson, sec.; F. W. Jacques, supt.

Inc. in Arizona. **Cap.,** $200,000; par 10 cts.; 1,100,000 issued.

Property: 138 acres, in the Wallapai district, near Chloride, Mohave county. The Windy Point mine is developed by a 145′ shaft in gneiss. Ore is mainly pyrite, arsenopyrite and chalcopyrite, occurring in a fissure vein, 2-4′ wide, with strike N. 42° W. and dip 77° N. E., said to run 3 oz. gold, 486 oz. silver and 21.5% copper p. t. The Bobby Burns group of 7 claims in the same district, acquired in February, 1917, is developed to depth of 250′ by tunnels said to have proved copper ore of commercial value. New shaft now 72′ deep.

Production: totaled $300,000 to end of 1916. Property considered very speculative.

ARIZONA COPPERFIELDS, INC. **ARIZONA**

Company is dead. Was one of the many promoted by George Graham Rice. Fully described in Volume XIII.

ARIZONA-EASTERN MINING CO. ARIZON

Address: P. O. Box 643, Los Angeles, Calif. **Mine Office:** Kingma Arizona.

Officers and Directors: Wm. Schuette, pres.; S. W. Odell, v. p.; Lew Lusk, sec.-treas.

Inc. July 9, 1915, in Ariz. **Cap.,** $1,500,000; $1 par; issued 700,000. Bon authorized, $100,000, none issued.

Property: 23 claims, 1 patented, 375 acres, 2 miles east of Hanco siding, on main line of Santa Fé R. R. and 10 miles south of Kingman, Ari includes the Red Hill and Fay mines, showing gold quartz fissure veins granite porphyry. The mine was worked years ago by Mexicans. Mill te said to show average value of $11.78 gold per ton, with a 93% recovery in cyani plant.

Development: by 200′ incline shaft and two 50′ shafts, with 400′ of u derground workings.

Equipment: includes gasoline hoist and a 5-ton stamp mill for testi purposes. Company plans further development work. Idle during 1918-1919.

ARIZONA MAMMOTH MINES CO. ARIZON

Mail returned, March, 1919, from Needles, Ariz. W. C. Rannells, mgr.

Installed hoisting plant at property south of Needles, Mohave county; deepen shaft now down 100′.

ARIZONA MOLYBDENITE CONSOLIDATED ARIZON

Office: 300-304 Los Angeles St., Los Angeles, Calif.

Officers: Theo. F. Bentel, pres.; J. A. Brown, v. p.; J. N. Beardslee, se J. C. Osher, treas., with J. W. Dubbs, L. H. Dutton, and R. L. Van Dusen, dire tors. E. C. Bradshaw, supt.

Inc. Feb., 1918, in Arizona. **Cap.,** $500,000; 10 cts. par; 3,500,000 issue Annual meeting, third Saturday in January.

Property: 21 claims, 28 miles from Yucca, Mohave county.

Development: tunnels have opened up molybdenum-copper ore.

Equipment: includes an 80-ton oil flotation plant, which started in Jun 1919.

ARIZONA ORE REDUCTION CO. ARIZON

Main Office: 1002 Citizens National Bank Bldg., Los Angeles, Cal **Mine Office:** Chloride, Ariz.

Officers: R. M. Martin, pres.; Geo. F. Goerner, v. p.-cons. engr.; C. Guittard, sec.; L. B. Wood, treas. R. M. Martin, Geo. F. Goerner, B. F. Perkin L. B. Wood, W. C. Fry, J. W. Brockman, Frank Jenkin, directors.

Inc. 1916 in Arizona. **Cap.,** $1,250,000; par; issued 999,245 shares.

Property: 11 claims, in process of patenting, 1.5 miles S. of Chlorid Mohave county, include the Copper Age, Blossom, Grand Boy and other min containing 9 parallel fissure veins in granite with strike of N. E.-S. W. and d of 70-80°, averaging about 2′ wide.

Ore: carbonates and oxides of silver, zinc and copper with gold changin to sulphides at about 60′ depth, and in places percentages of antimony. A re resentative sample of the sulphide ore is reported to carry: gold 0.02 oz.; silve 6.6 oz.; lead, 2.1%; copper, 0.10%; zinc, 4.7%; antimony, 2.2%. Estimate of o reserves are given as 138,178 tons, gross value, $1,617,907, based on metal pric of 1918.

Development and ore extraction has been mainly at the Copper Age min with a 360′ shaft, a 2,120′ adit or working tunnel, and 1,450′ of undergroun workings. On the 170′ level the ore shoot is said to be 300′ long, 3′ wide, an worth $40 per ton in gold, silver, and copper.

Equipment: a 150-ton wet concentrator operated intermittenly, is use to work out the best method of treatment. The machinery on hand consis of a 7″x24″ Sturtevant jaw crusher, Standard ball mills, tables and Deist slimers. Adequate continuous supply of water for milling is a serious proble the supply showing great fluctuations during the year. A 153,000 gallon reservo and Dorr thickeners are now installed, and a 750,000 gal. cement tank was bei built. The complex nature of the ore makes careful experimental work a pr requisite to success. Three hundred and fifty electric h. p. is used in mine an

mill, auxiliary boilers in reserve. Houses, tools, compressors, etc., have been provided.

ARIZONA-SOUTHWESTERN COPPER CO. **ARIZONA**

Office: 622 Higgins Bldg., Los Angeles, Cal. **Mine office:** Copperville, via Yucca, Mohave Co., Ariz.

Officers: R. H. Weber pres.; Fred Hessel, v. p.; J. H. Hoffman, sec.; C. Hoffman, treas.; preceding officers, W. G. Laidley, T. A. McNeal, C. L. Davidson and E. B. Schermerhorn, directors; John Lefler, mine supt.

Inc. 1907, in Arizona. **Cap.**, $4,000,000; $1 par; issued 3,300,000. Authorized bond issue, $150,000; all outstanding. Annual meeting held in Kingman, Ariz., in April.

Property: 14 claims, 9 patented, 276 acres, including the Pittsburgh mine, in Crow canyon, Cedar Valley district, Hualapai Mountains, 25 miles from Yucca, the nearest rail point. Mine has 2 orebodies, estimated by company to average 30′ in width and to be traceable 2 miles, opened by tunnels of 500′ and 682′, and shafts 400′ and 300′ connected on the 200′ level, with about 5,000′ of workings. Mine, which is quite wet, shows chalcopyrite, galena and sphalerite, estimated by the company to average 0.25% copper, 3% lead, 4% zinc, 10 oz. silver and $1 gold per ton, which seems too high for a large orebody of this type. Company claims to have 100,000 tons of $12 ore on the 200′ level.

Equipment: includes an 85 h. p. electric hoist, steel head-frame, a 12-drill air compressor, smithy and 300-ton concentrator, with 14 Overstrom tables. Planned to continue shaft sinking and do development work on the 400′, 600′ and 800′ levels.

Property has ore, but it is complex, and mining, milling and freight charges high, so that the problem of dividends is one requiring great skill, courage and time, as well as ample funds.

ARIZONA TELLURIUM MINES CO. **ARIZONA**

Mail returned unclaimed, 1919, from Kingman, Ariz.

Officers: Thos. H. Condon, pres.; Geo. A. Shea, sec.-treas., with Carl Bertschinger, W. C. Pedlar, directors.

Property: claims in the Maynard district, 15 miles E. of Kingman.

Development: by 200′ tunnel and shaft. Presumably idle.

ARIZONA VENTURE CORPORATION **ARIZONA**

Reorganized as the Waldron Mining Co., which see.

ARIZONA WASHINGTON MINE. **ARIZONA**

Address: F. E. G. Berry, Mineral Park district, via Chloride, Ariz.

Property: a silver mile reported in September, 1919, to be opening up rich ore.

BELLE UNION MINE. **ARIZONA**

Address: Chloride, Mohave county, Ariz.

BANNER GOLD MINING & MILLING CO. **ARIZONA**

Office: Kingman, Ariz.

Officers: B. L. Vaughn, pres., San Diego, Calif.; J. C. Brian, v. p.; E. E. Bollinger, sec., Kingman, Ariz.

Cap. $1,000,000; $1 par; issued 779,250 shares. 500,000 shares paid for property, May, 1918, offered 50,000 shares at four cents.

Property: 9 claims in the Union Pass district, Mohave county. Mine is said to carry the extension of the rich Sheep Trail vein, and a 400′ shaft has been sunk on milling ore. Shipping ore reported on 400′ level in drift 300′ west of shaft.

BERKLEY MINE **ARIZONA**

Address: T. J. Sparks, Kingman, Ariz.

Property: in 1918, this old silver mine in the Deluge Wash section was pumped out, and said to be operating a 40′ shaft on a 6′ vein, from which high-grade ore was mined.

BULLION HILL MINES CO. **ARIZONA**

Controlled by Knight Investment Co., Provo, Utah.

Officers: J. Knight, pres., Provo, Utah; A. M. McDonald, v. p., Eureka, Utah; W. L. Mangum, sec.-treas., with J. W. Knight and M. C. Godbe, directors; H. M. Eakin, supt.

Cap., 1,000,000 shares, par value 10c; all issued. Annual meeting 2nd Wednesday in February.

Property: 4 claims, near the Tennessee mine at Chloride, Ariz. Reported that vein was cut on the 300′ level. In places it is said to be 16′ wide. Property is in prospective state.

CATHARINE MINE. **ARIZONA**

See New Comstock Mining Co.

CERBAT SILVER MINES CO. **ARIZONA**

Office: Kingman, Ariz.

Officers: M. S. McEniry, pres.; E. W. Hokom, sec.-treas., with W. L. Hokom and J. M. Sheridan, directors.

Property: the old Imperial and White Elephant claims in the Wallapai mining district, 12 miles from Kingman and 3½ from Cerbat, Ariz.

Development: White Elephant claim has a 285′ shaft. The Imperial claim is being developed on the 125′ level, using a 15 h. p. hoist.

Company organized to lease property with option privilege. The ore, silver-lead, is treated in the Stiffey custom mill.

Production: to end of 1916 said to have been $300,000.

CERBAT SILVER MINING & MILLING CO. **ARIZONA**

Mine Office: Chloride, Ariz.

Officers: C. C. Perdoe, pres.; F. E. Steele, sec.; P. Potter, treas.

Inc. 1919 in Delaware. **Cap.**, $1,000,000; $5 par; issued 80,000 shares. Is reorganization of original company, whose capital of $1,000,000, $1 par, are exchangeable on basis of 5 of old for 1 of the new company. Transfer agent, Registrar & Transfer Co., N. Y.

Property: company has 10-year lease with 10-year renewal privilege on 8 claims and 3 millsites in the Chloride district, including the Elkhart, Argyle, Edgar, and Victoria millsite, with 9 veins showing. The Elkhart, which adjoins the Tennessee mine 1 mile E. of Chloride, is traversed by a strong vein, in places 10′ wide, with 1′ 5″ of pure galena and 8 feet of galena and silver with some gold and zinc.

Developed by shafts 200′ and 500′ deep, short tunnels, and about 2 miles of workings.

Gross production in past is said to have been about $1,000,000.

Ore reserves are estimated at over $500,000 proven ore, and $1,000,000 probable ore.

Equipment: crude oil hoist, 150-ton concentrating mill, etc. Propose sinking shaft deeper and installing flotation plant. Reported on by F. E. G. Bery.

CHARCOAL CANYON MINING CO. **ARIZONA**

Address: J. P. Ryan, pres.-sec., Chloride, Ariz.

Property: 5 claims, near Cerbat, 9 miles S. of Chloride, Mohave county, Arizona.

Development: by open cut that exposed ore 50′ wide and 200′ long. Thirty tons of this yielded $27 gold per ton. Exploratory work was under way in 1917.

CHLORIDE CERBAT COPPER CO. **ARIZONA**

Office: Chloride, Ariz.

Owners: J. T. Winn, C. P. Richards, Dr. A. W. Kirsch of Prescott.

Property at Mineral Park, near Chloride, Mohave county, opened by about 400′ of workings. Said to show a 3′ vein. Values up to 60 oz. silver and 20% lead, with some copper.

CHLORIDE GOLD MINING CO. **ARIZONA**

Taken over by the Chloride Samoa Mines Co., which see.

CHLORIDE MINING CO. **ARIZONA**

Address: Chloride, Ariz., or W. B. Twitchell, Phoenix, Ariz.

Cap., $2,000,000, $1 par; increased 1917 from 1,500,000, par 10c; 570,000 shares in treasury.

History: the Hidden Treasure mine, owned and operated for 17 years by Thomas Thornton, was transferred to the Chloride Mining Co. in 1915. In 1917, 400,000 shares were sold, and then W. P. Bonbright & Co. of New York, took up 680,000 shares after an examination by their engineer.

Property: Hidden Treasure, Revenue, Chenango and Oro Fino claims, 2½ miles east of town of Chloride.

Geology: strong veins in granite and schist.

Development: 500 tunnel E. on Hidden Treasure vein. Also a crosscut tunnel, driven 760′ N. on Oro Fino claim cutting 4 veins at depth of 234′. The most northerly (No. 1) vein opened 400′ E. and W. drifts disclosing ore for 300′, the west face being in pegmatite.

CHLORIDE QUEEN MINING CO. **ARIZONA**

Office: Phoenix, Ariz. J. M. Kellogg, mgr.

Officers: C. C. Thompson, pres.; R. C. Sanfley, v. p.; R. A. Jarrott, sec.; W. S. Goldworthy, treas.; all of Phoenix, Ariz.

Property: 5 claims and 2 fractions, better known as Sunday School and Silver Mtn. groups near Chloride., Mohave county.

Development: by shaft 300′ deep, with 150′ drift on 200′ level and tunnels 100′ and 200′ long. Report silver ore of commercial grade opened.

Equipment: includes air compressor and hoist.

CHLORIDE SAMOA MINES CO. **ARIZONA**

Office: 622 Higgins Bldg., Los Angeles, Cal. **Mine Office:** Kingman, Mohave county, Ariz.

Officers: L. Hoffman, pres.; A. B. Seelye, v. p.; J. H. Hoffman, sec.-treas., with C. Hoffman and R. Mangold, directors.

Inc. Feb. 26, 1917, in Arizona. **Cap.,** $1,500,000; shares $1 par; non-assessable; 1,019,050 issued.

Property: the Samoa mine, formerly owned by Chloride Gold Mining Co., consists of 6 claims, 1 patented, 125 acres, in Wallapai district, 3½ miles E. of Chloride, Ariz., said to show vertical quartz vein in granite, 8 to 36″ wide and 400′ long. Ore is a sulphide said to carry gold, silver, lead and iron worth $40 per ton. Lead content is given as 8% and iron 24%.

Development: by 300′ shaft and 3,500′ of workings. Crosscut tunnel being driven 1,664′ to open deposit to depth of 710′. Six veins are expected to be cut, all widening in depth, according to a cross section published.

Equipment: 15 h. p. Witte hoist and 2 compressors.

Production: 96 carloads of ore in 1903-1908, the last of 30 tons assaying 12 oz. gold, 11.5 oz. silver, 3% lead, worth $28.79 per ton. Total yield about $250,000. In 1918 lessees were working on the south end of property where they encountered some good ore.

Prospectus states that the 6 parallel fissures are substantially identical in character with the Granite Mountain mine of Butte, Montana, and that there is proven calculative ore estimated at $5,000,000, which is interesting if true.

CHLORIDE & TELLURIDE MNG., MLG. & LEASING CO. **ARIZONA**

Address: Bulkeley Wells, 1213 Hobart Bldg., San Francisco, Calif.

Property: 3 claims near the Tennessee mine, 1 mile E. of Chloride, Ariz., stated to have a fissure vein 5′ wide, strike N.-S., intersecting an E.-W. vein. Some rich ore was found on the 175′ level. Presumably idle.

CHLORIDE X-RAY MINING CO. **ARIZONA**

Main office: 33 N. First Ave., Phoenix, Ariz. Mine at Chloride, Ariz.

Officers: T. A. Barker, pres.; S. Chittick, v. p.; A. W. Galpin, sec.; W. H. Mann, treas.; J. Spargo, mine mgr.

Inc. in Arizona. **Cap.,** 1,500,000 shares, par $1, issued 700,000 fully paid non-assessable; no bonds.

Property: Hillside group of 6 claims, in the Chloride district near base of Rainbow Mountain. Developed by a tunnel 743′ long in May, 1917, reported to have 400′ of vein 3½′ wide carrying $30 per ton. Values are in gold, silver and lead. Tunnel is being driven to intercept the X-Ray vein. Property is a prospect that is to be listed on N. Y. Curb and which company says "will thus give our stock-holders a chance to realize speculative profits."

CLEOPATRA COPPER & GOLD MINES CO. **ARIZONA**

Main office: Warner & Nelson, Central Bldg., Phoenix, Ariz.

Officers: E. F. Thompson, pres.; Anson H. Smith, v. p.; J. W. Morgan, sec.-treas., with Harvey Hubbs, directors, all of Kingman, Ariz.

Inc. 1917 in Arizona. **Cap.**, $3,000,000; $1 par; 1,510,000 outstandin
Annual meeting, third Wednesday in January. Arizona Central Bank, Kin
man, Ariz., transfer office.

Property: the Cleopatra and Palo Verde groups, 19 unpatented clain
in the Owens mining district, Mohave county, 15 miles from Swansea by roa
Claims show gneiss and schist capped by 1 to 20′ of limestone, and cut by quar
porphyry dikes. These rocks are cut by a zone of brecciation and crushing 6
wide and exposed for 1,200′ in length, that shows iron and copper staining. T
ore contains gold and copper, present as carbonates and sulphides; assays
extensive sampling work show values of 2.9% copper with $1.32 gold, 0.3 o
silver, 87.6% insoluble, and 4.5% iron. Five hundred thousand tons of o
said to be exposed over 15 acres of ground.

Development: by shallow pits and open cuts. Claim 600,000 tons ore
sight, which is excessive. Stock issue offered at 50 cents.

C. O. D. MINING CO. **ARIZON**

Address: R. M. Wilde, Kingman, Ariz.

Property: gold mine 16 miles N. of Kingman, Mohave county.

Optioned by Rico Consolidated Mining Co., and first payment of $15,0
made February, 1919. See Rico Consol. Mining Co.

Reported in August, 1919, that mine was taken over by M. B. Dudley, a
was being unwatered to 300′ level and machinery installed.

COMMERCIAL MINING CO. **ARIZON**

Office: care Phelps, Dodge Corp., 99 John St., New York. **Mine office**
Prescott and Skull Valley, Yavapai county, Ariz. Maj. A. J. Pickerell, ge
mgr. Is controlled by Phelps, Dodge Corporation.

Property: includes the Senator and Snoozer mines, producing hig
grade sulphide ore from fissure veins and the Copper Basin mine with 18 clain
patented, in the Copper Basin, about 6 miles from the Santa Fé railroad; al
the Copper World mine, 14 miles east of Yucca, Mohave county, reported und
option to Charles Adams.

Development: by a 300′ two-compartment shaft, bottomed in good o
and 2 tunnels, that opened up large bodies of 3% oxidized ores. Employs
average of 25 men and ships from 80 to 100 tons per day of 7 to 10% oxidized o

Copper Basin mine yields oxidized ores found as segregations in alter
monzonite, but despite a promising outcrop, no body of commercial ore has y
been found in depth as on the adjacent Loma Prieta mine. Much of the o
shipped is a cemented stream gravel.

CONTINENTAL CONSOLIDATED COPPER CO. **ARIZON**

Office: 517 Thacher Bldg., Pueblo, Colo.

Officers: F. E. Wallace, pres.-treas.; G. E. Wallace, v. p.; G. S. Treade
sec. F. E. Wallace, G. E. Wallace, D. E. Arnitt, J. C. McCoy, F. J. Weber, L.
Gray, directors.

Inc. 1918, in Arizona. **Cap.**, $1,500,000; shares $1 par; outstandi
135,000 shares.

Property: 400 acres, Owens mining district, Mohave county, 40 mil
north of Wenden. Ore occurs in 2′ vein in altered schist, course N. W., dip 45
Developed by prospect pits and 60′ incline shaft. Assays reported as 5.6
copper and $3 to $100 gold.

Prospect has serious transportation difficulties to overcome.

COPPER AGE MINE. **ARIZON**

Owned by the Arizona Ore Reduction Co., which see.

COPPER FAME MINING CO. **ARIZON**

Mail returned unclaimed, March, 1919, from former address, P. O. Bo
692, Kingman, Ariz.

Officers: S. E. Barron, pres.-treas.; R. L. Gray, v. p.; E. L. Betswort
sec.; above with F. L. Rogers and C. W. Herndon, directors.

Inc. 1917 in Ariz. **Cap.**, $1,500,000; shares $1 par; 250,000 shares offere
the public at 10c. to raise funds for development and equipment. Compan
paid 700,000 shares of stock to the Gold Cliff Exploration Co. for its propert

Property: 10 claims, 153 acres, in the Cerbat range, Wallapai mini
district, Mohave Co., Ariz., 16 miles N. of Kingman. Claims adjoin the Dak

Basin Mining Co. property and show quartz bearing fissure veins in igneous rocks, with ore in shoots.

Development: by many shallow shafts, deepest 60', and a 110' tunnel with 15' crosscut. All openings reported to expose ore, assays being given as $4 to $20 gold, 10 to 20 oz. silver, 3 to 30% zinc and 5 to 23% copper, higher values undoubtedly from picked samples. Presumably idle.

COPPERFIELD PORPHYRY COPPER MINING CO. **ARIZONA**

Dead. Mail returned unclaimed, June, 1919, from Kingman, Ariz., stamped "Out of business."

Property was under option, 1916-17 to the Arizona Copperfields, Inc.

Address: Wm. Barrett Ridgely, pres., Felt Bldg., Salt Lake City, Utah, and 40 Exchange Place, New York City (now closed).

Cap., $1,000,000; shares $1 par; 500,000 in treasury.

Property: 200 acres in the Grand Wash, Mineral Park section, Wallapai mining district, Mohave county, Ariz., about 4 miles from Chloride and 22 miles north of Kingman. Ground covers high bluffs, called Ithaca and Goat Peaks, of old turquoise mines, which were drilled some years ago and very low-grade copper ore found. Copperfield group covers lower slopes where waters leaching bluffs would gather. Surface for 1,000' across said to show copper stain.

Development: by 200' shallow tunnel, reported to show 2% copper, both as native and sulphide, and 3 churn drill holes. Property is not a new discovery, and the 4 drill-holes used to "indicate" tonnage showed values too low to be of commercial interest. Control of the company was acquired in 1916, by the Arizona Copperfields, Inc., now defunct, a creation of George Graham Rice, which took 89% of the capital stock.

COPPER WORLD MINING CO. **ARIZONA**

See Commercial Mining Co., Arizona.

CUPEL MINING CO. **ARIZONA**

Address: Chloride, Ariz. D. E. Blake, supt.

Reported Nov., 1917 optioned to J. H. Conway. A long abandoned property said to have produced $1,500,000. Shaft 300' deep. Average assay about 40 oz. silver for drift. Management says there are "large bodies of milling ore under the caved workings" which is interesting, if true.

CYCLOPIC MINE. **ARIZONA**

Owner: Stanley C. Bagg, Chloride, Ariz.

Property: 6 claims in Gold Basin district, 25 miles north of Chloride, in the Cerbat range. Ore occurs in fissure vein, said to average $12 gold per ton. Developed by shafts 75' deep.

Equipment: includes 75-ton cyanide plant, 12 h. p. hoist and compressor.

DAISELL MINING CO. **ARIZONA**

Mail returned Feb. 21, 1919, from P. O. at Cerbat, marked "Out of Business."

Officers: M. B. Dudley, pres.-mgr.

Property: the old Twins mines at Cerbat, Mohave county. Old shaft said to have been re-timbered and development work reported under way, 1919, showing good ore.

DISTAFF CHLORIDE MINING CO. **ARIZONA**

Mail returned March, 1919, from Chloride.

Officers: J. R. Evans, pres.; D. L. Parham, v. p.; B. W. Evans, sec.-treas.

Inc. 1916 in Arizona.

Property: 4 claims, 70 acres in Chloride district, Mohave county, Arizona. Ore carries silver, with some gold and lead. Work resumed in October, 1916.

Development: by 285' shaft with 5 levels. All work on the Distaff up to 1917 had been done by lessees.

Equipment: includes 25 h. p. gas. engine, compressor, etc.

Production: totaled $200,000 to end of 1916.

ELKHART MINES CO. **ARIZONA**

See Cerbat Silver Mining & Milling Co.

EMERALD ISLE COPPER CO. **ARIZON**

Address: Robt. Jacobson, cons. engr., Chloride, Ariz.

Officers: A. J. Brawley, pres.; J. C. Stricker, v. p.; J. H. Conway, treas Carl G. Krook, sec., with James Robertson, W. C. Gould and R. C. Jacobso directors.

Property: about 3 miles S. of Chloride. Reserves said to be 200,0 tons of 2.85% copper ore.

Equipment: with 70-ton experimental leaching plant and crusher Mineral Park, producing 2,500 lb. electrolytic copper daily in Dec., 1918. Mi has electric power, compressor, etc. No figures are procurable.

EMERSON MINE. **ARIZON**

Address: E. M. Bind, mgr., Chloride, Ariz.

Property: 6 claims, 5 patented, in Chloride district, Mohave count Ariz., has an 18" vein said to carry 19% copper, 3 oz. silver and $2.80 gold per to

Development: by 175' shaft and 3 tunnels, longest 600', also 108' win below one tunnel. Ore carries gold and a little silver. In April, 1917, 18" rich copper-silver ore had been opened at 200'.

Equipment: 80 h. p. gas. engine, 6-drill compressor, 25-ton mill, etc.

ENTERPRISE MG., REDUCTION & IMPROVEMENT CO. **ARIZON**

Kingman, Mohave county, Ariz. Maj. W. A. Mensch, pres. and gen. mg 1729 29th St., San Diego, Cal.

Property and equipment reported sold at sheriff's sale for a debt of $2,1 in 1914. Described in Vol. XI, Copper Handbook.

ESTALEAH CERBAT SILVER MINING CO. **ARIZON**

Address: Barney Harmsen, mgr., Cerbat, via Kingman, Mohave count Arizona.

Property: formerly owned by J. H. Kane of Cerbat; said to have pr duced rich ore in the past.

FOUNTAIN HEAD MINE. **ARIZON**

A. C. Goodwill, Kingman, Ariz., has an option on this mine at Stockt Hill, near Kingman. The vein on the surface is reported to be 80' wide wi values of gold, silver, copper and lead. Tunnel 270' long has encountered sor lead-silver ore.

FRISCO GOLD MINES CO. **ARIZON**

Office: Jas. A. Roberts, sec., 257 Broadway, New York City, Ray Dimmick, mine supt., Kingman, Ariz.

Officers: C. S. Merrill, pres.; Chas. A. Lindsley, v. p., with P. G. Ba lett and Robt. Brown, directors.

Inc. 1913 in Maine. **Cap.,** 3,000,000 shares; 2,920,000 issued.

Property: shows gold-silver ore in veins in rhyolite. Shaft 200' de with crosscuts to orebody.

Equipment includes 125-ton cyanide plant, crude oil engine, etc. Operatio resumed March, 1919.

GATES AJAR MINING CO. **ARIZON**

Address: J. L. Craig, 246 S. Thirteen E. St., Salt Lake City, Utah.

Property: near Kingman, Mohave county. A contract was let for 3 of tunneling in August, 1919.

GENERAL METALS CO. **ARIZON**

Address: G. W. Peer, mgr., Chloride, Ariz.

Officers: G. W. Peer, pres.; R. M. Martin, v. p.; B. M. Brown, sec.

Property: the Copper Age group of 7 claims, 2 miles S. E. of Chlori Mohave county, Ariz.

Control of this company is held by the Arizona Ore Reduction Co. Chloride, which also controls the Immediate Ore Reduction Process, whi intended late in 1916 to erect 6 or 8 custom plants in Arizona, using the "Imm diate" process.

Development: by shafts, 20 to 250' deep; a main 500' shaft and ov 2,000' of workings. Considerable copper ore is said to have been opened.

Equipment: includes 150 ton "Immediate" plant.

No recent returns, presumably idle.

GEORGIA MINING CO. **ARIZONA**

Head office: 210 Judge Bldg., Salt Lake City, Utah. **Mine office:** Chloride, Arizona.

Cap., 1,000,000 shares, 10c par.

Officers: A. O. Jacobson, pres.; A. H. Godbe, v. p.; John Pingree, treas.; E. H. Matson, sec.; above with H. M. Eakin, supt.; F. W. Price, L. R. Eccles, G. S. Holmes, G. S. Holmes, Jr., and P. O. Perkins, directors; W. T. Beardsley, asst. sec.

Property: 2 claims between the Tennessee and Payroll mines, both large producers. Ore carries zinc, lead, copper and gold.

Development: main shaft down 300'. Good ore was cut at 100' and 200'.

Equipment: gasoline engine, hoist, compressor, and machine-drills. Employs 14 men. Considered promising in 1917, but whether now is not known.

GLADSTONE UNITED METALS CO. **ARIZONA**

Address: Phoenix, Ariz. F. C. Smith, supt., Chloride, Ariz.

Officers: F. C. Smith, pres.; W. B. Twitchell, v. p.; W. T. Smith, sec.-treas.

Inc. 1916 in Arizona. **Cap.,** 150,000 shares, $1 par.

Property: 7 claims, 3 miles east of Chloride, Mohave county, Ariz. Idle several years. Claims show igneous rocks, which at surface show much alteration and subsequent mineralization. Rhyolite dikes run into one main dike, in which are the veins. The Gladstone vein 15' thick with 6' of quartz ore on hanging wall side, and altered prophyry between this and narrow foot-wall quartz streak. Dip of vein 80°.

Development: by shaft 140' deep, sunk on hanging wall, drifts, and tunnel. Said to show a strong vein at 120', assaying $35 per ton in gold, silver, zinc, copper and lead. Surface showings on Gladstone and Longfellow claims regarded as good.

Equipment: hoist, blacksmith-shop, bunk-house.

Work will be continued on the main vein. A mill is contemplated.

No recent reports.

GOLCONDA CONSOLIDATED **ARIZONA**

Taken over by Union Metal Corporation, which see.

GOLCONDA EXTENSION MINING CO. **ARIZONA**

Address: O. D. M. Gaddis, Kingman, Ariz.

Officers: J. E. Perry, pres.; C. Metcalfe, sec.-treas.; O. D. M. Gaddis, directors.

Cap., 1,000,000 shares, all issued, 85% held by Messrs. Gaddis and Perry.

Property: 19 claims, 3 patented, adjoining the Golconda mine on the N., 16 miles N. of Kingman. A number of mineralized veins run through property.

Development: by main shaft, down 354', and considerable openings. Lessees extracted 2,500 tons of $80 ore. At 280' there is said to be 4' of gold-silver ore. Plan building milling plant.

Production: totaled $500,000 to end of 1916.

Regarded as promising but needs development. Idle at last accounts.

GOLCONDA MINE. **ARIZONA**

See Union Basin Mining Co.

GOLD BACK MINING CO. **ARIZONA**

Mail returned unclaimed, March, 1919, addressed to Edw. Copley, mgr., Chloride, Ariz.

S. S. Wold, pres. H. T. Widney, sec., both of Pasadena, Cal.

Property: 2 claims owned and 2 under option, 2 miles south of Chloride, Mohave county, Ariz., showing fissure vein carrying complex gold-silver-lead-copper-zinc ore. Development on 150' level said to show 7' of ore assaying $5 gold and silver, $20 lead, $15 copper, and $9 zinc (June, 1917).

Larger hoist and compressor were to be installed in 1917, but no recent returns.

GOLDEN CROSS METALS CO. **ARIZONA**

Address: 10 N. Second Ave., Phoenix, Ariz.

Officers: W. B. Twitchell pres.; J. W. Sims, v. p.; Shirley Christy, sec.-treas.; F. C. Smith, supt., Chloride, Ariz.

Cap., $150,000; par 10c; outstanding 882,800 shares.

Property: 2 claims near Chloride, said to have a fissure vein in granit with 8′ of gold ore; pay streak said to be 12″ in width and to assay $20 in gol and 2 to 3 oz. in silver. Opened by a 75′ shaft. Equipment includes a 15 h. p hoist. Plans sinking shaft to 300′ level. Property has promise.

GOLDEN HAMMER. ARIZONA

Owner: F. C. Smith, Chloride, Ariz.

Property in Mineral Park, south of Chloride, developing during 1918 b Mineral Development Co., has reverted to owner. Ore—gold-lead-zinc. De veloped by shaft and 300′ tunnel.

GRANBERG SILVER MINES CORPORATION. ARIZONA

Office: Oshkosh, Wis. **Mine office:** H. Johnson, Kingman, Ariz.

Officers and Directors: H. O. Granberg, pres.; H. Johnson, v. p.; N Granberg, sec-treas.

Inc. March, 1918, in Arizona. **Cap.**, $500,000; $1 par; issued 270,000.

Property: 4 unpatented claims in the Black Mtn. Range, Chloride dis trict, said to show 3.5′ fissure vein in pegmatite and schist, course S. 35° E dip 78°. Ore carries silver and lead, with some gold and zinc.

Development: by 90′ incline shaft with 110′ of underground working showing 18″ to 24″ shipping and 18″ low-grade milling ore.

GRAND GULCH MINING CO. ARIZONA

Office: 503 McIntyre Bldg., Salt Lake City, Utah.

Officers: Wm. H. McIntyre, pres.; Frank R. Snow, v. p.; W. P. Jen nings, sec.-treas.; preceding officers, Jas. E. Jennings, I. W. Little, Jos. A. Jen nings, directors; W. P. Jennings, mgr.; S. R. Calloway, supt. St. Thoma Clark county, Nev.

Inc. Sept. 15, 1874, in Utah. **Cap.**, $30,000; shares 10c par; issued 240,00

Dividends: total $64,758 to Dec. 31, 1918. Annual meeting, first Mon day in February.

Property: 9 claims 1 patented, 180 acres, in the Bentley district o Mohave county, Ariz., but more easily accessible from Nevada than from souther or central Arizona, owing to the barrier to access presented by the Grand cañ of the Colorado river.

Geology: property shows sandstone and limestone carrying an appar ently circular zone of copper impregnations, also having copper in the beddin planes. Ores occur as cuprite, melaconite, malachite, azurite and chalcocit estimated by management to assay 10% to 35% copper and 4 oz. silver per to Shipped some cars of 50% ore.

Development: by a 500′ shaft. Mine is 45 miles from St. Thoma Nev., railroad terminal on the Salt Lake Route. The mine has been in prac tically continuous operation since 1899.

Equipment: includes a 22 h. p. gasoline hoist, good for 800′ depth. 5 h. p. semi-Diesel engine, air-compressor, etc. There are 9 buildings and a sma and antiquated smelter, of no present value.

Production: in 1918 shipped 1020 tons of ore containing 11% to 35% copper. Property temporarily closed down.

GRANITE POINT SILVER-LEAD MNG. DEV. CO. ARIZONA

Operating an old-time silver-lead mine in the Wallapai range, Mohav county, near the Leviathan molybdenum mine. Property was being reopene by E. Hausman and W. D. Kinsey, of Jerome, Ariz., in 1917.

Development: by 300′ tunnel which is to be driven 1,800′. Averag sample of the main ledge is reported to assay $16.40 in gold-silver-lead.

Believed to be idle. Mail returned unclaimed, March, 1919.

HACKBERRY CONSOLIDATED MINING CO. ARIZONA

Office: 303 Title Ins. Bldg., Los Angeles, Calif. **Mine office:** Hackberry Arizona.

Officers: G. S. Holmes, pres., Salt Lake City; Chas. E. Green, sec., wit C. W. Herndon, directors. Wm. Neagle, mgr.

Inc. March, 1917. **Cap.**, $2,000,000; $1 par; listed on New York Curb $1,000,000 issued.

Property: the old Hackberry mine, located in 1874 by W. B. Ridenour, in the Peacock district, 26 miles N. W. of Kingman, Arizona.

The mine is credited with a production of $2,000,000 in high-grade silver ore. In the early days a 500′ incline shaft, giving a vertical depth of 360′ was sunk on the vein. At this depth water stopped operations. A new shaft sunk on vein to depth of 900′, has, it is said, developed 200,000 tons milling ore above the 600′ level, containing 20 oz. silver, $1.50 in gold, besides lead and zinc. Vein is said to be from 4 to 16′ wide, stopes up to 400′ long. High-grade ore is also found in the vein. The 600′ level has been driven 700′, and 278 samples averaged 32 oz. silver per ton.

Equipment: over $500,000 has been spent on development and machinery, including a 250-ton flotation mill finished in April, 1919, employing ball-mills and four K. & K. flotation machines. Recovery was 85% in September. The monthly income was then between $30,000 and $40,000.

In Dec., 1919, the mill was closed on account of insufficient ground open for stoping, but high-grade silver ore was to be shipped to smelter.

HIGHLAND MINING & MILLING CO. **ARIZONA**

Address: C. B. Bell, Chloride, Ariz., and L. R. Meyers, Minneapolis, Minnesota.

Property: formerly owned by the Middle Golconda Mines Co. The Middle Golconda, Golconda, and O'Dea mines were consolidated in April, 1919. The second named has been a big zinc producer.

Geology: veins in igneous rocks carry zinc ore, with small amount of lead, occurs in shoots, or expansions of the vein, 6 to 20′ wide.

Development: funds are now available for development of the group. The Golconda has been opened to a vertical depth of 800′. A tunnel is to be driven to cut out the veins of the group at 1,000′ depth.

HOLMES MIDNIGHT MINES CO. **ARIZONA**

Reported sold in 1916 to G. H. Holmes, Salt Lake City, Utah, for $250,000 and transfered to company; 85% of stock held by Mr. Holmes and by Jim Murray of Butte, Mont.

Property: 6 claims, 1½ miles S. of Chloride, Mohave county, Ariz., said to have 25,000 tons of gold-copper ore developed above 300′ level. Orebody on 100′ level, 56′ thick, averages 10% zinc and $7 gold.

Equipment: includes 10-stamp mill and concentrator, with hoist good for 1,000′.

Production: total $100,000 to end of 1916; no data since then.

HOME PASTIME MINE. **ARIZONA**

Address: J. M. Prisk or J. E. Hoover, Mineral Park, via Chloride, Mohave county, Ariz.

Property: formerly known as the Rattlesnake, a producer of rich silver ore. Main shaft is 300′ deep.

By September, 1919, the 80′ level had been cleaned out and 8′ of 40 oz. silver ore, with some gold, was exposed. A 12 to 18" streak reported to have assayed up to 204 oz. per ton. One carload shipment made.

HUGHES ARIZONA COPPER CO. **ARIZONA**

Office: Continental Sec. & Inv. Co., 607 McIntyre Bldg., Salt Lake City, Utah.

Officers: J. B. Hughes, pres.-treas.; E. B. Hughes, v. p.-mgr.; H. M. Parsons, sec.

Inc. 1916. **Cap.,** $1,000,000; $1 par; 500,000 shares outstanding; in trust for development purposes, 500,000 shares.

Property: 5 claims known as the Copperhill and Alma mines, 2½ miles S. E. of Chloride, Ariz. Also has a 2-year lease on the Bay State mine of the Arizona-Bay State Co., providing for a 15% royalty on all ore extracted. Veins are well defined, 10′ to 20′ wide and traceable 3,000′ across claims.

Development: by 500′ tunnel said to be driven on the vein, and for about half this distance, in ore. A shaft has been started and was 100′ deep, May, 1917. Prospecting by core drills in 1918 is said to have shown satisfactory results.

Lessees working on the Bay State claim near the Midnight, say the c carries antimony besides copper, silver, lead and zinc values.

A highly speculative venture.

ILLINOIS EXPLORATION CO. **ARIZON**

Address: W. J. Jennings, Kingman, Ariz.

Officers: H. C. Chapin, pres.; Lucille Roberts, sec.

Property: undeveloped claims in the Chemehuevos mountains, west Kingman.

JEMISON MINES CO. **ARIZON**

Head office: Wallace, Idaho. **Mine office:** Chloride, Ariz.

Officers: G. W. Kays, pres.; Henry Kehoe, v. p.; Charles McKinnis, se treas. and gen. mgr., with C. G. Crook and J. P. Smith, directors.

Inc. 1917 in Arizona. **Cap.,** $1,500,000; shares $1 par; non-assessable.

Property: 4 claims and fractions, 17 miles N. of Kingman in the W: lapai district, Mohave county, Ariz., ½ mile from the well-known Golconda mi at Chloride.

Development: main tunnel 500′ long, being extended E. 350′ to conne with old workings above. Ore-shoot has been proven continuous for 300′ and from 3 to 7′ wide, with $25 to $48 per ton in gold, silver and copper valu A shoot carrying arsenopyrite on the foot-wall contains as high as 10 oz. go per ton. Near this shoot a shaft is being sunk in ore from the main tunnel, han sorted ore paying half the expenses. In 1918, lessees were shipping some ore.

Equipment: 25 h. p. Fairbanks-Morse hoist, 5-drill compressor, pum houses, etc.

JUNO MINE. **ARIZON**

Address: Wm. Miller or Mrs. Sophy Loy, Long Beach, Calif.

Property: one of the earliest locations in the Chloride district, Moha county.

Development: by 570′ shaft and 2,000′ open-cut. **Production:** total $500,000 to end of 1916. No recent information received.

KEYSTONE CONSOLIDATED MINING CO. **ARIZON**

Address: 908 City Natl. Bank Bldg., Los Angeles, Calif.

Officers: G. S. Holmes, pres.; W. O. Kay, v. p.; T. H. Fitzgerald, sec mgr.; John Schneider, treas., with A. Patterson and A. McNally, directors; F. V Sherman, supt.

Inc. May, 1916, in Arizona. **Cap.** $2,000,000; $1 par; assessable; all ou standing. Bonds authorized $660,000; outstanding $125,000.

Property: 8 patented claims, including the Keystone mine, in Miner Park, Cerbat Range, formerly owned by Ross D. McCausland of Kingman.

Ore: lead-silver-zinc-copper bearing, containing 2 to 4% copper, 12 t 24% zinc and over 30 oz. silver per ton, as sampled from dumps. Past produ tion said to be $150,000.

Development: by 300′ shaft, with three levels and total of 3500′ unde ground workings.

Equipment: mill has been remodeled, using the Richmond flotatio system and accessories to treat dump ore and if successful, mine will be r opened. Claim to have ore reserves of 100,000 tons.

Probably a fair mine, but had a wrongly-designed plant rushed up before was needed. Company was consolidated with the Silver Keystone Co. in 191 Examined by Fred Chase, Wm. Nagle and M. McIntyre.

Production: totaled $150,000 to end of 1916.

KINGMAN ZINC MINING CO. **ARIZON**

Office: R. V. Dawson, Kingman, Ariz.

Cap., $1,000,000, shares $1 par; 800,000 shares outstanding.

Property: 6 miles from A. T. & S. F. R. R. in the Chloride distric Some hand-sorted silver-zinc ore has been shipped by lessees.

Not favorably regarded, as the promotions of Mr. B. K. D. are looked upo with suspicion by many people.

LA ANOZIRA GOLD MINING CO. **ARIZONA**

According to statement of vice-president and engineer, company went out of business in 1917. For full description see Vol. XIII, p. 371.

LEVIATHAN MINES CO. **ARIZONA**

Office: 512 Sellwood Bldg., Duluth, Minn. **Mine office:** Yucca, Ariz.

Officers: Theo. Hollister, pres.; G. Carlson, v. p.; C. P. Craig, sec.; C. S. Tremelling, treas.; E. M. Kelly, supt.

Inc. Oct. 14, 1914, in Arizona. **Cap.,** $1.000,000; $1 par; 893,902 shares issued. Annual meeting first Tuesday in December.

Property: the Whale & Copper Wonder mines, 7 claims, about 120 acres, in the Copper canyon, Cedar mining district, Mohave county, Ariz., shows copper-molybdenite-silver ore in 2 quartz veins traversing an altered granite. The main orebody said to be 7′ wide and proven for 600′ in length; runs N. 8° E. and dips 80° E. Ore said to average 1% molybdenum, with some copper and silver. Vein reported to be 14′ wide at 100′ level.

Development: 250′ shaft and 2 tunnels 60′ and 400′ long with 252′ and 400′ drifts.

Ore reserves: estimated at 100.000 tons blocked out.

Equipment: includes 100 h. p. and 50 h. p. oil engines, with complete concentrating plant of 50-70 tons daily capacity. Refining plant at Vernon, Cal., for retreating concentrates and manufacture of ammonium molybdate, molybdic acid, calcium molybdate, etc.

Operations suspended December, 1919, owing to poor market for mobydenum.

LOS ANGELES GEM CO. **ARIZONA**

Office: Los Angeles, Cal. Mail returned unclaimed, August, 1918, from **Mine office:** Kingman, Mohave county. E. E. Peck, pres. and gen. mgr. C. W. Morrell, sec.-treas.

Property includes a variscite mine in Esmeralda Co., Nev., but the principal property is the George Washington group of 6 claims in Mineral Park, near Kingman. This property carries a vein of 18 to 24″ width, developed by a 140′ upper tunnel and a 370′ lower tunnel, said to show ore assaying up to 4% copper, 200 oz. silver and $4 gold per ton. The company mined turquoise from the claims for some years, before developing copper.

Equipment: includes gasoline hoist. No recent information received.

McCRACKEN SILVER-LEAD MINES CO. **ARIZONA**

Office: 622 Higgins Bldg., Los Angeles, Cal. **Mine P. O.:** Yucca, Ariz. Mines at McCracken, Ariz.

Officers: W. B. Van Horne, pres.; H. H. Mather, v. p.; J. H. Hoffman, sec.-treas.; Leonard Hoffman, gen. mgr.

Cap., $1.500,000; $1 par; 1,200,000 issued.

Property: owns a group of 10 claims and operates the adjoining Ostego mine under control, all located about 30 miles S. E. of Havaland, Mohave county.

Development: by tunnels and shafts, aggregating 2,500′ of workings. Company estimates ore reserves of about 400,000 tons worth $15 per ton. Mill ore contains from 5 to 15% lead and 6 to 15 oz. silver per ton. Two carloads crude ore shipped are reported to have returned 71% lead, 4.3 oz. silver.

Equipment: includes air-compressor, hoisting engine and 100-ton mill, employing dry concentration. The first shipment of concentrate was made late in September, 1919.

MERRIMAC MINE. **ARIZONA**

Owned by Geo. Cleeland of Philadelphia, Pa., but bonded to J. C. Rankin in June, 1917. A. W. Henning, supt.

Property: a mile west of Chloride, is developed by 400′ incline shaft and new shaft sunk in 1917. The vein is said to be 22′ wide, and cuts through [illegible] and diorite. Ore carries gold, silver, lead and zinc.

Production: totaled $175,000 to end of 1916. Nothing reported since

[illegible]GOLCONDA MINES CO. **ARIZONA**

[illegible] to Highland Mining & Milling Co., which see.

MINNESOTA-CONNOR MINING & MILLING CO. ARIZO

Address: P. S. Virgin, mgr., Chloride, Ariz.

Officers: H. B. Hanford, pres.; J. T. Jackson, v. p.; J. S. Freema sec.; J. O. Kerbaugh, treas.; the first three at Philadelphia, Pa.

Property: 13 claims, 1½ miles S. of Chloride, Mohave county; said carry the outcrops of 17 distinct veins.

Development: by 725′ vertical steel-lined shaft, also 4 inclines from to 530′ deep. At 600′ depth the main vein is 15 to 25′ wide, but of low gr At 700′ it is 38′ wide, also poor. West of the shaft is a 20′ vein, the Pluto, w is expected to join with the Minnesota below 700′.

Equipment: three 100 h. p. boilers, 75 h. p. hoist, 900 cu. ft. compres lighting plant, mill engine and 150-ton concentrator.

Production: totaled $1,150,000 to end of 1916. Work was suspen late in 1916 for want of funds. Believed to be idle.

MISSOURI-MOHAVE MINING CO. ARIZO

Address: G. W. Marks, mgr., Cerbat, via Kingman, Ariz.

Property: in the Cerbat range, reported to have opened up a 4′ vei lead-zinc ore carrying gold, on the 100′ level. Driving tunnel north of shaf cut the vein.

MOHAVE MOLYBDENUM CO. ARIZO

Address: L. P. Morel, sec.-treas., Oatman, Ariz.

Officers: C. A. Martin, pres., Oatman, Ariz.; D. T. Boone, v. p., K man, Ariz.

Inc. 1918. **Cap.**, $150,000; 10c par; 600,000 shares paid for property

Property: 11 claims in Maynard district, Wallapai Mountains, devel ing some molybdenum veins. A prospect.

MOLLY GIBSON-CHLORIDE MINES CO. ARIZO

Address: Chloride, Ariz.

Officers: R. C. Ferguson, pres.-mgr.; J. C. Wilson, treas., Kingn Arizona.

Inc. in Arizona.

Property: 3 claims, 1,000′, S. W. of the Tennessee mine, Chloride trict, Mohave county, Ariz. Ore carries silver and lead, with some gold copper in two fissures as far as opened to 70′ depth.

Production: totaled $100,000 to 1916.

Property is a meritorious prospect, which present management plan develop by sinking a 200′ shaft.

Equipment: includes a 25 h. p. hoist, and a 10x10″ Sullivan compres

Property is being promoted by W. B. Twitchell of Phoenix and others.

MONTORO MINING CO. ARIZO

Address: 300 Wright Bldg., Denver, Colo., and Chloride, Ariz.

Officers: A. J. Fowler, pres.; J. L. Smith, v. p.; E. L. Brock, s treas.; H. I. McCarn, mgr.

Cap., $500,000; shares $1 par.

Company organized in 1919 to take over the property of Rainbow Moun Mining Co.

Property: 9 claims, unpatented, on Rainbow Mt., 2 miles E. of Chlo Wallapai mining district, Mohave county. Claims said to show a vertical containing gold silver lead-zinc ore

Development: work totals 3,000′ including 780′ of tunnels and 450′ sh with 4 levels opened up. Former company claimed to have 10,000 tons of partly blocked out, May, 1917, mostly on South ore-shoot.

Equipment: includes an 80 h. p. hoist and 2-mile aerial tram, 300 ft. compressor, Cornish pump

Former management planned driving a 3,000′ crosscut tunnel to cut vei 1,000′.

Production: shipments to Needles smelter, totaling 3,000 tons, of sil gold lead ore, have yielded $140,000 to end of 1916. None reported since.

NANCY LEE MINING CO. **ARIZONA**

Address: P. O. Box 27, Bisbee, Ariz.

Officers: F. T. Bragonier, pres.; Robt. Ferguson, v. p.; H. J. Hierl, sec.-treas.; foregoing with W. E. McKee, Dr. W. A. Holt, R. Brown, directors. Inc. 1915 in Arizona. **Cap.** $1,000.000; $1 par; issued 420,000 shares.

Property: 6 claims, 3 fractions and mill site in Secret Pass district, 9 miles N. of Oatman. Elevation 3,000', water on property. Claims show N. W.-S. E. fissures 4' to 12' wide in andesite, filled with a close-grained, dense rhyolite, with strike faults and shrinkage cracks.

Development: by 180' incline shaft and connecting tunnel 320' long; total workings, 1,000'. No work done during 1916-1919. Vein assays from a trace to $12.50 per ton. Values are mostly in gold, with some silver.

Examined by John Tait Milliken and R. D. Johnson. Mine warrants further development.

NEEDLES MINING & SMELTING CO. **ARIZONA**

Company was liquidated Dec., 1917, and its property and assets turned over to the U. S. S. R. & M. Co., which see. **Works office:** Needles, San Bernardino county, Calif. A. P. Anderson, gen. mgr.; D. R. Muir, mgr., of this and the Gold Roads Mines Co., Needles, Calif., and Goldroad, Ariz.

Inc. 1909, in Me., as successor of Arizona-Mexican Mng. & Sm. Co. For full description see Vol. XIII. The lease on the Tennessee mine (a producer of many millions of dollars) has been relinquished, and property bought by Schuykill Mining Co., which see.

Property: Champion mines, 12 mines north of Kingman, consists of the following unpatented claims: Champion, Champion No. 2, and Primrose, 27.5 acres. These claims, like the Banner group, were acquired as a prospect and some development work was done which yielded a small tonnage of gold, silver, lead and zinc ore, which was shipped to the company's mill at Needles. They are now being worked by lessees.

Champion was shipping about one car daily to Needles.

The Stockton Hill group of mines, at Stockton Hill, Mohave county, Ariz., 80.5 acres. No work is being done on this group at present.

The milling plant at Needles, Calif., a concentrating plant of 125 tons daily capacity, equipped with crushers, jigs, tables and a flotation plant, the latter for the recovery of zinc values from tailings. It also treats small tonnage of custom ores. The plant is thoroughly modern and well-equipped for economic work.

Production: to the end of 1916, the Champion produced over $200,000.

NEW COMSTOCK MINING CO. **ARIZONA**

Address: W. A. Howard, mgr., Pyramid, via Kingman, Mohave county, Arizona.

Property: the Catharine mine, west of Kingman in Union Pass section, near Pyramid. Claims show a limestone-granite contact with a fissure vein containing copper and a 12" quartz vein containing bismuth. The 400' shaft is said to show 12' of $30 ore, at a depth of 200'. In September, 1919, the adjoining property was acquired for $15,000 cash.

NEW JERSEY MINING CO. **ARIZONA**

Mail returned from former address. Ed. Mingle, mgr., Chloride, Ariz. Described in Vol. XIII.

OATMAN GOLD TOP MINE **ARIZONA**

J. P. Loftus and J. K. Turner, of Goldfield, Nev., operators. Mine is in the Secret Pass district, 10 miles from Oatman, Ariz.

Has 30-ton ball and amalgamating mill, but whether it treated any ore cannot be said.

ORO-PLATA MINE **ARIZONA**

Mail returned from former address. O. B. Stanton, supt., Kingman, Mohave county, Ariz., and 101 Wall St., N. Y. Property is a gold mine which produced lead-zinc ore, with gold and silver values.

Development: by 280' shaft; equipped with gasoline hoist. Mine has mill with 2 Nissen stamps. Credited with production of $500,000 in gold and silver up to 1917.

PAYROLL MINE **ARIZOI**

Address: A. W. Henning, mgr., Chloride, Ariz.; T. B. Scott, New Yo owner. Reported under 10-year lease to F. L. Martin.

Property: 1½ miles E. of Chloride, Mohave county.

Development: by 400′ vertical shaft. On the bottom level over 2 has been driven in ore, the shoot being from 1 to 8′ wide. At 200′ the vein v 12′ wide for 290′. Minerals are mostly zinc, with a little gold and silver.

Equipment: electric hoist,. compressor, etc.

Production: totaled $50,000 to end of 1916.

Shipping 35 tons of lead-zinc ore per day to mill at Needles at last rep

POLARIS MINING CO. **ARIZOI**

Office: 520 Lyceum Bldg., Duluth. Minn.

Officers: W. A. Eaton, pres.; J. O. Davis, v. p.; G. L. Maycroft, se treas.; above with A. E. Fritz, G. A. Eaton, O. E. Dahly, B. P. Wheeler a G. D. Tulian, directors.

Inc. 1916 in Minn. **Cap.,** $1,000.000; shares $1 par; 294,281 issu Company is successor of the Summit Gold Mng. Co., which in turn succee Summit Copper Co. Stockholders of Summit Gold Mng. Co. were offered st in Polaris, share for share with payment of 25c a share.

Property: 21 claims, 5 patented, known as the Klondyke mine, ab 400 acres and a mill site, adjoining the Golconda mine on the south, in the V ginia district, Mohave county, about 22 miles N. W. of Chloride, the near railway station.

Geology: of district is described in U. S. Geol. Survey Bull. No. 3 Claims said to show Golconda, Tub, and Blackfoot veins, and 5 others.

Ore is a gold-bearing quartz occurs in a vein up to 50′ in width 1897 a 10-stamp amalgamation mill was erected near the property, and mine credited with production of 3,000-4,000 tons of ore running from $8 to $37 ton. Gold is finely disseminated, and as only a 32% extraction could be ma operations were suspended.

Development: by 300′ tunnel.

Transportation, water, etc., are some of the difficult problems confronting company.

No recent returns.

QUEEN BEE MINE **ARIZON**

Address: M. B. Dudley, owner, Mineral Park, via Kingman, Ariz.

Property: an old silver-gold mine sold in August, 1919, by James U capher. Surface outcrops were rich, and lessees in recent years have extrac considerable shipping ore.

RAINBOW MOUNTAIN MINING CO. **ARIZON**

Described in Vol. XIII.

Company liquidated and property conveyed to a new company, the Mont Mining Co.

REDEMPTION COPPER MINING & MILLING CO. **ARIZON**

Dead. Lost its property, 1914.

The mine near Chloride, Mohave county, Ariz., was sold to Dr. M. Tay Uhler, Philadelphia, in 1917. See Vol. XII.

RED GAP GOLD MINES CO. **ARIZON**

Officers: C. C. Ward, pres.; C. W. Hernden, v. p.; C. M. Pedley, se treas.

Inc. 1917, in Arizona. **Cap.,** $1,500,000; shares $1 par.

Property: a group of claims in the Weaver district, 25 miles N. of Chloride, developed by tunnels and drifts said to expose veins from 10 wide, showing gold-silver values. A prospect. Reported optioned in 1918 Eastern capitalists.

RICO CONSOLIDATED MINING CO. **ARIZON**

Superseded by Rico Exploration Co.

RICO EXPLORATION CO. **ARIZON**

Address: 1101 Citizens Bank Bldg., Cleveland, Ohio.

Officers: M. A. Monaghan, pres.; C. J. Weideman, sec.-treas., M Cleveland, v. p.-mgr., Kingman, Ariz.

Inc. in Arizona. **Cap.**, $500,000, increased from $100,000 in August, 1919.

Company recently took over property of Rico Cons. Mining Co., reported in March, 1919, that a first payment of $15,000 had been made.

Property: the Rico and C. O. D. mines, 20 miles N. of Kingman, Mohave county. The C. O. D. has a past production of $1,500,000 in silver and gold. The new company has added a gas engine and a compressor and was planning to sink below the old workings.

RURAL-BUCKEYE MINES **ARIZONA**

Address: W. W. Widdowson, mgr., via Kingman, Ariz.

Property: in Mineral Park district, near Kingman. Reported in 1919 that the Rural and Buckeye gold-silver mines had been taken over by M. B. Dudley and associates. The Rural has a 200′ shaft, the Buckeye a 700′ tunnel. Estimated to have 22,000 tons good milling ore in mine and 8,000 tons milling ore on the dumps.

Equipment: includes electrically-driven hoist, compressor, pump; also machine-shop, dwellings, water supply, etc. A 100-ton mill under construction in 1919.

SCHUYKILL MINING CO. **ARIZONA**

Address: M. J. Keily, supt., Chloride, Ariz. H. A. Broughton, pres., San Francisco, Calif.

Property: 2 patented claims, on the S. adjoining the Tennessee mine, Chloride district, Mohave county. In March, 1918, company purchased, for cash, the Tennessee mine from the Wallapai Mining Co., original owners. This mine consists of the Empire No. 2, Tennessee, Great Lead and Tennessee South patented claims.

The ore contains gold, silver, lead and zinc in varying proportions and occurs in a fissure vein between pegmatite and schist, striking north and south. The ore shoot averages about 300′ in length and 6′ in width and has been followed down to the 1,170′ level. The ore is being extracted through a shaft which up to date has reached a depth of 1,400′. Indications are that the ore shoot will be followed in undiminishing strength to a much greater depth than has been yet achieved.

The original property of the Schuykill Mining Co. is developed by 800′ incline shaft and levels at each 100′. The vein is almost vertical, dips slightly E. and strikes N. 9° W. At 500′ the shoot is 5′ wide. In a tunnel connected with the 200′ level, the shoot is 8′ wide.

Equipment: 100 h. p. steam hoist, 108 h. p. gas engine, 460 cu. ft. Sullivan angle-compound compressor, lighting plant, etc. Company has added new electric equipment to the Tennessee mine and was planning on a mill.

SENATE SILVER MINING CO. **ARIZONA**

Address: Kingman, Ariz.

Officers: C. C. Spicer, pres.; A. G. Keating, v. p.; J. N. Harper, treas.; S. M. Warmbath, treas.; with P. C. Thorne, directors.

Inc. in Arizona. **Cap.**, $150,000; 10c par; 50,000 shares issued.

Property: 4 claims, 3 miles from Hackberry, and 30 miles from Kingman. Reported that development would be carried through vertical shaft of Hackberry Cons. until company sinks its own shaft, which was 200′ deep September, 1919, and still sinking on vein with 30″ of 48 oz. silver ore.

Equipment: includes 25 h. p. hoist and a compressor. Is a prospect.

SILVER HILL MINING & MILLING CO. **ARIZONA**

Mail marked "out of business," returned from former address, Chloride, Ariz., in July, 1919. Described in Vol. XIII.

SILVER KEYSTONE CO. **ARIZONA**

Address: F. W. Sherman, supt., Chloride, Ariz.

Consolidated with Keystone Consolidated Mining Co., whose mill treated ore from both mines. No recent returns.

SILVER KNIGHT MINE **ARIZONA**

Address: Chas. Parisia, mgr., Chloride, Ariz. T. N. Barndall, Pittsburgh, Pa., owner.

Property: 2 claims, said to be on the S. extension of the Tennessee vein, Chloride district, Mohave county.

Development: by vertical shaft, reported to have opened good lead ore.

SOUTHWESTERN COPPER CO. **ARIZONA**

See Arizona-Southwestern Copper Co.

STANDARD MINERALS CO. **ARIZONA**

Address: 116 W. Center St., Anaheim, Cal.

Officers: G. M. Simpson, pres.-supt, Box 727, Kingman, Ariz.; L. C. Deming, v. p.; C. C. Randall, sec.-treas.; with H. L. Seares, directors, all of Anaheim.

Inc. Nov., 1917, in Arizona. **Cap.**, $2,000,000; $1 par; non-assessable outstanding, 1,500,000.

The company acquired the property of the Telluride Chief Mining Co. See Vol. XIII.

Property: 25 claims, unpatented, 450 acres, in Hualapai range, 20 miles S. E. of Kingman, has molybdenite and silver in quartz vein in granite. Claims 50,000 tons of ore blocked out.

Development: 355' vertical shaft, with 2,000' of workings. On 200 and 300' levels a large tonnage of 1% molybdenite ore has been opened.

Equipment: includes 100-ton flotation mill which started operating in March, 1919; a 40 h. p. hoist and 500 cu. ft. compressor, with 25, 80, and 120-h. p. oil engines.

Management states that $151,000 was spent in 1918 in development and equipment. Production not reported.

STENE CONS. COPPER CO. **ARIZONA**

(Successors to R. M. Stene Mines, Ltd.)

Exec. office:. 40 Wall St., New York City. **Operating office:** Phoenix, Arizona.

Officers: R. M. Stene, pres.; Col. Julius Leonori Nichols, v. p.; C. B. Christy, sec.-treas., Phoenix, Ariz.; with L. W. Coggins, C. T. Washburn, C. W. Clawson, F. L. Patton, Jr., directors. A. P. Dittmar, gen. supt. U. S. Corporation Co., transfer and registrar. Promoted by Globe Syndicate, and Frey & Co.

Inc. Dec. 3rd, 1917, in Arizona. **Cap.**, $3,000,000; $1 par; issued 1,381,233.

Balance sheet of August, 1918, shows: 333,334 shares paid for Riverside group and 650,000 shares for Oregonian group, besides $5,900 cash. Smelter returns test shipment $1,358, cash received from sale of stock R. M. Stene Mines Co., $24,374.

Promotion stock to directors, attorneys, etc., 135,387 shares; to R. M. Stene for stock due by Stene Mines Co., 28,680 shares; shares sold, old company, 166,666; new company, 67,166. New stock issued for leaching plant, etc., 606,267 shares. A Globe syndicate underwrote this stock in July, 1919.

Property: 785 acres, the Oregonian group, 6 claims, and the Riverside group, 34 claims, in Mohave and Yuma counties, 12 miles N. E. of Swansea. The Oregonian group, 6 claims, was purchased for 650,000 shares in 1918. This tract on the north side of the Bill Williams river has a flat orebody in part covered by gravel. The orebody is reported to be 1,400' long, to average 250' wide and from 6' to 30' thick. Fifty-one samples are reported to average 8.1% copper. Mr. Donohue estimated 275,000 tons of 2.5% ore.

The Riverside group covers a canyon cut by the river through upturned schists with a flat fault fracture showing copper ore in rather sporadic occurrence. The development work thus far done on the group is disappointing, but the waterpower right may prove quite valuable.

Company reports August 3, 1919, arrangements made to install 300-ton crushing and sampling plant, bins and power unit, with 150-ton leaching plant, also compressor, quarry track and power equipment, etc.

The Keystone track drill No. 5 and a Keystone steam shovel were to be ordered and a bridge built across the river at the dam-site.

The acquisition of the Oregonian group as recommended by the examining engineer gives the company a producing property, while Riverside claims will be developed later.

The Stene Development Corporation, 701 Madison Ave., New York, is fiscal agent for the Stene Cons. Copper Co.

TELLURIDE CHIEF MINING CO. **ARIZONA**

Described in Vol. XIII. Property acquired by Standard Minerals Co., which see.

TELLURIDE & CHLORIDE LEASING M. & M. CO. **ARIZONA**

Mail returned from former address, Chloride, Ariz.; G. R. Harkness, v. p.; J. M. McMillan, sec.-treas.

Property: the Schenectady mine, 3 claims and a millsite, in Chloride district, only 585' north of Tennessee mine, has 5' fissure vein, crossed by Genevieve vein.

Development: sinking a shaft to 400' depth in June, 1917, with good silver ore reported at 225'.

Production: totaled $10,000 to end of 1916. Probably idle.

TENNESSEE MINE **ARIZONA**

Chloride, Ariz. See Schuykill Mining Co.

TINTIC MINE **ARIZONA**

Property: 1½ miles W. of Chloride, Mohave county, Ariz.

Development: to 100' depth. Vein is from 3 to 5' wide, and considered promising.

Production: totaled $100,000 of gold to end of 1916. No recent information.

TIPPERARY MINING CO. **ARIZONA**

Address: Oatman, Ariz.

Property: in October, 1919, company purchased the McKesson mines, 6 miles W. of Wallapai Station, Mohave county, and was to install machinery from its property at Oatman.

TOWNE MINING CO. **ARIZONA**

Address: J. E. Shank, sec.-treas., Chloride, Ariz.; S. S. Jones, pres.; T. J. Murphy, v. p.; with Dan Murphy and J. M. Francis, directors.

Property: the Towne mine, 1½ miles S. of Chloride, Mohave county, developed by 225' vertical shaft.

Production: totaled $1,125,000 to 1916, mostly silver ore. Smelter returns show carloads assaying 7 oz. gold and 600 oz. silver per ton. For this production the ore was selected. Mine is idle at present, but management states that financing will be undertaken in the fall of 1919 and work resumed.

UNION BASIN MINING CO. **ARIZONA**

Office: 67 Milk St., Boston, Mass.

Plant was burned down in 1917: insurance collected; funds invested. Company in process of dissolution. Property sold for $35,000 to C. B. Bell. Described in Vol. XIII.

UNION METALS CORPORATION **ARIZONA**

Address: Frank F. Peard, 30 Broad St., New York City. A. W. Clapp, mgr., Golconda, Ariz.

Property: Fredonia and Fredonia No. 2 lode claims, N. of Kingman, in the Wallapai mining district, Mohave county, formerly owned by the Golconda Consolidated, said to have developed a strong lead-zinc vein carrying gold and silver.

UTAH-ARIZONA GOLD & COPPER MINING CO. **ARIZONA**

Office: 626 Dooly Bldg., Salt Lake City, Utah.

Officers: Heber S. Cutler, pres.; J. F. Shelley, v. p.-gen. mgr., Shelley, Idaho; John W. Geiger, sec.-treas.; with W. J. Burton, Geo. F. Shelley and M. Thomas, directors.

Inc. Nov. 11, 1907, in Arizona. **Cap.,** $1,000,000; $1 par; issued 961,023

Annual meeting, second Tuesday in September.

Property: 60 claims, unpatented, about 1,200 acres, and a 20-acre mill site, in the Weaver district, 18 miles N. W. of Chloride, Mohave county, Ariz., the nearest rail point. Claims show quartz veins traversing granite and mica-schist, carrying gold-copper ore. Property includes the Golden Gate mine, developed by two incline shafts of 125' and 135', on parallel veins, and several short tunnels, with total of about 2,000' of workings.

Equipment: includes a 5-stamp mill, idle since 1914. Manageme stated that it expected to start development in fall of 1919.

WALDRON MINING CO. **ARIZON**

Office: 535 Chamber of Commerce Bldg., Pasadena, Cal. **Mine offic** Venture Camp, Kingman, Mohave county, Ariz. Geo. H. Hill, mgr.; W. V **Doren, sec.**

A reorganization, 1918, of the Arizona Venture Corp'n, which owned groups, 12 claims, about 240 acres, near the Old Diamond Joe mine, developed t tunnel, and by 600' shaft.

Equipment: includes hoist, air compressor, electric power plant and mill.

Company also owned the Waldron group at Deluge, Wash., and at last a counts was sinking a shaft to 500' level, with crosscut on 400' level, showing 4' of $23.60 ore. In 1915 management announced production of "lenzite" in con mercial quantity, used for wireless telegraphy, in crystals valued at $5 eac The Lenzite Crystal Corporation was incorporated for this purpose.

The commercial value of property and patents remains to be proved.

WALLAPAI CHIEF MINING CO. **ARIZON**

Address: S. C. Hall, 648 S. Olive St., Los Angeles, Cal., or Kingma Arizona.

Officers: C. F. Eyton, pres.; J. W. Squires, v. p.; S. C. Hall, sec.-treas with H. T. Rudisill and E. A. Gord, directors.

Inc. April, 1916, in Arizona. **Cap.,** $2,000,000; shares $1 par; non-assess able; 1,000,000 outstanding.

Property: 5 claims in Maynard district, near Kingman, Mohave count Arizona.

At last report sinking was under way to open a gold-silver vein in quartzit

WALNUT CREEK MINING & MILLING CO. **ARIZON**

Address: Kingman, Mohave County, Ariz. C. E. Worten, pres.; R. Wheelock, mgr.

Property: 9 miles S. of Kingman, developed by a tunnel 800' long December, 1918, said to have crosscut 20' of vein material showing some copp ore, and footwall had not been reached.

WASHINGTON-ARIZONA COPPER CO. **ARIZONA**

Address: E. D. Reese, mgr., Kingman, Ariz.

Property: the George Washington claims in Mineral Park district, Mo have county, said to have a large tonnage of copper-silver ore.

Development: by 3 tunnels and a shaft to a depth of several hundre feet.

In August, 1917, a 300-ton mill, using the Fields flotation process, was re ported ready to start operations. In July, 1918, reported that company had bee reorganized and work would be resumed, and in June, 1919, that stopes wer being opened. In July the mill was said to be making a fine grade of concentrat high in silver.

WESTERN ORE CONCENTRATION CO. **ARIZONA**

Mail returned, June, 1919, from former address.

F. E. Steffy, gen. mgr., Chloride, Ariz. Company operates a 250-ton custo plant including a 9x15" Blake crusher, two 14x30" Reliance rolls, Marcy ball mill Hancock jig, 10 Wilfley tables and K. & K. flotation unit.

WRIGLEY EXPLORATION CO. **ARIZONA**

Company liquidated. Described in Vol. XIII.

YUCCA-ARIZONA COPPER CO. **ARIZONA**

Property sold by court order several years ago and company presumably dead Described in Vol. XIII.

YUCCA TUNGSTEN MINING CO. **ARIZONA**

Address: Harvey Klotsch, mgr., Yucca, Mohave County, Ariz.

Property: 26 claims, 25 miles N. of Edmaier Mining Co. (tungsten mine), in Cedar Valley district, shows a 5' vein of ore, carrying 5% tungstic acid and 1% to 3% copper.

Development: comprises a 250′ shaft and 1,300′ of drift tunnels, 200′ apart vertically. Company operates a 50-ton mill; two flotation units were added in 1918. A dividend of $20,000 was paid in September, 1918.

OATMAN DISTRICT, MOHAVE COUNTY

ADAMS MINING CO. **ARIZONA**

Address: 620 I. W. Hellman Bldg., Los Angeles, Calif. **Mine office:** Oatman, Ariz.

Officers: E. H. Newland, pres.; N. A. D'Arcy, sec.-treas.-gen, mgr., with C. H. Palmer, Jr., and M. Lines, directors. Thos. Kilker, supt.

Inc. Dec., 1915, in Arizona. **Cap.** $100,000; 10c par; issued 734.000. Annual meeting, first Monday in February. Listed on Los Angeles Stock Exchange.

Property: 9 claims in the Black Range section, adjoining the Nellie.

Development: by 420′ shaft, crosscuts and drifts, said to show 3′ of ore assaying $20 per ton.

Equipment: includes 80 h. p. engine and pumps. Closed down in 1917, but reported in July, 1919, to be getting good results from development.

ALCYONE MINING CO. **ARIZONA**

Office: Oatman, Ariz.

Officers. W. O. Wright, pres.; Niels Buck, v. p.; Chas. F. Pugh, sec.-treas., with H. C. Topp and H. T. Becker, directors. Chas. F. Pugh, mgr.

Inc. Nov., 1915, in Arizona. **Cap.** $100,000; par 10c; 700,000 issued.

Property: 4 claims, now being patented, in San Francisco district, 2½ miles south of Oatman. Mine shows a quartz fissure vein in andesite; strike N. 80° E., dip 68°. Ore, free milling gold, said by company to run $42 per ton.

Development: by 415′ incline shaft and 800′ underground workings. Drifting east on the 400′ level to strike the ore-shoot at last accounts. No ore blocked out as yet.

Equipment: 60 h. p. hoist, compressor, etc. Management plans further drifting and sinking.

AOTMAN PIONEER GOLD MINES, INC. **ARIZONA**

Address: Oatman, Ariz. **Officers:** R. G. Tryon, pres.; Geo. F. Moser, sec.-mgr.

Inc. in 1915. **Cap.** $1,500,000; $1 par; all outstanding.

Property: 6 patented claims, including the Pioneer, formerly owned by the Pioneer Cons. Mines Co., 2 miles from Oatman. The Pioneer vein, one of the largest of the district, is covered for 4,000′ by company's claims.

Development: by 420′ main Pioneer shaft and several hundred feet of crosscuts and drifts on the 100′, 200′ and 400′ levels, exposing above the 200′ level 17,000 tons of $9.20 ore north of the shaft and $100,000 south, or a total of $256,400 gross. No estimate is made of the lower-grade ore below the 400′ level, and the high-grade shoot is bottomed.

In the Treadwell mine a 340′ shaft with levels at 100′, 200 and 300′ exposes 12,800 tons of an average value of $5.62, which is about the cost of handling such ore in the district.

The 35 Parallel mine has a 220′ shaft connecting on the 150′ level with a tunnel. The work is all in ore, exposing 8,500 tons of $13.30 ore.

Equipment: includes 10-stamp mill, 80 h. p. engine, compressor and 2 hoists.

Property has merit, but the high cost of mining and milling the ores of the Oatman district must be overcome before the low-grade material in this and other mines can be successfully handled. The property is large and though ore is of low grade, mine is said to have merit. A detailed report by Geo. F. Moser was made in March, 1917. No information available since then.

ARGO MINES CO. **ARIZONA**

Address: Oatman, Mohave Co., Ariz.

Officers: S. S. Jones, pres.-gen. mgr.; J. M. Francis, v. p.; J. E. Shank, sec.-treas., with J. S. Withers and Wm. Bates, directors.

Inc. in Arizona. **Cap.** $1,000,000; $1 par; 410,000 shares held in trea
ury. Listed on Los Angeles Stock Exchange.

Property: 9 claims in the Oatman district, shows a vein 40′ to 130′ wi
on surface, stated to be a continuation of the Tom Reed vein.

Development: a two-compartment shaft 605′ deep.

Equipment: includes a hoist with 1,000′ capacity, and a 360 cu. ft. a
compressor.

Is one of many boom-day mines of this district.

ARIZONA CENTRAL GOLD MINES CO. **ARIZON**

Now controlled by Arizona Divide Mining Co. of Nevada, which see.

ARIZONA EAGLE MINING CO. **ARIZON**

Dead. See Vol. XIII of this book.

ARIZONA GOLD STAR MINING CO. **ARIZON**

Office: 347 Title Insurance Bldg., Los Angeles, Cal.

Officers: R. Mansard, pres.; R. H. Sayers, v. p.; M. M. Miles, sec.-trea
Cap., $100,000; 10c par; issued $50,000.

Property: owns the Valkyrie and La Paz claims, 40 acres, 2 miles V
of the Gold Road mine, in the Tom Reed-Gold Road mining district, Moha
county. Developed by 100′ shaft, to be sunk to 400′ depth. Equipped with hoi
and compressor.

Company is supposedly dead.

ARIZONA MOSSBACK MINES CO. **ARIZON**

Office: Oatman, Ariz.

Officers: Chas. W. Maier, pres.; William H. Holcomb, v. p.; M. I
Kempley, sec.-treas.; with Jesse W. Speidel, Lee C. Paull, D. Garth Hearne, ar
C. H. Burlock (mgr.), directors. Jack Lamb, supt.

Inc. Sept. 4, 1917, in Arizona. **Cap.,** $1,000,000; $1 par; issued 750,00
Bonds authorized, $400,000; none issued. Annual meeting, second Monday
January. Registrar of stock, M. E. Kempley, Kingman, Ariz.

Property: 5 patented claims, 100 shares, 4 miles northerly from Oa
man, Mohave county.

Geology: Andesite-porphyry is cut but by a fissure vein having a di
of 76° S. E. down to depth of 400′, where it changes to N. W. and S. E. cours
Ore-shoots are 250′ and 300′ long. Ore is free milling, assaying $10 per ton
gold and silver.

Development: by 700′ vertical shaft with 1,500′ of underground worl
ings. Ore reserves are estimated by company at 500,000 tons.

Equipment: includes 40 h. p. hoist, compressor, 60 h. p. gas engi
pump.

ARIZONA REX MINING CO. **ARIZO**

Office: 1202 Hollingsworth Bldg., Los Angeles, Cal.

Officers: Frank A. Keith, pres.; J. L. McIver, v. p.; R. I. Rogers, s
treas., with Geo. W. Long, W. K. Ridenour and S. W. Mudd, directors.

Inc. Sept., 1915, in Arizona. **Cap.,** $1,000,000; $1 par; 666,700 sha
outstanding. Annual meeting, first Monday in December.

Property: 14 claims, at Oatman, Mohave county, only slightly dev
oped. Presumably idle.

ARIZONA TOM REED GOLD MINES CO. **ARIZO**

Oatman, Mohave Co., Ariz. **Officers:** Geo. F. Moser, pres.; Chas.
Seeley, sec.; C. L. Moser, v. p.; Geo. F. Moser, gen. mgr.

Inc. July, 1915.

Cap., $1,000,000; $1 par; issued 657,903. Stock listed in Los Ange
and San Francicco.

Property: owns 7 claims, 97 acres, and has a lease and bond on
Snowball group, 90 acres, all adjoining the property of Aotman Pioneer G
Mines, Inc., on the north. Main ledge of the Pioneer continues into compa
claims.

Development: by several shafts 10′ to 100′ in depth and on the 400′ le
by a crosscut from the Aotman Pioneer. Company sinking a main working sh
on the Trio claim at last accounts.

BIG JIM CONSOLIDATED MINING CO. **ARIZONA**

Office: 591 I. W. Hellman Bldg., Los Angeles, Cal. **Mine office:** Oatman, Mohave county, Ariz.

Officers: C. C. Spicer, pres.; Lester M. Dull, v. p.; S. M. Warmbath, sec.-treas., with Elmer M. Bray and C. W. Pope, directors. A. G. Keating, supt.

Inc. 1917 in Arizona. **Cap.,** $1,500,000; shares $1 par; non-assessable; 1,250,000 shares outstanding. Stock listed on Los Angeles and San Francisco exchanges. Is the successor of Big Jim Mng., which see.

Property: 7 claims, unpatented, in the Tom Reed-gold Road mining district. The Bluebird group is 3,000′ west of the Tom Reed. Ore is gold, occurring in andesite.

Development: 400′ shaft on the Bluebird group, reported to cut the vein in a crosscut on the 200′ level.

Equipment: includes 25 h. p. gasoline hoist and Ingersoll-Rand compressor. There has been no production and property is still in the development stage.

Regarded as a speculation, but with good ground, worthy of prospecting.

BIG JIM GOLD MINING CO. **ARIZONA**

Dissolved by vote of stockholders, April 24, 1917. The Big Jim and Monarch claims were sold to the United Eastern Mng. Co. in 1917, the owners of Big Jim G. Mng. Co.'s stock receiving 1/6 shares of United Eastern stock and one share of Big Jim Cons. Mng. Co. stock.

BLACK RANGE MINING CO **ARIZONA**

Address: Oatman, Mohave county, Ariz.

Officers: D. P. Wright, pres. and mgr.; Theodore Peterson, v. p.; Del Sherer, sec.-treas.

Inc. Oct. 30, 1913, in Ariz. **Cap.,** $1,000,000; shares $1 par; non-assessable; outstanding, 700,000. Listed on Los Angeles Exchange. Annual meeting, first Tuesday in November.

Property: 8 claims, 2 patented, 155 acres, 5 miles south of Oatman. Shows quartz veins in andesite. Ore is said to run from $2 to $20 per ton. Developed by 300′ shaft, with 600′ of workings.

Equipment: includes a gasoline hoist, air-compressor, and pumps. Property is still in the development stage, but was closed in June, 1919.

BLANTON GOLD BULLION MINE CO. **ARIZONA**

Address: Oatman, Ariz.

Officers: Chas. P. Blanton, pres. and gen. mgr.; B. Ginsberg, v. p.; Herman Marks, sec.-treas.; with Louis Dorfman, directors.

Reported to have a gold property in the Mossback section.

BOUNDARY CONE GOLD MINES CO. **ARIZONA**

Oatman, Ariz. **Officers:** F. H. Biles, pres.; J. D. L. Williams, Rex Arms Apt., Los Angeles, sec.; Calvin Hartwell, treas.; preceding, with W. F. Ball, S. M. Barnes, T. C. Job, directors. Frank Dryden, supt.

Inc. in Arizona. **Cap.,** $1,500,000; shares $1 par; outstanding 1,198,000 shares. Listed on Los Angeles Stock Exchange.

Property: 8 claims, 82½ acres, patented, 1 mile S. W. of Oatman. **Ore:** gold.

Development: shaft 775′ deep, January, 1919, with about 4,500′ of workings. On the 450′ level management reported an ore-shoot 150′ long, 15′ in width, with average assays of $14 per ton, and on the 550′ level to have a shoot that was 150′ long when work was stopped and shaft-sinking resumed. Also said to have opened up considerable milling grade of ore in rather thin stringers. Shaft makes 15,000 gal. of water daily, handled by bucket.

Equipment: hoist, 300 cu. ft. air compressor, blacksmith shop. Plans cross-cutting to vein on 750′ level, development of orebody and erection of a mill. Idle March, 1919.

CARTER GOLD MINING CO. **ARIZONA**

Oatman, Ariz. E. A. Shaw, pres.; Henry Lovin, v. p.; W. K. Ridenour, sec.; H. H. Watkins, treas. Dan Bosque, in charge.

Inc. in Arizona. **Cap.,** $1,000,000; shares $1 par.

Property: New York, Giant and Gold Cross patented claims, 55 acres, in Tom Reed-Gold Road mining district, near Oatman, Mohave county, Ariz. Developed by incline shaft 350′ deep, with several hundred feet of workings on the 150 and 250′ levels. The vein on the 150′ level was said to be 12′ wide, but of small value. On the 250′ level management reported that the vein was over 7′ wide and averaged $8.60 gold per ton. On the 350′ level 1,200′ of drifting was done.

In January, 1919, company was reported idle and surface equipment was reported sold.

CASEY JONES MINING CO. **ARIZONA**

Oatman, Ariz. **Officers:** J. M. Francis, pres.; V. S. Rowley, v. p.; J. E. Shank, sec.-treas., with J. J. Casey and H. M. Caswell, directors.

Inc. in Ariz. **Cap.,** $100,000; 10c par; 600,000 shares in treasury. Listed in San Francisco.

Owns the Swallow group, 14 claims, 176 acres, adjoining the Oatman Gold, and the Argo and Tom Reed properties. Property in the development stage.

CLARISSA MINING & MILLING CO. **ARIZONA**

Gold Road, Mohave county, Ariz. E. M. Rabb, pres.; A. W. Sydnor, v. p.; treas.; F. T. Bragonier, sec.

Inc. 1915, in Ariz. **Cap.,** $1,000,000; shares $1 par, non-assessable; 550,000 shares in treasury. Owns 7 claims, 80 acres, adjoining the United Western on the north of Oatman, Ariz. Company cut 4′ of quartz vein matter at 65′. Idle, 1919.

CONE MINING & MILLING CO. **ARIZONA**

Office: 132 Edgerly Bldg., Fresno, Cal.

Officers: J. P. Eaton, pres.; M. J. Walsh, v. p.; Hugh Sparkman, sec.-treas.

Inc. Aug., 1911, in Arizona. **Cap.,** $1,500,000; $1 par; 778,875 shares issued.

Property: 12 claims, unpatented, 240 acres, 2½ miles S. W. of Oatman, in the Tom Reed-Gold Road district, Mohave county, Ariz. Ore occurs in veins in rhyolite dike, traversing ground from E. to W.

Development: 235′ shaft with crosscutting to reach ledge on 200′ level.

Equipment: includes a 15 h. p. Fairbanks-Morse hoist.

CRESCENT MINING CO. **ARIZONA**

Geo. W. Pierce, mgr., Oatman, Ariz.

Has 1,000′ tunnel, driven to cut ore-shoot found 300′ above. No reports since 1917.

CROWN CITY GOLD MINES CO. **ARIZONA**

Idle. Last address: John C. Dalton, 6 Union Savings Bank Bldg., Pasadena, Cal. See Vol. XII.

DOME MINING CO. **ARIZONA**

Mail returned unclaimed from Los Angeles, Calif., Phoenix and Oatman. Mine is at Oatman, Ariz.

Directors: C. P. Campbell, pres.; C. C. Spicer, v. p.; A. M. Wheelock, sec.-treas.

Inc. Oct. 9, 1915, in Arizona. **Cap.,** $100,000; shares 10c par, non-assessable; 500,000 shares in treasury. Annual meeting, last Saturday in Sept. Listed on Los Angeles Exchange. Company reports $1,000 in treasury, April 17, 1916.

Property: 32 acres, unpatented, at Oatman, Mohave Co., Ariz. Developed by 40′ shaft and a little trenching. Management states that a hoist will soon be added. Property is a prospect, idle, and probably moribund.

EAST BLACK RANGE MINING CO. **ARIZONA**

Address: W. S. Tarbell, 668 I. W. Hellman Bldg., Los Angeles, Cal.

Inc. 1916, to operate 6 claims adjoining the Black Range Mng. Co., at Oatman, Ariz. Fifty thousand shares of stock were offered to the public in April, 1916, at 15c a share.

Is a prospect of unproven merit.

ESPERANZA EXPLORATION CO. **ARIZONA**

Address: Joseph Krauss, pres.-mgr., P. O. Box 149, Oatman, Ariz.

Officers: E. L. Terwilliger, v. p.; Jos. Kielen, sec.-treas.

Inc. Dec. 6, 1915, in Ariz. **Cap.**, $150,000; shares 10c par; 884,000 issued perating expenses, 1916, $35,000.

Property: 10 claims, 170 acres, in San Francisco mining district, which how an E.-W. 15' fissure vein, with 15° dip N. Ore carries gold, average value ging $3 per ton.

Development: by 217' shaft. **Equipment:** 25 h. p. engine, 320 cu. ft. compressor, etc.

ESSENDEN GOLD MINING CO. **ARIZONA**

Property closed for 2 years, and company practically out of existence.

Address: Oatman, Ariz.

Officers: M. A. Fessenden, pres. (Kay mine Canyon, Ariz.) F. W. Cross, v. p.; H. A. Culloden, sec.-treas., with J. O. A. Carper and C. M. Moses, directors.

Inc. in Arizona. **Cap.**, $100,000; shares 10c par; treasury, 250,000 shares isted in Los Angeles.

Property: the Sunlight and Moonlight claims, 40 acres, adjoining the nited Eastern on the north, at Oatman. Developed by 500' shaft and quipped with 3-drill compressor. No ore was found.

ILT EDGE MINES CO. **ARIZONA**

Address: Oatman, Ariz.

Officers: E. A. Burns, pres.; E. A. Shaw, v. p.; S. W. Klass, sec.-treas., Kingman, Ariz.

Inc. in Arizona. **Cap.**, $150,000; shares 10c par 800,000 in treasury. isted on San Francisco and Los Angeles exchanges.

Property: 95 acres, 2 miles S. W. of Oatman, adjoining the Old Vivian mine, said to show 4 parallel veins varying from 4' to 60' in width.

Development: 4 tunnels, one claimed to have opened a vein for 50', with gold values from $5 to $12 per ton. Company sank a shaft, 250' deep, April 6, 1916, at which depth altered andesite was found, said to show quartz and spar of fair value. Crosscutting done on the 100' and 200' levels. Sinking to 600' as contemplated.

Equipment: includes 25 h. p. hoist and a 52 h. p. air compressor. Presumably idle.

IRARD MINING CO. **ARIZONA**

Address: Oatman, Mohave county, Ariz. H. B. Magill, sole owner.

Company is not incorporated.

Property: 6 claims, also leases on the Della claim of the Tango group. Test shipment of 300 sacks (5 tons) of ore to smelter in 1919 netted $14.12 per ton. This ore was taken from the outcrop, as a general sample, because assays of hand samples were so erratic as to be untrustworthy. Tango group has strong persistent "dike-vein", and the Girard group, 3 cross veins.

OLD CLIFF EXPLORATION CO. **ARIZONA**

Address: P. O. Box 412, Oatman, Ariz.

Officers: Stephen E. Barren, pres. and mgr., Oatman; H. H. Alvey, sec.; Thos. Devine, treas.; Axel E. Johnson and Asa W. Le Barron, directors.

Inc. 1914, in Arizona. **Cap.**, $1,000,000; shares $1 par; 136,212 shares old; 363,788 shares in treasury.

Property: 19 claims, 285 acres, adjoining the Tom Reed Gold Mines Co. property, near Oatman. Developed by 53 shallow openings.

In 1916 company sold to the Copper Fame Mining Co. 10 claims in the Chloride district, Cerbat Mountains, between the Tennessee and Golconda mines. The price was 700,000 shares of Copper Fame stock.

Is a prospect. Presumably idle, 1919.

OLD DUST MINING CO. **ARIZONA**

Successor to the Orion Mining & Milling Co.

Office: 733 Central Bldg., Los Angeles, Calif. **Mine office:** Oatman, Mohave county, Arizona.

Officers: G. E. Burnell, pres.; C. J. Rhodes, v. p.; Wm. H. Wise, sec.-treas.

Inc. 1919. **Cap.**, $1,000,000; shares 10c par; issued 700,000 shares. Lis on Los Angeles Stock Exchange.

Property: 170 acres, all patented, at Oatman. Has been develop for several years by different companies. Vein said to be 8' wide on 200' l with milling ore of $8 to $15 per ton in gold, increasing in width and value 300' level. Several thousand tons of milling ore was reported as developed.

Development: by several shafts from 100 to 550' deep. A 100' tun drifts and crosscuts. Drifting on the 500' level, in March, 1919.

Equipment: includes 360' cu. ft. compressor, 75 h. p. electric hoist, stamp-mill and cyanide plant. In July, 1919, efforts were being directed tow opening enough ore to keep the mill running.

Regarded favorably as a prospect.

GOLD KEY MINING CO. **ARIZO**

Office: 733 Central Bldg., Los Angeles, Calif. Mine near Old Tra Mohave county, Ariz.

Officers: W. H. Wise, pres.; H. M. Hall, v. p.; B. E. Shaw, sec.; w W. K. Ridenour and Raymond A. Carr, directors.

Inc. 1915, in Arizona. **Cap.**, $1,250.000; shares $1 par. Stricken fr New York Curb listing, August, 1918.

Property: the Treasure Key group, 4 claims, 50 acres, between the Bo dary Cone and Orion groups, west of Old Trails and near Oatman, Ariz. C tains the Oatman type fissure veins in andesite, showing gold quartz ore. T one under development is 20' wide.

Development: by a 310' shaft with drifts on 300' level. The east d exposes an ore-shoot 75' long and 4'-6' wide, showing 3' of $30 ore. A sec shoot 75' to the west is said to average $12. No recent information receiv Property is a likely prospect.

GOLD ORE MINING CO. **ARIZO**

Address: A. C. Werden, Goldroad, Ariz.

Officers: A. C. Werden, pres.-mgr.; S. M. Warmbath, v. p.; I. W. W den, sec.; A. F. Pollock, treas., with E. A. Shaw, directors.

Inc. in Arizona. Cap., $1.000,000; shares $1 par; 819,310 issued. Lis on Los Angeles Stock Exchange. H. E. Teter & Co., Los Angeles, trans agents; Security Trust and Savings Bank, Los Angeles, registrar.

Property: 6 claims, 120 acres, ½ mile N. of the Gold Road mine, Moha county, which the Gold Ore is said to resemble and which has yielded $5,000,0

Development: by 680' main shaft and over 2,000' of drifts, etc. Lev have been driven at 350', 530', 650' E. and W. along the vein. On the bott level is a shoot 4'-6' wide, 75' long and 200' high. In 1916 the Gold Road n treated 2,300 tons from the 530' level, returning $14.50 net per ton. Reser are placed at 30,000 tons of $15 to $20 ore.

Equipment: a good road has been constructed and the 300-ton G Road cyanide mill leased for ore treatment, about a third capacity to be used a start. In March, 1919, company was expecting to resume operations.

GOLD RANGE DEVELOPMENT CO. **ARIZO**

Office: Oatman, Ariz.

Officers. F. T. Torpey, pres.; M. M. Miles, sec., Los Angeles, Ca E. M. Rogers, supt.

Inc., 1918. **Cap.**, $150,000; 10c par.

Property: April, 1918, proposes to purchase 7 claims formerly own by the Gold Range Mining & Milling Co. in the San Francisco mining distri near Oatman. Shaft 300' deep. Some gold ore developed, said to assay $4 to

GOLD RANGE MINING & MILLING CO. **ARIZO**

See Gold Range Development Co.

GOLD REED MINING & MILLING CO. **ARIZO**

Address: J. C. Connors, Colorado Springs, Colo. **Mine office:** Oatma Ariz., T. L. Welp, supt.

Property: claims in Oatman district, Ariz., developed by 570' shaft a drifts.

GOLD ROAD ANNEX MINING CO. **ARIZO**

Office: Goldroad, Mohave Co., Ariz. L. M. Hopkins, pres.

Property: near Gold Road mine, Oatman district, Ariz. Machinery in-lled for sinking shaft to 500'. Prospects fair. No recent reports.

OLD ROAD BONANZA MINING CO. **ARIZONA**

Address: Goldroad, Ariz. **Officers:** F. T. Torpey, pres. and treas.; W. Ross, v. p.; W. P. DeWolf, sec. E. M. Rogers, supt.

Inc. in Arizona. **Cap.,** $1,000,000; shares assessable, $1 par. In treasury, 000 shares. Listed in Los Angeles.

Property: 90 acres, adjoining the Gold Road mine on the S. W. Shaft k 600', with considerable drifting. Vein on the 450' level said to be 2' to 6' le and for 100' averaging $12 per ton. Operations were resumed in 1919 and shaft was to be sunk another 150', to 700'.

OLD ROAD MINES CO. **ARIZONA**

Address: D. R. Muir, mgr., Goldroad, Ariz.

Inc. in Maine. **Cap.,** 400,000 shares; $5 par; entirely owned by U. S. elting, Refining & Mining Co., which see for officers.

Property: 15 patented claims, 216.52 acres at Goldroad, Mohave county, miles west of Kingman, on the Santa Fe R. R.

Ore: gold-bearing quartz occurring in a fissure vein with E. W. strike. mpany owns about 1¼ miles on the strike of this vein. The mine had a d record of production prior to its purchase by this company in 1912. Stoping rations had been carried down to the 500' level and were extended on the ke of the vein and also in depth to the 900' level. Assay value of ore diminishes depth as far as explored to date, and only a small percentage of ore found on 800' level is of commercial grade, though the vein continues strong and stent.

Development: to a depth of 1,100' by 5 miles of workings. There are aits, one reaching the 800' and the other the 900' level, equipped with cages skips. Property is fully equipped with power house, air compressors, shops, house and dwellings. Ore is reduced at mine by crushers and Marcy mills piped to the 300-ton cyanide mill, located within a few hundred feet of the . Electric power is purchased from power plant at Kingman.

The mine has considerable unexplored territory, besides that which has een worked, and the mine workings contain territory worthy of further work. serves reported at 200,000 tons of $15 ore. Operations suspended during 1918 t of high costs, but resumed 1919.

D TRAIL MINING CO. **ARIZONA**

Leased to Grant McKesson and J. Marines, Goldroad, Ariz.

Office: D. A. McMillan, pres., Kingman, Ariz.

Inc. in Ariz. **Cap.,** $1,500,000; $1 par; 695,817 shares outstanding.

Property: 10 unpatented claims, 18 miles from Kingman.

Development: by short tunnels and a 90' shaft. Ore said to occur in contact veins between andesite and rhyolite.

OLD TRAILS MINING & MILLING CO. **ARIZONA**

See Gold Trail Mining Co.

REEN QUARTZ GOLD MINING CO. **ARIZONA**

Address: Oatman, Ariz.

Inc. 1917 in Arizona. **Cap.,** $1.000,000; $1 par; 500,000 shares in treasury.

Property: has 3 veins all of usual Oatman type, with gangue of quartz, dcite, adularia, etc., containing free gold and telluride. Vein croppings are om 4' to 20' wide and show 3' to 4' of pay ore at several points.

An arrastra run on the property for years, yielded a living to former owner, ating surface ores only. Property has water enough for a mill and is re-rted to "have more ore than any of the properties around it and a darned ght more than the Nellie or Black Range."

REY EAGLE DEVELOPMENT CO. **ARIZONA**

Office: Oatman, Ariz.

Property: in the Oatman district, developed by 3 incline and 1 vertical aft, deepest 400', connecting with 1,600' adit tunnel at 340' depth. Sinking winze connect with Aztec property. Vein is in granite; ore-shoot is stated to be

"over 500' long on the 200' level and to have yielded shipments of 500 tons th averaged 0.83 oz. per ton."

Production during the '70's and '80's said to have been about $750,000.

HIGHLAND CHIEF GOLD MINING CO. **ARIZON**

Offices: Alliance, Ohio and Oatman, Ariz.

Officers: Chas. Thompson, pres.; Carl Tanner, v. p.-gen. mgr.; F. V Fuller, sec.-treas.; with John Eyer, and Creighton Thompson, directors.

Inc. Aug., 1919, in Ohio. **Cap.**, $30,000; par 2c; non-assessable. Pu poses selling 750,000 shares.

Property: 15 claims, 200 acres in the Black Range near Oatman, sho quartz veins in andesite. Ore is free milling and is said to assay $4 to $13 go per ton.

Development: a 690' tunnel. Present company plans continuing d velopment.

IVANHOE CONSOLIDATED MINES CO. **ARIZON**

Reorganized April, 1918, as Ivanhoe Gold Mining Co., which see.

IVANHOE GOLD MINING CO., REORGANIZED **ARIZON**

Office: 591 I. W. Hellman Bldg., Los Angeles, Calif. **Mine office:** Oa man, Ariz. Ed Carter, mgr., Oatman, Ariz.

Cap., $150,000; 10c par; assessable. Formerly Ivanhoe Consolidate Mines Co., but reorganized April, 1918, under above title. Assessment of 1c p share was due June 10, 1918, to pay debts and to contiuue exploration.

Property: 5 claims and 2 fractions in N. W. part of Oatman distric and covering 3,000' along the strike of the veins.

Development: by 500' shaft and a total of over 2,500', up to mid-191 when work was resumed on 500' level of the Nancy Lee claim, where 60' of lo grade ore was cut at 204' from shaft.

Property considered of promise.

JEROME-OATMAN MINING CO. **ARIZON**

Office: Jerome, Ariz. **Mine office:** Oatman, Ariz.

Officers: Walter C. Miller, pres.; D. J. Shea, v. p.; S. F. Denison, sec H. W. Lewis, treas.; with H. E. Campbell and Henry Lovin, directors. **Jas.** I Rice, supt.

Inc. July, 1915, in Arizona. **Cap.**, $150,000; shares 10c par; 442,25 shares in treasury, Oct., 1915.

Property: 11 claims, unpatented, in San Francisco mining district, miles N. W. of Oatman, Mohave county, shows gold-silver ore in quartz cuttin andesite and rhyolite. The veins run N. W.-S. E. and dip N. 70°.

Shut down in 1917 on account of water on the 390' level, machinery bein unable to cope with it. As practically no commercial ore was proved by 39 shaft and 600' of drifts, the resumption of work is indefinite. Claims wer being patented in 1917. No news since then.

LAZY BOY GOLD MINES CO. **ARIZON**

Address: Oatman, Ariz.

Officers: W. K. Ridenour, pres.-treas.; J. A. George, sec.; J. H. Mor v. p.

Inc. Sept. 9, 1915, in Ariz. **Cap.**, $1,000,000; shares $1 par; 604,500 issue Listed on San Francisco Exchange.

Spent $51,000 on development work, 1916-1917. Had $4,000 cash on han March 1, 1919.

Property: 9 claims, 150 acres, in San Francisco mining district, Mo have Co., Ariz., shows several veins in andesite carrying gold values.

Development: by 220' vertical shaft, with total workings of 750'.

Equipment: includes 300 cu. ft. compressor, 3 jackhammer drills, 40 h. p gasoline hoist. Is considered one of the good prospects of the camp.

LEXINGTON-ARIZONA MINING CO. **ARIZONA**

Office: I. W Hellman Bldg., Los Angeles, Calif. **Mine office:** Oldtrails Arizona.

Officers: Dr C H. Phinney, pres.; Dr. C. M. Heberton, v p.; H. R Woods, sec. treas., with R. M Keeney and C. E. Woods, directors. H. E Woods, mgr

Inc. Feb. 12, 1912, in Ariz. **Cap.**, $1,000,000; shares $1 par; 894,000 shares issued. Stock listed on Los Angeles Stock Exchange. Annual meeting, 4th Tuesday in September.

Property: 15 claims, 8 patented, 155 acres, at Oldtrails, in the Tom Reed-Goldroad district, shows fissure veins, from 6'-25' wide, running N. W.-S. E. and dipping 75° N.-N. E. Ore occurs as quartz-spar, in andesite, and is said to assay from $2-$14 gold per ton.

Development: by numerous shafts from 45' to 280' in depth, the 3-compartment vertical shaft is to be sunk deeper.

Equipment: includes hoist, compressor, Cornish pump and electrical pumping equipment. Company also owns the townsite of Oldtrails.

LOST TREASURE MINING CO. **ARIZONA**

Address: Oatman, Mohave county, Ariz.

Officers: Geo. W. Long, pres.; J. F. McConnell, v. p.; J. L. McIver, sec.-treas.; J. E. Strumquist and L. J. Hammell, directors.

Inc. 1915, in Ariz. **Cap.**, $150,000; shares 10c par.

Property: the Gold Ore Extension Nos. 1 and 6, 120 acres, at Goldroad, adjoining the Gold Ore on the N. and W., and claimed to carry the extension of the Gold Ore vein. A 100' vertical shaft is now being sunk. The mine is one of the many new prospects in the Tom Reed district yet to be proved.

Idle since 1917.

LUCKY BOY MINING & MILLING CO. **ARIZONA**

Office: 581 I. W. Hellman Bldg., Los Angeles, Calif. **Mine office:** Oatman, Ariz.

Officers: F. W. Remy, pres.; N. A. D'Arcy, v. p.; W. S. Tarbell, sec.-treas.-gen. mgr.; R. A. Watson, supt.

Inc. 1915 in Ariz. **Cap.**, 1,000,000 shares; 10c par; 775,000 shares outstanding. Stock listed on San Francisco and Los Angeles Exchanges.

Property: 200 acres in the Tom Reed district, adjoining the Telluride on the S. and the Tom Reed on the S. W., said to show gold ore occurring in stringers of quartz and calcite. The shaft on the Friday claim is 425' deep. Crosscut lacks about 100' to cut vein. The Friday, Lucky Boy, Lucky Boy Annex, and Hackshaw No. 6 claims reported April 1, 1919, leased on a royalty basis for a period of 5 years. In July, work was proceeding on the 450' level, but in December, 1919, operations were reported suspended.

Equipment: includes 25 h. p. hoist, 200 cu. ft. air-compressor, 35 h. p. engine, compressor and jackhammer drills, installed in 1915. Property considered promising.

LUCKY SAM MINING CO. **ARIZONA**

Office: 678 I. W. Hellman Bldg., Los Angeles, Calif.

Officers: W. S. Tarbell, pres.; G. M. Gilbert, v. p.; Geo. E. Fairhead, sec.-treas.; L. C. Randall, supt.

Inc. 1915, in Ariz. **Cap.**, $100,000; shares 10c par.

Property: 12 claims, 235 acres, in the Tom Reed district, Mohave county, carries 2 main parallel veins, 4-6' wide. Developed by 2 shafts, deepest 163'. A prospect and probably idle.

LUCKY SEVEN GOLD MINING CO. **ARIZONA**

Mail returned unclaimed, March, 1919, addressed to A. L. Krous, pres., Oatman, Ariz.; H. E. Bonnell, sec.

Property: the Eva group at Oatman. Also has bond and lease on the Ibex mine, 4 miles from Klinefelder, near Needles, Calif., from which several carloads of ore shipped ran $37 per ton. Developed by 227' shaft.

Presumably idle.

MIDWAY MINING & MILLING CO. **ARIZONA**

Office: 632 Laughlin Bldg., Los Angeles, Calif. **Mine address:** Oatman, Arizona.

Officers: W. Atkinson, pres.; D. A. McMillan, v. p.; Kasson Avery, sec.-treas., with F. E. Shaffer, S. I. Wellman, C. H. Burlock, James A. Fay, directors.

Cap., $2,000,000; 10c par.

Property: 14 claims, said to adjoin the ground of the Arizona Moss back Mines Co. The Moss vein is traceable across the property and is reporte as being from 20′ to 100′ wide, outcrops assaying 50c. to $4 gold per ton. Sha 145′ deep showed $5.80 gold ore. Intend sinking shaft to 500′. A prospect.

MOHAWK CENTRAL MINING CO. ARIZONA

Address: Colin Timmons, Oatman, Ariz.

Property: the Mohawk mine at Mammoth, a once profitable silver gold mine. In recent years, the lead molybdate of the dumps and old working has proven valuable here as it has at the adjacent Mammoth mine. Groun recently churn-drilled. Plan resumption of mining and treatment of tailing from milling operations of former company.

MOSS MINES CO. ARIZONA

Office and mines: Goldroad, Ariz.

Officers: A. C. Worden, pres.; L. F. Hammel, v. p.; I. W. Worden sec.-treas.

Cap., $150,000; 10c par; 250,000 shares issued as promotion stock; tota issued 513,781 shares.

Property: one claim. This is a well-known old mine that has pro duced some exceptional gold ore, though only opened to a shallow depth.

MURDOCK MINING & MILLING CO. ARIZONA

Address: Oatman, Mohave County, Ariz.

Officers: S. R. Porter, pres.-treas.-supt.; D. Gibson, v. p.-sec.; F. L Porter, asst. sec., with D. P. Wright and G. D. Page, directors.

Inc. Dec. 3, 1915, in Ariz. **Cap.,** $1,000,000; $1 par; 690,000 issued Transfer office and registrar: Security Transfer & Registrar Co., New York

Property: near Oatman, shows a vein in andesite. Ore is gold-bearing and of the usual dense quartz type.

NAVY GROUP M. & M. CO. ARIZONA

Office: 912 Higgins Bldg., Los Angeles, Calif.

Officers: Dr. Geo. P. Waller, pres.; F. M. Townsend; sec.-treas.; R. H Zuver, agent at Gold Road, Ariz.

Inc. 1915. **Cap.,** $1,000,000; shares $1 par.

Property: 3 claims, 48.26 acres, in Tom Reed-Goldroad district, Mohave county, developed by 750′ tunnel. A prospect. Presumably idle, 1919.

NELLIE GOLD MINING CO. ARIZONA

Address: Oatman, Ariz.

Controlled by Howland Bancroft and Julius Bache. Mine operations are carried on by the Woods Investment Co. of Los Angeles, who also control the Lexington and have a big interest in the Lazy Boy and United Western.

NELLIE MINING CO. ARIZONA

Mine office: Oldtrails, Mohave county, Ariz.

Officers: F. M. Woods, pres.; R. C. Wilson, v. p.; E. T. Walmsley, sec. treas.; H. E. Woods, mgr., with C. S. Buck, directors.

Inc. July 3, 1906, amended Aug. 4, 1915, in Ariz. **Cap.,** $1,000,000 shares $1 par. Stock is listed on the San Francisco, Salt Lake and Los Angeles Exchanges. Registration Surety Co., 205 Russ Bldg., San Francisco, registrar Annual meeting, first Wednesday in June.

Property: 11 claims, 190 acres, in Tom Reed-Goldroad mining district 5 miles S. of Oldtrails, shows a fissure vein in andesite and andesite tuff, with gangue consisting principally of fine grain quartz and adularia and calcite. The values are exclusively gold, although traces of copper stain are found in the altered dikes which strike out from the main lode, having a general strike N. 52° W., with dip about 55° N. E. Assays said to average $5.90 gold per ton. Developed by 530′ 2-compartment vertical shaft.

Reported that on the 350′ level 200′ of drifting opened ore worth up to $3 per ton. At 435′, in shaft No. 2, vein is reported to be 24′ wide, and on 500 level 25′ wide, 10′ of it assaying $5.31 per ton. Closed down early in 1917 re-opened Feb., 1919, and drifting on 500′ level to encounter ore-shoot out cropping on surface 300′ east.

Equipment: includes 100 h. p. gas hoist, 55 h. p. compressor, pumps, 3,600′ water pipe line, bunk and boarding houses. Property reported on by A. G. Keating.

NEVADA-ARIZONA MINES CO **ARIZONA**

Office: 510 Odd Fellows Bldg., St. Louis, Mo. **Mine office:** Hackberry, Mohave county, Ariz.

Officers: John Schmoll, pres.; Chas. E. Hamilton, v. p.; A. E. Louis, sec.; J. Wm. Seller, treas., with J. Phillips, Aug. Richter, Jr., C. D. Morley, Edward J. Ryan and Wm. Burmeister, directors. T. D. Walsh, supt.

Cap., $1,500,000; shares $1 par. Reported, March, 1919, to have issued $150,000 in bonds; indebtedness, $28,569.

Property: 17 patented claims, about 340 acres, in the Music Mountains, said to show gold and silver values. Ore occurs in fissure veins, 4-10′ wide, in granite formation. Average assays reported at from $10-$50 per ton.

Development: includes the 700′ Lucknow shaft and 700′ Roosevelt tunnel, latter in milling ore for 200′. At depth of 515′ the Lucknow vein is reported to be 12′ wide, of good grade ore.

Equipment: includes compressor and gas hoist. Company erected a small concentrator with a Chilean mill, which started work in Oct., 1913. No production data, if any, available.

OATMAN CRESCENT MINING CO. **ARIZONA**

Office: 25 Broad St., New York. **Mine office:** Oatman, Ariz.

Officers: Geo. W. Peirce, pres.-gen. mgr.; W. T. Esser, v. p.; Gowen Peirce, sec.-treas., with A. G. Reynolds, directors.

Inc. 1915. **Cap.,** 1,000,000 shares; 10c par; 650,000 issued. Security Transfer & Registrar Co., New York, registrar and transfer agents.

Property: 9 claims, 170 acres, 4 miles S. E. of Oatman said to show 3 strong veins outcropping at surface for 3,000′ in length and giving average assays of $6.13 per ton in gold. The veins strike N. W. and dip steeply S. The Highland Chief vein, from 10-40′ wide, consists of altered and brecciated wall rock, with quartz and calcite, associated with black oxide of manganese.

Development: by tunnel, several shallow pits and openings. In 1916, 1,200′ of drifting and tunnel work was done. Drift was said to be within 200′ of ore zone, June, 1917. No later information.

Equipment: includes 50 h. p. engine, compressor, jackhammers, etc. Is regarded as a promising prospect.

OATMAN GOLD MINING & MILLING CO. **ARIZONA**

Address: Kingman, Ariz. Eli Hilty, pres.-mgr.; S. W. Klass, sec.

Inc. 1915, in Arizona. **Cap.,** $1,000,000; shares $1 par.

Property: 10 claims, about 160 acres, in the Tom Reed-Goldroad mining district, shows several well-defined veins with stringers of quartz and calcite carrying free gold.

The Kokomo vein is a fault fissure, 40′ wide at surface, and said to show for 4,500′ on company's ground, with strike N. 62° W., and dip 80° N. E., cutting the andesite, or occurring in a contact between rhyolite and andesite.

Development: a 500′ shaft was sunk on the Kokomo vein in 1915, and crosscuts were run N. and S.

Equipment: includes compressor and 25 h. p. hoist. A prospect. No recent information. Reported on by E. W. Brooks.

OATMAN-JUMBO M. & M. CO. **ARIZONA**

Mail returned from Oatman, Ariz. Described in Vol. XIII.

OATMAN NORTH STAR MINES CO. **ARIZONA**

Address: Oatman, Ariz. A. O. Parsons, pres., with C. E. Gilman, R. R. Moore and Lloyd Trevis, directors.

Inc. 1915, in Ariz. **Cap.,** $150,000; shares 10c par. Stock is listed on San Francisco and Los Angeles Exchanges.

Property: 17 claims, 250 acres, at Oatman, claimed to carry extension of Tom Reed vein system was sinking a 400′ shaft in 1916. No later information.

OATMAN SOUTHERN MINING & MILLING CO. **ARIZONA**

Oatman, Ariz. No returns, 1919. Probably idle. Described in Vol. XIII.

OATMAN SYNDICATE MINING CO. **ARIZONA**

Oatman, Ariz. **Officers:** J. L. McIver, pres.-mgr.; Geo. W. Long, v. p.; C. W. Herndon, sec.-treas.

Inc. Oct. 29, 1915, in Ariz. **Cap.,** $100,000; shares 10c; 500,000 shares issued. Valley Bank, Phoenix, Ariz., transfer agent.

Property: the Putney group, 11 claims, 4 patented, about 200 acres, 6 miles S. of Oatman, embraces about 3,500′ on the main Black Range-Nellie lode system. Mine shows a quartz contact deposit surrounded by andesite, rhyolite and granite, with N. W. strike and dip of 45°.

Development: by 400′ vertical shaft. Drifts run both ways on the vein from the 400′ level.

Equipment: includes 40 h. p. hoist, 5 drill compressor and gasoline power.

OATMAN UNITED GOLD MINING CO. **ARIZONA**

Address: Oatman, Ariz.

Officers. A. F. Andrews, pres.; O. Wimpenny, v. p.; L. Ashmun, sec.-treas.; J. K. Turner, cons. engr.

Inc. 1917, in Ariz. **Cap.,** $200,000; 10c par, assessable; issued 1,588,143 shares. Listed on Los Angeles Stock Exchange.

Company took over the Oatman United Mines Co.

Property: 120 acres surveyed for patent, 1½ miles N. E. of Oatman, adjoining United Eastern on N. and Tom Reed on S. W., said to show five gold bearing fissure veins in andesite and along andesite rhyolite contact.

Development: 580′ shaft, to be sunk to 800. and 1,300′ of crosscuts on 400′ level in April, 1919. In August, exploration was under way on 600′ level.

Equipment: includes 5-drills compressor, 40 h. p. hoist and 50 h. p. hoist and 50 h. p. engine. A prospect.

OATMAN UNITED MINES CO. **ARIZONA**

Company taken over by Oatman United Gold Mining Co., which see.

ORION MINING & MILLING CO. **ARIZONA**

Succeeded by Gold Dust Mining Co., which see.

PITTSBURG MINING & MILLING CO. **ARIZONA**

Oatman, Ariz. **Officers:** L. P. Hansen, pres.-treas.; H. J. Walsh, v. p.; S. R. Porter, asst. sec.; above are directors; Jas. McLachlan, sec.

Inc. Jan. 31, 1912, in Arizona. **Cap.,** $1,500,000; outstanding April 1, 1916, $723,300; shares $1 par, assessable. Security Transfer & Registrar Co., New York City, transfer agent and registrar. Listed on New York Curb as a prospect, but stricken off list on Dec. 26, 1919.

Property: 11 claims, 220 acres, 1 mile W. from Goldroad and 1½ miles N. W. from Oatman, is said to show 3 distinct veins. The main vein strikes E.-W., dips N. 80°, and has a width of 6′ to 40′ along an outcrop said to be traceable for over 5,000′, in which distance it shows two faults. Vein filling is chiefly quartz, with some calcite. Paralleling the main vein and 20′ from it there is another vein 4′ to 8′ in width and nearly vertical, which is supposed to intersect the main vein. Near the center of the property these two veins merge and form one vein 40′ wide. A third or footwall vein parallels the main vein and has a similar dip; at east end of property this vein is 200′ back in the footwall; but is supposed to join main vein near center of property.

Development: 300′ double compartment vertical shaft, sunk on E. end of Pittsburgh claim between main and hanging-wall veins; water prevented sinking deeper; at this level 125′ of work has been done, but to date the ledge where opened has been low-grade. Total workings, about 1,000′.

Equipment: includes a 20 h. p. gasoline hoist. Nothing reported since 1916.

RECORD LODE MINING CO. **ARIZONA**

Address: J. J. McCarthy, supt. Oatman, Ariz.

Officers. Chas. A. L. Gehrmann, pres.; Lee R. Myers, v. p.; L. L. Wallace, sec.-treas., with J. J. McCarthy, directors.

Inc. Jan., 1916, in Arizona **Cap.,** $250,000; shares 25c par.

Property: 10 claims, located on Hardy vein. **Equipment:** hoist, compressor, etc. Developing since 1917. An incline shaft was sunk on the vein to

00' level where vein left the shaft. At last accounts shaft was 500' deep and crosscutting was in progress.

RED LION MINING CO. **ARIZONA**

Address: Oatman, Ariz. Frank W. Strong, pres. Mine lies between the Ben Harrison and Gray Eagle claims, supposedly on the Tom Reed vein.

Development: in Feb., 1919, the proposed 400' shaft was down 260', and some crosscutting was being done on the 225' level, and a hoist added to the equipment.

SECRET PASS GOLD TOP MINING CO. **ARIZONA**

Address: J. P. Loftus, 1615 Martel Ave., Hollywood, Cal.; and Kingman, Ariz.

Officers: J. P. Loftus, pres.; C. S. Sprague, v. p.; G. P. Loftus, sec.-treas., with F. Kemp, J. K. Turner and S. L. Carpenter, directors.

Inc. May 30, 1916, in Arizona. **Cap.,** $100,000; shares 10c par, non-assessable; 587,000 issued.

Property: 5 claims, 100 acres, in Oatman district, Mohave county. Open cuts and other shallow workings show 5,000 tons of $6 to $15 gold ore developed.

Equipment: 30-ton plant, including 3' Hardinge ball mill. Operating in 1918, but no recent returns received.

SUN DIAL GOLD MINING CO. **ARIZONA**

A. F. Carper, supt., Oatman, Ariz. Is one of the big crop of wildcats born in Oatman since the strike in the United Eastern.

SUNNYSIDE MINING CO. **ARIZONA**

Office: Oatman, Mohave county, Ariz.

Officers: C. H. Palmer, Jr., pres.; F. A. Keith, v. p.; R. I. Rogers, sec.-treas., with S. W. Mudd, Philip Wiseman, P. L. Mullen and M. R. Sullivan, directors.

Inc. in Ariz. **Cap.,** $1,500,000; $1 par.

Property: Sunnyside group of 3 claims, 2 miles S. E. of Oatman, said to have a vein with assay values of from $2 to $8 gold per ton. Development on vein at 400' level, considered promising. Property is in the development stage. Idle since 1917.

TELLURIDE M., M. & DEV. CO. **ARIZONA**

Office: Oatman, Ariz.

Officers: J. L. McIver, pres.; Geo. G. M. Mackay, v. p.; Byron Campbell, sec.-treas., with W. Matthie and J. B. Dowd, directors.

Inc. 1915, in Ariz. **Cap.,** $220,000; increased May, 1919, to $300,000; shares 20c. par; treasury shares, May 1, 1917, 175,516.

Property: 14 claims, 177 acres, at Oatman, Mohave county, said to carry gold ore of milling grade.

Development: by 580' shaft with crosscutting and drifting on 475' and 535' levels.

Equipment: includes 40 h. p. White & Middleton engine, double-friction hoist, Fairbanks-Morse and Chicago Pneumatic compressors, mine buildings, etc.

Mine examined in Jan., 1917, by Etienne A. Ritter, who discusses the geology and development in 13 pages. He suggested diamond-drilling, and considers that the property is well situated, also that some important bodies of commercial ore should be uncovered. Exploration was under way in Sept., 1919.

TIMES MINING CO. **ARIZONA**

Mail returned, 1918, from former address, Oatman, Ariz. Described in Vol. XIII.

TOM REED APEX MINING CO. **ARIZONA**

Address: Oatman, Ariz.

Is a prospect, on which company was reported developing a strong vein exposed on Ricebird claims. In 1916, 50,000 shares were offered at 15c. each.

Letters returned unanswered in July, 1917, and no report since then.

TOM REED GOLD MINES CO. **ARIZONA**

Office: 606 Chamber of Commerce Bldg., Pasadena, Calif. **Mine office:** Oatman, Ariz.

Officers: S. S. Wold, pres.; Chas. Mushrush, v. p.; W. J. Lawrence, s J. W. Roach, treas., with O. Keck, and E. S. Harwood, directors. W. B. Ph mgr.

Inc. Dec. 17, 1906 in Arizona. **Cap.,** $1,000,000; $1 par; outstand 909,555. No bond issues, mortgages or indebtedness. Listed on Los Ang Stock Exchange.

For year ending April 1, 1918, total mine earnings were $644,350. Mi milling and development costs of $450,310 materially reduced this. Net p for year, $10,008. For year ending April, 1919, net operating profit was $315, less depreciation and depletion, $129,165; left $184,426, carried to surplus.

Dividends: aggregate over $2,600,000. The first dividend of 6% paid in 1908, and a second dividend of 3% was paid in 1910. Since then divid averaged 4½% per month for five years. In 1916, 10½c. per share was p Dividends were resumed in Nov., 1918, at rate of 2% per month.

History: the mine was discovered in 1900, 20 years after the discov of the Gold Roads mine nearby. Early development proved unsuccessful in 1904 the mine was sold for $75,000, one-tenth cash. The purchasers fa to meet payments and the property passed to the Title Insurance & Trust Co Los Angeles, representing creditors, for $45,000. The present company formed and deeper developments undertaken. The Ben Harrison shaft was t 150′ deep and the Tom Reed 90′. The first shoot of commercial ore was enco tered on the 150′ level.

Property: 29 claims, 12 patented, in three distinct groups, 431 a Also owns water rights and mill sites in Cottonwood Canyon. Thus far n of production has been from the Tom Reed group, but development on Black Eagle group promises early production.

Geology: the claims cover the outcrop of the big Tom Reed l one of the typical quartz-adularia veins of the district, which has been reope and crushed by strike faulting with enrichment of the primary ore. The shoots persist to the deepest level developed (1,400′), with no change in or value. Ore is gold-bearing; average value about $9 per ton in 1918.

At 400′ depth in the Aztec claim there was opened 1,000′ of milling ore, results on 500′ level were disappointing, although late in 1919 some high-gr ore had been opened showing good width. Here the management had expe to develop ore of a much higher grade than that on the level above. Repo in June, 1919, that a 6′ vein of $15 ore had been opened on 400′ level of the B Eagle claim.

Reserves: April 1, 1919, estimated as 65,800 tons.

Development: to a depth of 1,400′, vertical, with total workings approximately 4 miles. New work totalled 5,477′ in 1918. The Red Cl shaft was down 700′ in August, 1919.

Equipment: working shaft has a 150 h. p. electric hoist. Power is s plied by the Desert Light & Power Co., Kingman. There are 3 compress with capacity of 4,000 cu. ft.

The mill, re-built in 1917, of 300 tons capacity, has ball-mills, classifiers counter-current decantation system of cyanidation. Mine has machine-sh supply store, hospital, recreation hall, etc. Present equipment cost more t $300,000.

Production: for year ending March 31, 1918, 81,114 tons ore treat average assay $7.595; tails averaged $0.446. Mining and milling costs w remarkably low, $5.25 per ton, including all overhead, taxes and depreciati During the year ending April 1, 1919, there was treated 88,525 tons of average value, $9.09 per ton; tails averaged $0.37. Mining and milling c were $5.31 per ton, of which $2.09 was for milling and $3.21 was for mini Total costs were $5.87 per ton. During the year 36,524 oz. gold, and 17,229 silver were produced.

Property is a good one, and equipment complete. During the past sev years there have been many changes in the Tom Reed management, the being in Sept., 1917. The new mill is working well and profitably trea lower-grade ore, but management is not so liberal about information as form

Reported in April, 1919, the company had brought suit against United Eastern Mng. Co., claiming apex rights, the case involving the Big Jim claims.

TOM REED, JR., MINING CO. **ARIZONA**

Mail returned 1918, from former office, Citizens' Bank Bldg., Los Angeles, Calif. No recent reports, probably idle. Described in Vol. XIII.

UNITED EASTERN MINING CO. **ARIZONA**

Office: Oatman, Ariz.

Officers: Philip Wiseman, pres.; F. A. Keith and G. W. Long, v. p.; R. I. Rogers, treas., with S. W. Mudd, J. L. McIver, W. K. Ridenour, Geo. D. Nordenholt, D. C. Jackling, and R. C. Nowland, directors; W. K. Keith, sec. and purchasing agent. J. A. Burgess, gen. mgr.

Inc. in 1913, in Ariz. **Cap.,** $1,500,000; $1 par; outstanding, 1,363,000; Equitable Trust Co., New York, Security Trust & Savings Bank, Los Angeles, transfer offices. Listed on Los Angeles Stock Exchange and on New York and Boston Curbs.

Dividends: started in July, 1917, at rate of 5c per share monthly, in 1918 62c. per share was paid; in 1919, 7c. monthly has been paid since February. Total dividends to 1919 were $1,253,960. In future, distributions are to be made quarterly. On Jan. 28, 1920, the first quarterly of 21c. was paid.

Property: 27 claims, 300 acres, patented, at Oatman. Mohave county, adjoining the Tom Reed mine on the N., and covering the N. W. extension of Tom Reed vein; 26 miles S. W. of Kingman, the nearest rail point.

In April, 1917, the Big Jim mine adjoining was purchased for 160,000 United Eastern shares, or over $800,000.

Geology: deposit consists of a vein, irregularly banded with quartz, in andesite. Geology of the district is complex, composed of andesite flows with rhyolite intrusions, and has been studied by many engineers. Veins outcrop either as prominent silicified ribs or as shallow depressions in the andesites, all showing more or less brecciated rock fragments cemented by calcite or quartz. Ore occurs as a series of lenses pinching vertically and horizontally within the vein-filling. Gold is seldom found near the surface in commercial quantities. The gold is extremely fine, so fine grinding is necessary. None of the mines are wet.

Development: main shaft 1,500′ deep, with crosscuts opening the vein on the 300′, 465′, 565′, 665′, 815′, and 915′ levels. Ore has been developed to the 865 or 965′ level. In August, 1919, a large deposit was opened on the 1,400′ level. During 1918 the amount of ore opened by development work was greater than that taken out, so there has been an increase in ore reserves. Ore blocked out on Jan. 1, 1919, was 265,363 tons with gross value of $6,467,005, assuring a 3 years mill supply. Main shaft will be sunk to 1,600′ depth.

Equipment: complete, with electrically driven hoists, compressors, and 365-ton mill. It includes Marcy ball mills, tube mills, and the counter-current system of cyanidation.

The United Eastern mine and mill are described by Otto Wartenweiler in the November, 1917, Bull. of the A. I. M. E.; and the mill operations during 1917 and 1918, by W. O. North, in Bull. 152 of the A. I. M. & M. E., Aug., 1919.

The machinery includes an Allis-Chalmers double-drum 150 h. p. electric hoist, 350 h. p. 888 cu. ft. Ingersoll-Rand compressor, 200-ton coarse ore bin, No. 6 Telsmith gyratory crusher driven by 50 h. p. motor, 400-ton mill ore bin, 2 No. 10½ Marcy mills driven by 100 h. p. motors, Dorr classifiers, three 5x6′ Allis-Chalmers ball-mills driven by 75 h. p. motors, Callow tanks, 6 Dorr 40x12′ thickeners, 7 Dorr 24x14′ agitators, 16 diaphragm pumps, Krogh centrifugal pumps, Merrill classifying and zinc dust precipitating presses, refinery and the necessary cyaniding accessories. The whole surface equipment including water system, houses, roads, etc., cost $248,468.

Production:

Year	Tons Ore Milled	Average Value	% Rec.	Cost per Ton Mining	Cost per Ton Milling	Total Opera
1919*.....	87,310	$20.71	.....	.....	.....	$9.50
1918.....	92,339	23.16	96.95	$4.728	$2.216	8.50
1917.....	84,548	22.42	96.41	4.181	2.159	7.28

* 11 months.

In 1917 the metal extracted was 85,918 oz. of gold and 43,989 oz. of silv and in 1918, it was 97,827 oz. and 52,485 oz., respectively.

Analysis of the balance sheet and mine records show that while curr earnings are not up to those of former years, that mining and milling costs slowly being lowered, though checked by the new wage scale. The managem is reticent and conservative, and very efficient.

UNITED NORTH MINES CO. **ARIZO**

Mail returned 1919, from former address, 434 I. W. Hellman Bl Los Angeles. **Mine office:** Oatman, Ariz.

Officers: C. T. Howland, pres.; W. H. Thomas, sec. and treas.

Inc. 1915, in Ariz. **Cap.,** 1,000,000 shares; par 10c: in treasury, 500,0 Listed on Los Angeles Stock Exchange.

Property: the Lion, Kennedy Fraction, and Poorman claims, 40 acr between United Eastern and Gold Road mines, N. of west end of Fessen claims.

Equipment: 25 h. p. gasoline hoist, compressors, etc. Sinking 2-co partment shaft to explore two veins. In Dec., 1916, $2 to $12 ore had b opened on 400′ level, the vein being 50′ wide. No recent information.

UNITED WESTERN MINES CO. **ARIZO**

Address: Oatman, Ariz.

Officers: W. K. Ridenour, pres. and treas.; H. E. Woods, v. p., with S. Vermilyea, E. H. Newland and M. Lines, directors.

Inc. in Arizona. **Cap.,** $1,000,000; shares $1 par; in treasury, 600,0 Listed on San Francisco and Los Angeles Stock Exchanges. Was listed as prospect on New York Curb, but was stricken from the list in Aug, 1918.

Property: 4 claims, 65 acres, one mile S. W. of Oatman, Mohave coun crossed by main road connecting Gold Road and Oatman, and adjoining pr erty of the United Eastern Company along what appears to be a continuation the main ore zone of that property. Also owns the Oofty Goofty group a water rights 4 miles N. W. of Oatman, total, 125 acres. Ore is free-milling go containing little silver. Pay ore occurs in shoots of undetermined extensi Development shows strong vein on the upper levels but below milling gra On 505′ level the vein is large, wet, and reported to show milling value.

Development: comprises a shaft 500′ deep with crosscuts at 200′ a 500′. At the latter depth a heavy flow of water from the vein temporarily stopp work, 1916.

Equipment: includes 50 h. p. hoist, compressor, buildings, etc.

Property a good prospect, but drifting alone can determine its value. recent information.

VIVIAN MINING CO. **ARIZON**

Office: Merchants' National Bank Bldg., Los Angeles, Calif. **Mi** office: Oatman, Ariz.

Officers: E. M. Ross, pres.; G. A. Hancock, v. p.-gen. mgr.; E. A. Olso sec.; the foregoing and E. P. Thom, C. Leonhardt, R. Deving, directors. Farme & Merchants' National Bank, treas.

Inc. in Cal. **Cap.,** $500,000; $1 par; outstanding, 410,292. No bonded i debtedness. Annual meeting, first Saturday in July.

Property: 11 claims, 183 acres, 2½ miles W. of Oatman, Mohave coun

Development: 450′ shaft; workings, 5,400′.

Equipment: two 40 h. p. oil engines, steam compressor, 8 h. p. hoi electric light plant, buildings, etc. Was developing in 1917, being financed assessments. No later report. Probably idle.

WEST GOLD ROAD MINING CO. **ARIZONA**

Office: Crocker Bldg., San Francisco, Calif.

Officers: T. C. Petersen, pres.; R. L. Mann, v. p.; Gurdon Bradley, sec.

Inc. in Calif. **Cap.,** $1,000,000; shares $1 par.

Property: 5 claims, 63 acres, near Oatman, said to contain the W. extension of the Gold Road vein.

Development: consists of main shaft 455′ deep, and several crosscuts and drifts. No later news.

WINCHESTER GOLD MINING CO. **ARIZONA**

Address: L. E. Hesla, Prescott, Ariz.

Officers: L. E. Hesla, pres.-treas.; A. W. Bark, v. p.; C. F. Paul, sec., with C. J. Dalken and O. H. Hesla, directors.

Inc. July, 1915, in Arizona. **Cap.,** $1,500,000; $1 par; 535,000 outstanding. Annual meeting, first Monday in July.

Property: 6 claims and 2 fractions, 140 acres, 2 miles W. of Oatman, Ariz. During 1916 owners spent $3,500 on prospecting and report good surface results. A lode 17′ wide assayed from a trace to $2.30 gold per ton at depth of 0′. Another 30′ shaft, 1,000′ away, opened $7 ore. Placer work years ago yielded considerable gold on part of the property. Company does not reply to requests for information.

PIMA COUNTY

ACME MINING & REDUCTION CO. **ARIZONA**

Idle. Mail returned from former address in Tucson, Ariz. See Vol. XI, Copper Handbook.

AJO CONSOLIDATED COPPER CO. **ARIZONA**

Property purchased in 1917 by New Cornelia Copper Co., which see. Fully described in Vol. XII.

AJO CORNELIA COPPER CO. **ARIZONA**

Address: P. O. Box 78, Miami, Ariz.

Officers: Ed. J. Grant, pres.-mgr.; J. D. Elliott, sec.-treas., with I. L. Kreninger and J. B. Johnston, directors.

Inc. Dec. 11, 1916, in Arizona. **Cap.,** $1,500,000; $1 par; 768,000 shares outstanding.

Property: 14 claims, 280 acres, adjoining the Ajo Consolidated at Ajo, Pima county, carries a lenticular deposit of carbonate and sulphide ore in rhyolite, developed by a 40′ shaft.

The State Corporation Commission, after inspection of the company's books, ordered a public sale of the Ajo Cornelia property to be held March 8, 1919, to satisfy a claim of the E. I. Longyear Co. for $2,000.

Company is apparently dead. Both the president and the secretary-treasurer are reported to have left Miami without delegating any one to take their places.

AJO GUNSIGHT MINING CO. **ARIZONA**

Address: Ajo, Ariz.

Property in the Gunsight mountains, 20 miles S. E. of Ajo, is said to show main vein 25′ wide, with gold values of from $10 to $20 per ton for small block of developed ore.

AJO PIMA COPPER CO. **ARIZONA**

Address: H. B. Thomas, care Valley Bank, Ajo, Ariz.

Controlled by H. B. Thomas, C. B. Zingg, Emory Orr, and R. M. Boller.

Property: 24 claims, 480 acres; one group of 20 claims adjoining and being contiguous to New Cornelia Copper Co., the remainder lying separate and apart from main group, about 2,000′ in a southerly direction, all in the Ajo district, Pima county. The general geology is said to be identical with that of New Cornelia and Ajo Consolidated, and surface indications are considered good.

Development: by shallow shafts and trenches on numerous outcrops. One shaft is down 25′ on a stringer of high-grade copper ore pitching toward the contact, which is highly mineralized and can be traced through property for

several thousand feet. Shallow pits along this formation have exposed good
Company is seeking capital for development.

ALPHA COPPER MINING CO. ARIZO

Office. 34 S. Stone Ave., Tucson, Ariz.

Officers: John W. Bogan, pres.; R. J. Monahan, v. p.-mgr.; Geo Myers, sec., with F. S. Lockwood, J. L. Toohey, J. W. Bogan and John Ne directors.

Inc. Oct. 7, 1916, in Ariz. **Cap.,** $1,000,000; $1 par; increased f $500,000 March 16, 1917; 350,000 shares in treasury. Last offering of 10 shares at 50c. made in May, 1917.

Property: 22 claims, comprising about 450 acres, including the P and Fries groups, situated midway between Mineral Hill and Twin Buttes ca San Xavier district, Pima county.

The tract is underlain by granite capped on the hills by quartzite and versed by two different sets of veins, both metalliferous. The fracturin complex and the veins associated with porphyry dikes, andesite dikes and breccia zones.

Ore: carries silver and copper as chalcopyrite and gray copper (nantite) with silicious gangue. The Pima mine, opened to 150′ in depth, produced $85,000 in silver.

Development: by 215′ shaft on the Pima vein with levels at 150′ 200′ cutting 2 veins, 4′ to 5′ wide, with stopes above 150′ level yielding ore is said to average $16.35 per ton with copper at 25c. and silver at 65c.

Equipment: adequate for existing needs only, includes 2 gasoline gine hoists, pumps.

Reported on by W. Tovote, who said property appears to have merit.

AMERICAN MOLYBDENUM CO. ARIZ

Mail returned unclaimed, March, 1919, from Tucson, Ariz.

Inc. 1917 in Arizona, for the purpose of handling contracts of sumers of molybdenum and for the development of their properties in Sierra Colorado and Old Hat districts, Pima county.

ARIZONA BELMONT MINING CO. ARIZ

Office: Bullitt Bldg., Philadelphia, Pa. **Mine:** Silverbell, Pima Co Ariz. Meyer Schamberg, pres.; N. S. Keith, treas.

Inc. in 1911 in Arizona. **Cap.,** $1,000,000; $1 par; issued 870,000.

Property: 4 claims, adjoin the Imperial Copper Co. at Silver bel the east and northeast and are developed by 392′ shaft. Operations susp in 1913.

ARIZONA CONSOLIDATED COPPER & MINING CORP. ARIZ

Name changed in Feb., 1919, to Liberty Silver Mines Co., which see

ARIZONA COPPER MINING CO. ARIZ

Office: Tucson, Ariz.

Officers: John U. Mettler, pres.; V. Brunner, sec.-treas., with L Wachs and Jos. Brunner, directors.

Inc. Aug. 1, 1901, in Arizona. **Cap.,** $1,000,000; $1 par; 183,000 s outstanding June, 1919.

Property: 22 claims, 440 acres, 16 miles W. of Tucson, in Amole ing district, Pima county. Developed by 100′ tunnel and 300′ shaft, s show a vein carrying 2% copper. Ore occurs in porphyry and limeston carries much iron.

Equipment: includes hoist, engine and several buildings.

ARIZONA CORNELIA MINES CO. ARIZ

Mail returned unclaimed, April, 1919, from former office, Tucson, Ar

Officers: John Nelson, v. p.-treas.; Tom K. Richey, sec., with Latz and M. C. Adams, directors.

Inc. 1917 in Ariz. **Cap.,** $2,000,000; $1 par.

Property: 7 claims, adjoining the New Cornelia in the Ajo di Pima county. Probably idle.

IZONA MOLYBDENUM CO. **ARIZONA**

Address: F. J. Wharton, pres., Tucson, Ariz.

Inc. 1917, in Ariz. **Cap.,** $300,000.

Property: 10 claims, about 200 acres near Yucca, in the Baboquivari ntains, Pima county, about 35 miles from Twin Buttes, slightly developed by eral shallow shafts.

Ore: occurs a pegmatite carrying molybdenite, chalcopyrite and galena, veins of quartz-feldspar, 4-10′ wide, with S. E. strike, traversing coarse- ined granite. Samples reported to assay 2.2 oz. silver, 1.8 oz. gold and 3.9% per. A 50-ton flotation plant constructed in 1917, was reported to be pro- ing 1,500 lb. of concentrate daily, running 18% molybdenum.

Reports in August, 1919, stated that a K. & K. flotation machine was recently alled, and the recovery was 83% of the molybdenite and 66% of the copper, ing a 25% and 24% concentrate, respectively. This test was on old tailing .

IZONA PAYMASTER MINING & MILLING CO. **ARIZONA**

Address: Edmund E. Walton, supt., Twin Buttes, Ariz.

Property: about 27 miles south of Tucson, is an old silver-lead mine on ich work has recently been started. Has shaft 100′ deep.

One of many mines boomed by recent high metal prices.

IZONA RAY COPPER CO. **ARIZONA**

Name changed to New Arizona Ray Copper Co., which see.

IZONA-TONOPAH MINING & MILLING CO. **ARIZONA**

Office: 503 Delta Bldg., Los Angeles, Calif. **Mine office:** 30 E. Congress Tucson, Arizona.

Officers: Jos. Dixon, pres.; R. D. Dunn, v. p.; Geo. Ankers, sec.-treas.; Countess Mirafiori and W. L. Shaffer, directors.

Inc. Jan., 1916, in Arizona. **Cap.,** $1,000,000; $1 par; 500,000 outstand- Annual meeting, first Monday in January.

Property: 34 claims, 688 acres, in Amole mining district next to the ona-Tucson and Saginaw mines in Pima county, 9 miles S. W. of Tucson, s granitic schists, limestone, andesite and rhyolite, carrying a sulphide sit. proved for 100′ and said to assay from 1-5½% copper, with gold and r.

Development: by 185′ tunnel with 73′ shaft at end. Idle, 1917; man- ent reports steady development and installation of additional equipment July, 1918. The shaft is to be sunk to 200′. Another prospect shaft, 1,500′ W. of the main shaft, passed through some 17 oz. silver ore, and is being to the 200′ foot point. Not favorably regarded.

IZONA-TUCSON COPPER CO. **ARIZONA**

Officers: Harwood Robbins, pres., Riverside, Calif.; J. J. Freeman, sec.; dale, Cal.; B. F. Dogett, treas.; T. E. Kelso, gen. mgr.

Property: 32 patented claims, in Amole mining district, next to the ona-Tonopah and Saginaw mines, 8 miles S. W. of Tucson.

Development: by former owners to depth of 130′ by shaft. Ore car- gray copper, and selected samples assay about 26½% copper, $18 gold, and silver per ton. Present company started sinking a 2-compartment shaft, will be continued to the 300′ level. In Aug., 1919, a rich shoot of copper- ore was opened.

Equipment: 60 h. p. Fairbanks-Morse crude oil engine, 20 h. p. dis- engine, hoist, head-frame, dwellings, etc.

AS MINING CO. **ARIZONA**

Defunct. L. & K. W. Gano, Cincinnati, Ohio, owners. J. F. O. Reilly, rbell, Arizona, agent.

Property: 6 claims, 5 mill sites, all patented; one mile N. W. of the rbell post office. Property located 1879, and equipped with 40-ton smelter 88, which operated for years on rich surface ores, but unable to handle de ores, closed down 1889. Operation by lessees since then, with extrac- of small tonnages of rich copper sulphide ore and of zinc carbonate.

BEACH MINES, INC. ARIZ

Address: Tucson, Ariz.

Officers: Geo. M. Beach, pres.-gen. mgr.; John B. Wright, v. p.; Trueheart, sec.-treas., with Jas. M. Treachey, J. W. Hopkins, Geo. R. Da all of Tucson, and L. H. Hyatt, of Chicago, directors.

Inc. June, 1917, in Ariz. **Cap.**, $2,500,000.

Property: 40 claims, 800 acres, in Ventana and Baboquivari mining tricts, Pima county, 65 miles S. W. of Tucson, said to show veins in diorite schist. Veins said to vary in width from a few inches up to several feet; carry copper sulphide with gold and silver values, the ore assaying up t copper, 6.3 oz. silver, and 0.15 oz. gold per ton.

Development: by tunnels and shallow shafts; in Sept., 1919, one nel was said to be in 200'. Property is in the prospect class.

BLACK BESS MINING CO. ARIZ

Office: 33 Davison Ave., Highland Park, Mich.

Officers: I. N. Potter, pres.; J. W. Travers, v. p.; H. L. Hall, Levi Stanton, treas.; J. L. Austin, counsel; preceding with A. W. Bramwell S. E. Hall, directors.

Inc. 1918 in Arizona. **Cap.**, $600.000; shares $10 par; non-assessab

Property: 10 claims near the Bullion Bar, 7 miles west of Guns Pima county, known as the Submarine group. Shaft 200' deep. Vein o 50' and 80' levels said to have 20" of excellent free milling gold ore, conta tungsten and molybdenum. Reported idle Jan., 1919. Mail returned unclai March, 1919, from Ajo.

BLACK PRINCE METAL PRODUCTION CO. ARIZ

March, 1919, mail returned unclaimed from Ajo and from Tucson, Ari

Officers: J. D. Johnson, pres.; O. H. Finn, v. p.; E. W. Oakley,

Cap., $1,000.000; shares 50c par.

Property: 16 claims, also bond and lease for $25.000 on three in the Sierra Blanca or Quijota Mountains, 40 miles southeast of Ajo. In or 1918 Arizona Corp. Commission refused permit to sell stock on the gr that the company was operating property which did not belong to it, but w had been taken over on lease and bond.

Assays reported by an optimist for a block of ground 40' wide and 80' are 30% lead, 4.9% copper, 6 oz. silver.

Reported idle, Dec., 1918, payments on bond and lease overdue two mo

BLANCHE ROSE MINING CO. ARIZ

Practically dead. At Twin Butte. Company relocated land of the b rupt Chesterfield Copper Co., described in Vol. XI, Copper Handbook.

See Esperanza Mine.

BULLION BAR MINING & DEVELOPMENT CO. ARIZ

Address: I. N. Potter, 33 Davison Ave., Highland Park, Mich.; A. Bramwell, Ajo, Arizona.

Officers. I. N. Potter, pres.; J. W. Travers, v. p. and gen. mgr.; H Hall, sec.; S. E. Potter, treas.; J. L. Austin, counsel; Levi Stanton, supt., A. W. Bramwell, directors.

Inc. 1918, in Arizona. **Cap.**, $300.000; shares $10 par.

Property: 8 claims, 24 miles east of Ajo, in the Gunsight district, sh ing a 5' vein on a contact between basalt and granite. Values as given are $4 to $50 free milling gold per ton with about 1½% tungsten. Develope 150' shaft. Planning erection of 10-stamp mill.

BUSH-BAXTER MINING CO. ARIZ

A close corporation. Fully described in Vol. XIII.

CABABI MINING CO. ARIZ

Secretary and address: E. H. Emerick, 321 Law Bldg., Indianapolis.

Mine P. O.: Camp Cababi, via Tucson, Pima Co., Ariz.

Officers: Allen W. Conduitt, pres.; with E. J. Scoonover, Albert and R. A. Wilcox, directors.

Inc. 1908, in Arizona. **Cap.**, $1,500.000; shares $1 par; non-assessa issued $1,250,000. Annual meeting, third Monday in June.

Property: 50 claims, about 1,000 acres, 35 claims patented, also 2 mill sites of 5 acres, situated in the Cababi mountains, 69 miles S. W. of Tucson.

Development: by numerous shallow shafts, and main shaft 450′ sunk on the Picacho claim, includes an antigua, reopened about 1860, by Francisco Padrea, and which, years ago, was a small producer of silver-bearing copper and lead ores.

Equipment: includes a steam hoist good for 500′, an adobe store building and several frame structures and tents utilized as dwellings.

A full report on the property made Oct., 1912, by C. J. Price, mg. engr., shows 2,240 tons of ore, valued at $28,485, on dumps. Manager reported 10,000 tons high-grade ore blocked out April 25, 1913. Mine now idle, but company claims it will be reopened when rail transportation is afforded.

CALCUTTA GROUP. **ARIZONA**

Owners: W. E. Murphy, Phillip Contzen, Tucson, Ariz.

Property in the Twin Butte district reported August, 1917, bonded to a Butte, Mont., company for $60,000.

CARDIGAN COPPER CO. **ARIZONA**

Office: Ajo, Ariz.

Officers: J. E. Suits, pres.; H. E. Frederickson, sec.

Inc. in Arizona. **Cap.,** $1,000,000.

Owned certain leases and options in the Ajo district, 2½ miles S. of Ajo. Ore occurs in a contact vein. Shipments made from a depth of 85′ are said to have returned 12% copper, 36 oz. silver. In March, 1919, mail returned unclaimed, stamped "company dissolved."

COLONIAL COPPER CO. **ARIZONA**

Norwood, Mass. Geo. H. Morrill, former president, reported that company was sold out on foreclosure sale, March, 1916. See Vol. XIII.

COPPER BUTTE MINES CO. **ARIZONA**

Office: 906 New York Life Bldg., Minneapolis, Minn. and Phoenix, Ariz.

Officers: Ace. P. Abell, pres.; Wm. H. Lucia, v. p. E. B. Crabtree, sec.-treas.

Inc. 1904, in Arizona. **Cap.,** $6,000,000; shares $10 par.

Property. 8 patented and 8 unpatented claims, 4 miles N. W. of the Ray Consolidated.

The ore deposit is a mineralized breccia, consisting of schistose rock with fragments of quartz, diabase, granite and limestone; the ores are the oxides and silicates of copper. Mine is fully described in Vol. XII.

Development: by several shafts, deepest 300′ and 6 tunnels. Report orebody 85′ wide at depth of 185′ containing 4 to 7% copper.

Was shipping a car of ore daily until closed down, Jan., 1919.

CORNCOB MNG. & DEV. CO. **ARIZONA**

See Korncob M. & Dev. Co.

CORNELIA AJO COPPER CO. **ARIZONA**

Name changed to Cornelia Cons. Copper Co., which see.

CORNELIA CONSOLIDATED COPPER CO. **ARIZONA**

Name changed from Cornelia Ajo Copper Co., April, 1918 to avoid confusing it with other Ajo companies.

Office: 8 West 40th St., New York City, and Southern Arizona Bank and Trust Bldg., Tucson, Arizona. Mine address: Ajo, Pima county, Arizona.

Officers: J. A. Hunter, pres.; J. S. Keegan, v. p.; W. O. Mickel, sec.; Jacob Schaefer, treas.; J. A. Hunter, J. S. Keegan, H. B. Haines, T. F. Martin, H. B. Monroe, H. L. Martin and J. B. Wright, directors. Security Transfer & Registrar Co., transfer agents; Corporation Trust Co., registrar.

Inc. 1916, in Delaware. **Cap.,** $2,500,000; shares $1 par; 1,340,000 outstanding; fully paid and non-assessable.

Stated Jan., 1918, Cornelia Extension Copper Co. held 1,079,000 shares of Cornelia Ajo stock.

Property: 29 mining claims, making a contiguous group with combined area of about 500 acres, on the southern slope of the Ajo Mountains adjoining the New Cornelia Company's holdings at Ajo, Ariz. The Monzonite

Copper Company's holding of six full claims were purchased in 1918; the prop erty is west of the Cornelia Consolidated Copper Company's main holdings, an is said to be on monzonite domes appearing in that section.

Geology: in general is similar to that of the New Cornelia Copper Co which see. The monzonite dips west-southwest under the rhyolite, and compan expects it will be encountered at the Bull Dog shaft (now 40′ deep) at a dept of 100′. Samples from the shallow shafts and open cuts are reported to ru from 1.5 to 38% copper.

Development: nothing reported for 1918. Old development consists o open-cuts, trenches, and shallow shafts up to 50′ deep. Company states prop erty will be tested by 3 diamond-drill holes and the Bull Dog shaft will be sun to a depth of 500′. Drilling was started in Oct., 1919, and by end of Decembe ore hole was down 350′ in favorable ground.

CORNELIA WEST MINING CO. **ARIZONA**

E. E. Ganz, trustee, Phoenix, Ariz.

Company organized by Phoenix, Ariz., people to take over the 12 claims o Geo. Sayer adjoining the the New Cornelia Copper Co. The contract cost o the property was $37,500. It was reported that company would incorporate fo $7,500,000, shares $5 each. Very little development work has as yet been done t show value of the property.

COWBOY MINING & SMELTING CO. **ARIZONA**

Owners: O. S. Stapley and associates of Mesa. **Address:** A. Bell Twin Butte, Ariz.

Property: 18 claims in the Twin Butte district, formerly known a the Old Mormon claims. Ore reported to average 7 oz. silver and carries arsenic Developed by shaft 300′ deep besides numerous old caved shafts and tunnels Old workings stated to have shown large bodies of disseminated chalcopyrite ore

Equipment. includes 25 h. p. gasoline engine and a 3 drill compressor

DAILY ARIZONA CONSOLIDATED COPPER CO. **ARIZONA**

Address: 48 West Pennington St., Tucson, Ariz.

Officers: Dr. W. H. Martin, pres., Kokomo, Ind.; J. G. Hancock, v. p. R. W. Langworthy, sec., Tucson; W. H. Daily, v. p. and gen. mgr., Tucson; J. W Daily, treas. and supt.

Cap., $2,000,000; shares $1 par; 1,000,000 shares issued in payment for property; 627,000 shares in treasury; 125,000 to be sold at 50c. to pay for pro posed mill.

Property: 22 claims, about 400 acres in the Old Hat mining district near Oracle, Pima county, developed by 2,000′ of work, mostly by tunnels longest 400′, but including several shallow shafts. This work develops 70,00 tons of sulphide ore averaging 3% copper and $2 in gold and silver. The Princess orebody is said to be 300′ long, 50′ wide and opened to depth of 500′ The Road, the Bull Dog and the Precious metal orebodies are barely pros pected as yet. Ore as shipped will average 6% copper and $2.00 in gold and silver.

Geology: the ore is a garnet rock carrying chalcopyrite; it is an inclined bed of limestone altered and mineralized by contact metamorphism. Though of low average grade, there are local masses of richer shipping ore. The deposi is quite similar to that of the adjacent mine owned by Phelps Dodge Corp Company will erect 100-ton flotation plant in 1920 to cost $40,000. The deposit are large, and is a sufficient tonnage is proven by development, can be mined and milled by flotation methods at a profit, provided cheap transportation i possible, since the mine is on a high mountain top and far from a railway. In Sept., 1919, a new State highway started from Oracle to the Old Hat district a distance of 22 miles, to be paid for by U. S. Government and State of Arizona at cost of $160,000.

Equipment: includes 100 h. p. boiler, compressor, drill sharpener sev eral buildings, a 2½-ton truck, drills, tools, assay office, and dwellings.

DAWSON METALLURGICAL CO. **ARIZONA**

Address: Tucson, Ariz.

Officers: W. A. Doyle, pres.; Dr. O. B. Dawson, v. p.; Randolph Lang worthy, sec.-treas.

Inc. in Arizona. **Cap.**, $300,000; par $10. Owns the Dawson furnace patents in the U. S. and Mexico. Reported that one of the furnaces has recently been completed, at a cost of $60,000-$75,000, near the Narragansett mine at Rosemont, 42 miles S. W. of Tucson, and that smelter costs would be only $3 a ton under this method.

The process, as described in the prospectus of the company, "has been devised to treat copper ores, carbonates, oxides, silicates, and sulphides, lead and tin ores in any form." After crushing, the ore is heated to a temperature of 1,700 degrees F., "at which temperature the gangue cracks and opens up, exposing the mineral, which is now oxide of copper, to the action of the re-agent which produces the actual reduction to metallic copper. The re-agent is carbon, slightly moist. When the required temperature has been reached, the carbon is charged into the furnace and all outlets closed. A considerable pressure is immediately obtained in the furnace, due to the formation of carbonic oxide and hydrogen gases. These gases combine with the oxygen of the oxide of copper, leaving the copper in the state of metallic copper in the form of shots or globules."

DAYLIGHT MINING CO. **ARIZONA**

Address: Tucson, Ariz. Has a lease on part of property of Rosemont Copper Co., which see.

DOS CABEZAS GOLD RIDGE MINING CO. **ARIZONA**

Office: P. O. Box 987, Tucson, Ariz. **Mine address:** A. J. Welty, gen. mgr., Dos Cabezas, Ariz.

Officers: J. H. Huntsman, pres.; S. B. Brown, v. p. and W. A. Julian, sec.-treas.

Inc. in Ariz. **Cap.**, $1,000,000; shares $1 par; issued. Annual meeting first Monday in January.

Property: 10 claims, in the Dos Cabezas mining district, said to show a schistose fissure vein in granite and limestone carrying gold, silver and copper values as sulphides. Oreshoot reported as 4 to 34′ in width with assays from $12 to $1,912.

Development: by new 700′ tunnel, a 200′ shaft and old 1,700′ tunnel to be connected by winze with new tunnel 125′ below. Equipped with 30 h. p. hoist. Said to have 75,000 tons of ore partly developed. Employed 20 men in 1917, but how many now is unknown. In 1918, the company directors authorized the construction of a mill.

EL TIRO COPPER CO. **ARIZONA**

For full description of property, see Vol. XIII.

Address: G. D. Bouton, v. p.; Drexel Bldg., Philadelphia, Pa. **Mine office:** Percy Williams, mgr., Silverbell, Ariz.

Company reports "all properties, real and personal, of El Tiro Copper Co., were sold at public sale at Tucson, Ariz., Jan. 15, 1919, under mortgage foreclosure sale instituted by the Empire Trust Co., trustee for bondholders, and brought a sum only sufficient to refund the Receivers' certificates that had been issued for the preservation of the properties, the Trustees' fees, attorney's fees, Receiver's compensation, court costs, etc., etc., leaving nothing for distribution to bondholders." It is reported the property was purchased by G. D. Bouton as trustee for the bondholders, and is being operated by him under a 5-year lease and option. Employing 35 men and shipping 450 tons of ore monthly.

EMERY-WHITCOMB TUNGSTEN CO. **ARIZONA**

Acquired by International Tungsten Corp., which see.

Reported James H. Emery had filed suit in the Supreme Court, Dec., 1918, to foreclose on a mortgage for $25,000 held on the Emery-Whitcomb Tungsten Co. and the National Tungsten Co.

ESPERANZA MINE **ARIZONA**

Near Twin Buttes, Pima county, Arizona. Under operation, 1917, by Messrs. E. A. Pike, J. C. Shell and Edward Thornton.

Mine was owned in 1913 by the Chesterfield Copper Co. which went into bankruptcy. Company was reorganized in 1914 as the Blanche Rose Mining Co., but has not operated since 1914 and is practically dead. Present lessees have shipped several carloads of ore.

GLANCE MINE ARIZON

Address: J. E. Wood, city collector, Tucson, Ariz. Dan Ellison, sup

Property: formerly known as the Providencia, 1 mile west of Linco Camp, Papago district, bonded by J. E. Wood and W. G. Hurd. Ore occu in 40′ vein in andesite.

Assays reported as high as 100 oz. silver, 58% copper per ton. Shipment 14 tons from depth of 30′ said to have returned $200 per ton.

GLANCE MINING CO. ARIZON

Address: Twin Buttes, Ariz.

Officers: E. G. Bush, pres., treas. and gen. mgr.; S. J. Gunn, supt G. H. Langworthy, sec. Is a close corporation.

Inc. in Ariz., in 1916.

Property: 3 claims, patented, held under option for old Twin Butt Mining & Smelting Co., and a 2-year lease on the Twin Buttes railroad. Th ore occurs in shoots at intersection of cross fractures with a main fissure altered limestone near and roughly parallel to a granite contact. The or contain copper glance, chalcopyrite and iron pyrite, with rather low gold-silv contents, and run 7% to 9% by smelter return. The last oreshoot developed 15′ wide and averages 12% copper. The Glance mine has a 625′ shaft. No la news to hand.

GORDON COPPER CO. ARIZON

Address: Tucson, Ariz.

Holdings are 10 undeveloped copper claims in the Rincon district, 15 mil east of Tucson.

GOULD PROPERTY ARIZON

Under bond and lease to R. McClelland, Newhouse Bldg., Salt Lake Cit Utah. Mail returned unclaimed, March, 1919. A. W. Beck, supt.

Property: 12 claims in the Amole district, 18 miles W. of Tucson, a joins Mile Wide mine. Shaft 350′ deep. Ore on 100′ level said to average 3.5 copper.

GROWLER MINES ARIZON

Owner: Geo. H. Morrill, 155 Pearl St., Boston, Mass. Bought a sheriff's sale.

Property: 26 patented claims, 15 miles S. W. of Ajo, with a quart vein, developed by shafts 330′, 260′ and 135′ deep, and a tunnel 185′ long. Or carries copper with precious metal values.

Equipment: 26 and 70 h. p., steam hoists and an 8 h. p. pump.

Shipments: last shipment of ore made in Sept., 1917, netted $1,000 or $2 per ton. Property worked for many years, though only in a small way.

GUNSIGHT MINE ARIZON

Operators: J. D. Mitchell, L. L. Scott, Paul Fernald, of Ajo, have 1 year bond and lease.

Owners: First National Bank, Canyon City, Texas.

Property: the old Gunsight mine bought at sheriff's sale in 1918. Re ported to show a fissure vein in granodiorite, pay streak varying from 12″ to in width, with lead and silver value. Old workings said to show ore averagin above $20 per ton.

Development: 400′ shaft, various tunnels, etc., totaling over 2,000′.

Property seems to warrant development.

GUNSIGHT DETROIT MINING & MILLING CO. ARIZON

Address: M. Quinner, supt., Ajo, Ariz. or N. Potter, Detroit, Mich

Property: includes the Bullion Bar and the Black Bess mines. Ore i gold and tungsten. There is an old mill belonging to the property in which or extracted by lessors is treated.

GUNSIGHT GOLD & TUNGSTEN MINING CO. ARIZON

Office. Ajo, Pima county, Ariz.

Officers: J. W. Mayes, pres.; F. V. Lee, v. p.; Chas. Luke, v. p.; J. T Hoyt, treas.; E. S. Smith, sec.-mgr., preceding with A. W. Bramwell, and J. J Sullivan, directors. Edward Hardie, supt. Annual meeting, third Tuesday i January.

Inc. 1918 in Arizona. **Cap.**, $500,000 $1 par; non-assessable.

Property: 17 claims, comprising the Aster and Wonder groups at Walls Wells, near Gunsight. Ore treated carries about $15 gold per ton and some scheelite (tungsten).

Ores from the Old Gunsight, Black Bess, Bullion Bar and other mines being treated in old 5-stamp mill using Wilfley tables and pan amalgamators. Building a new 50-ton ball-mill in March, 1919.

HELVETIA COPPER CO. **ARIZONA**

Office: 907 Metropolitan Life Bldg., Minneapolis, Minn. **Mine and works office:** Helvetia, Pima county, Ariz.

Officers: C. C. Prindle, pres.; Chas. W. Sexton, v. p. and sec.; preceding, with William A. Paine, Jas. H. Seager, John S. Pillsbury, Russell M. Bennett and John R. Van Derlip, directors; Robt. H. Gross, treas.

Inc. March 3, 1899, in New Jersey, and reorganized Oct. 4, 1905, in Arizona. **Cap.**, $5,000,000; shares $25 par, in $250,000 full-paid and $4,750,000 assessable stock; fully issued. Listed on Boston Stock Exchange. Levied 50c. assessments, payable July 20, 1908; April, 1909; February, 1910, and Feb. 15, 1911, the latter assessment rendering the stock $15 paid. Last assessment of 50c. was paid in August, 1919. State Street Trust Co., Boston, registrar; Boston Safe Deposit & Trust Co., transfer agent. Annual meeting, first Monday after first Tuesday in October.

Financial statement of Dec. 31, 1916, is as follows: Capital stock, $3,100,000; expenditures to date for mining property, $2,181,786; for development, $806,429; for equipment, $40,250; treasurer's account, $69,887; unpaid assessments, $35,363; interest, $12,141; ore account, $46,461; general expense, $34,428; taxes, $1,327.

Property: 38 patented claims, also 8 patented mill-sites and 960 acres of scrip land, giving total holdings of 1,673 acres, 30 miles S. E. of Tucson, at Helvetia, at the west foot of the Santa Rita mountains, 18 miles south of Vail, on the Southern Pacific, and El Paso & Southwestern railroad.

Geology: the formations, resembling those of Bisbee, include Carboniferous and older limestones lying north of a great granite mass with porphyritic intrusions. The limestone has many iron outcrops, underlain by orebodies occurring as replacements. These have an average strike of N. 35° W., with average dip of 45°, carrying ore of 2 to 4% copper.

For full description of properties and developments, see Vol. XI, Copper Handbook.

It is said that company spent over $2,000,000 trying to develop property into a paying copper mine, but was unsuccessful in discovering any large body of commercial ore. During the war some molybdenum and copper ores were shipped at a profit. Company now has leases on some oil-land near San Antonio, Texas, and by Oct., 1919, had drilled six holes, which were yielding a total of 52 barrels of high gravity oil per day. These wells are below 1,300'. Considerable speculation resulted from these developments and the stock advanced several hundred per cent. in price.

HORSESHOE BASIN GOLD MINING CO. **ARIZONA**

Now the Lowell Gold Mining Co., which see.

IMPERIAL COPPER CO. **ARIZONA**

Defunct. (Was a subsidiary of Development Co. of America).

Property: 52 patented claims now owned by Am. Sm. Ref. Co., 120 Broadway, New York City.

INTERNATIONAL TUNGSTEN CORPORATION **ARIZONA**

Office: 42 Broadway, New York.

Officers: Hiram Whitcomb, pres.; Richard Lounsbury, treas.; C. E. Greenough, sec.; A. A. Westerhouse, asst. sec.

Inc. June 16, 1916, in Virginia. **Cap.**, $10,000,000; shares $10 par. Company acquired entire capital stock of the Emery Whitcomb Tungsten Co. and the National Tungsten Co., both incorporated in Arizona.

Property: 8 patented claims, 143 acres, and 18 unpatented claims, 350 acres, all contiguous, in the Arivaca mining district, county, 65 miles S. W. of Tucson and 23 miles from Amada on the So. Pac. R. R. Claims are said to cover an area of granite, rhyolite and diorite, the latter with quartz-filled fissures

containing tungsten ore. Two of the veins are said to traverse the property fo over 10,000′ with widths ranging from 2½′ to 12″; one ore-shoot claimed to b 12″ wide, 175′ long and containing 1% tungstic oxide, WO_3.

Development: mainly by tunnels, longest 500′ with several shafts, deep est 156′, which is said to be sunk on a 30′ vein that traverses the property for mile; 15′ of this vein is said to contain rich tungsten ore; the balance, 2½% copper sulphide ore, "which taken together constitutes a mammoth mine." Or reserves are undoubtedly greatly over-estimated.

Equipment: includes a hoist, compressor and a 7½-ton auto. truck fo delivering ore to the mill. The 10-stamp mill has three 50 h. p. gas engines Blake crusher, gyratory crusher, 8 Wilfley tables, Johnson vanner and 2 smal air compressors. After a shut-down of several months, work was resumed, Ma 1, 1917. Mill treats 100 tons daily, yielding 1 ton of 65% tungsten concentrate

Reported in Dec., 1918, that James H. Emery had filed suit in the Superio Court to foreclose on a mortgage for $25,000 held on the Emery-Whitcom Tungsten Co. and the National Tungsten Co., subsidiaries of the Internationa Tungsten Co.

LIBERTY SILVER MINES CO. **ARIZONA**

Formerly the Arizona Consolidated Copper and Mining Company, nam changed by permission of the Arizona Corporation Commission, February, 191

Office: 25 Broad St., New York City. **Mines:** Greaterville, Pima Co Arizona.

Officers: C. H. James, pres.; M. J. Fink, v. p.; E. A. Abrahams, sec treas., preceding with J. B. Anderson and J. C. Anderson, directors.

Inc. 1918 in Ariz. **Cap.**, $1,500,000; $1 par; issued in payment fo properties 750,000 shares. Security Transfer & Registrar Co., N. Y., transfe agent.

Property: 15 claims at Greaterville, Tucson district, Pima county, re ported to show 10 veins varying in width from a few inches to 20′, occurring as stockwork. A 30″ sample at 90′ depth reported to have assayed $2.80 gold, 16. oz. silver, 2.2% copper, 41.2% lead, 12.1% zinc. Developed by several shafts deepest 180′.

Regarded as a prospect whose ore appears to be pockety.

LITTLE AJO COPPER MINING CO. **ARIZONA**

Officers: W. A. Knox, pres., Apex, Mo.; C. C. Wheeler, v. p.; O. T Richey, sec.; C. E. Walker, treas., all of Tucson, Ariz.

Inc. 1917. **Cap.**, $1,000,000; shares $1 par. First allotment of 100,00 shares treasury stock offered at 25 cents.

Property: 3 claims adjoining the mines of the New Cornelia, Ajo Con solidated and Cornelia Ajo, at Ajo, Arizona. Greater portion of the claims i covered with conglomerate, while the bottom of a 50′ shaft is said to sho slightly altered porphyry. Prospecting is being carried on by diamond-drilling At 1,000′, low-grade copper ore is said to have been encountered, continuing t bottom or 1,720′ in sulphides. In Sept., 1919, this hole was 1,900′ deep in min eralized ground.

LOWELL GOLD MINING CO. **ARIZONA**

Formerly Horseshoe Basin Gold Mining Co.

Address: A. F. Borrego, sec.-treas., Bisbee, Ariz. **Mine:** Quijotoa Pima county, Ariz.

Officers: J. L. Winters, pres.; J. P. Williamson, v. p.

Cap. 200,000 shares.

Property: six claims in the Quijotoa mountains, with a 28″ vein sai to assay from $6 to $28 in free milling gold. Developed by numerous pits an an 80′ prospect shaft.

MAGNATE COPPER CO. **ARIZONA**

Address: M. Brooks, sec.-treas., Liberty Bldg., Philadelphia, Pa.

Officers: C. Z. Jones, pres.; Carl M. Kneass, v. p.; T. M. Smith, ger mgr.

Inc. Nov. 19, 1916, in Del. **Cap.**, $5,000,000; shares $1 par; 2,499,500 i treasury. Listed on New York Curb.

Property: 29 claims, in Twin Buttes district, Pima county; 32 miles from Tucson and 4½ miles from railway at Twin Buttes. Reported to have option on Lucky Strike and Mesa mines.

Geology: surface shows characteristics of producing porphyry-copper areas. Basal rock is a grano-diorite of varying grain. Most of the area is covered by a dense fine grained rock very greatly altered, but probably monzonite. Mineralization proceeded along dominant N. E.-S. W. fractures, which are filled with quartz, pyrite and chalcopyrite. Erosion with oxidation of the pyrite, forming acid water, further changed the altered rock and formed a deposit of disseminated ore whose extent is not yet determined.

Development: by shafts, 150′, 118′ and 40′ deep, also by 3 drill holes. From the 118′ of No. 3 shaft, levels were driven at 35′ and 85′ depths with 625′ of workings. The deposit thus far developed shows veins and stringers of high-grade copper glance as a network in the disseminated material. Careful sampling showed 1½ to 2½% copper, 1½ oz. silver per ton. Ore contains a cupriferous turquoise.

Diamond drill has more than confirmed favorable predictions based on surface examination. Holes No. 1 and 2, indicate a blanket deposit 65′ thick; hole No. 3 is reported to show over 100′ of ore. Assays ran from 1.77 to 2.2% copper as averages. The overburden is slight.

Is an attractive prospect, with possibilities of development into a big "porphyry" copper.

MATT PERRY MINING & MILLING CO. **ARIZONA**

This gold property, near Quijotoa, 80 miles west of Tucson, is reported under bond and lease to A. F. Borrego, and J. R. Hibbs. Property has an old mill which is to be overhauled.

MICHIGAN & ARIZONA DEVELOPMENT CO. **ARIZONA**

Office: 905 Metropolitan Life Bldg., Minneapolis, Minn. Mine near Helvetia, Pima Co., Ariz.

Officers: C. C. Prindle, pres.; R. M. Bennett, v. p.; Chas. W. Sexton, sec.-treas. This company reorganized the Helvetia Copper Co., under a plan explained in Vol. V. Formerly owned a considerable share interest in the Helvetia.

MIDDLETON MINE, INC. **ARIZONA**

Address: H. C. Clark, Tucson, Ariz.; Bevil G. Granville, cons. eng.; Paul Henshaw, supt.

Property: 40 miles S. W. of Casa Grande in the Black Range district. Planning erection of leaching plant.

MIDLAND COPPER CO. **ARIZONA**

Office: E. G. Bush, P. O. Box 1197, Tucson, Ariz. **Mine:** Twin Buttes, Arizona.

Officers: E. G. Bush, pres.-treas.-mgr.; J. R. Ricketson, v. p.; G. H. Langworthy, sec.; S. J. Gunn, supt.

Inc. in Arizona. **Cap.,** $2,000,000; $5 par, non-assessable, issued 600,000.

Property: 5 claims in the Twin Buttes district. Silver-copper sulphide ore occurs in contact veins between porphyry and limestone with dip of 55°, course E. W.

Development: by incline shaft 550′ deep and 400′ of underground workings. In August, 1919, 5′ of 5% ore was cut at 250′.

Equipment: 25 h. p. distillate engine, compressor, etc.

Production: 8 months of 1918, gave 4,842 tons of ore, yielding 783,493 lb. copper and 8,901 oz. silver.

MILE WIDE COPPER CO. **ARIZONA**

Main office: Tucson, Ariz.

Officers: C. P. Reiniger, pres. and mgr.; L. E. Jettinghoff, sec.; Prescott Lyon, treas. The president with C. W. Freeman, E. C. Carter, W. H. Singer and F. C. Douds, directors. Annual meeting, July 7th.

Inc. May, 1916, in Arizona. **Cap.,** $5,000,000; shares $5 par, all outstanding.

Property: about 55 unpatented mining claims and 2 mill sites, abou 1,400 acres; on the south side of Amole Peak, 18 miles from Tucson. Claim are divided into groups: the Copper King, Orient, Copper Mountain and Esper anza, with the Oro Fina placer claims and Copper King and Copper Crown mil sites.

Geology: a number of intrusions of quartz-porphyry, granite-porphyr and some andesite between beds of limestone, have caused considerable altera tion and metamorphism. A striking feature of the topography is the dike-lik amphibole and garnet outcrops. The general strike of the contact is N. E.-S. W with 45 to 65° dip to the southeast. The change of dip is very noticeable, be coming flatter the greater the distance from Amole Peak. This system has bee cut at right angles by system of vertical slips and faults. At some of the inter sections of these two systems a circulation of mineral solutions depositing pyrit and chalcopyrite resulted in the replacement of the limestone. These replace ments are the orebodies, having a width of 5′ to 8′ and a length of 15′ to 20′, an probably the same in height. Three such bodies of chalcopyrite ore have bee cut on the 200′ level. In places there are bunches of high-grade chalcopyrite.

On the opposite side of the mountain and much nearer the railroad severa of the claims held by the company shows several apparently isolated contac metamorphic deposits consisting largely of garnet containing chalcopyrite, an averaging in the exposures seen, about 2½% copper. The limited developmen does not disclose the limits of any of the orebodies, but their surface exposure are not great.

Development: main development on the Copper King group is by 30 incline shaft with levels at 100′ and 200′. Station being cut at 300′.

Production: During 1918 reported as shipping 4 cars monthly, averag ing about 8% copper to the Sasco smelter, from three of the ore "pockets."

Equipment: 25 h. p. gas hoist; 500 cu. ft. compressor, 100 h. p. F. M gas engine, 60 h. p. gas engine and hoist, store and buildings.

The properties of this company do not come up to the very rosily-painte descriptions given out by the brokers who held an option for 51% of the stock the balance being owned by the company's manager.

Property closed down early in 1919 with no immediate prospects of re-opening

MINERAL HILL CONSOLIDATED COPPER CO. **ARIZONA**

Office: 1014 Frick Bldg., Pittsburgh, Pa. **Mine office:** Tucson, Pima county, Arizona.

Officers: Robt. Law, Jr., pres.; E. B. Reeser, v. p.; Jas. A. Dunn, sec treas. and F. A. Minard, cons. engr.

Inc. March, 1904, in Arizona, as successor of Azurite Copper & Gold Mining Co. **Cap.,** $3,200,000; shares $1 par.

Property: the Azurite mine with 26 claims, 12 patented, 520 acres, in the San Xavier district, 18 miles S. W. of Tucson, said to have produced $550,000 worth of ore under former ownership. Company's lands also include the American group of 8 claims and the Mineral Hill group of 5 claims. The min is claimed to have a large body of sulphide ore averaging about 3.5% copper Recent developments on the 500 and 600′ levels is said to have disclosed a large body of 4% copper sulphide ore. Has shipped about 60,000 tons of carbonate ore in past.

Development: by 74 pits and open cuts, 8 tunnels, longest 250′ and shafts, deepest 600′, mine having a total of about 2 miles of workings. Company is devoting all its energies to development work.

Equipment: includes gas engines, electric generators, air compressor pumps, etc.

Company is favorably regarded.

MOLYBDENUM MINING CO. **ARIZONA**

Address: Orendorff Hotel, Tucson, Ariz.

Officers: F. J. Wharton, pres.-mgr.; J. M. McBride, sec.

Inc. 1909, in Ariz. **Cap.,** $1,000,000; $1 par.

Property: about 200 acres of land in the Baboquivari mountains, 5 miles S. W. of Tucson, with 4 shafts, deepest 80′. Claimed to have a ledge 300 wide.

In 1917 the State Corporation charged that company was selling stock without a permit. A prospect.

MOLYBDENUM PRODUCTS CO. **ARIZONA**

Address: Arthur Geeson, Box R, Tucson, Ariz.

Officers: F. H. Hereford, pres.; Harold Steinfeld, v. p.; Alan Kissock sec.-treas. and mgr., with Hiram Corbett, R. K. Shelton, K. G. Smith and Maxwell Miltors, directors.

Inc. June, 1916, in Arizona. Cap., $100,000; $1 par; 30,000 issued.

Company owns no mines yet, but operated an electric smelter, buying wulfenite ores, mainly from Arizona Rare Metals Co. Was said to be one of the largest producers of molybdenum in the United States in 1917.

NARRAGANSETT COPPER CO. **ARIZONA**

Address: care W. R. Ramsdell, 30 So. Stone Ave., Tucson, Ariz.

Officers: W. R. Ramsdell, pres.; R. J. Williams, v. p.; James S. Kelso, sec.-treas.

Inc. 1917 in Arizona. **Cap.**, $3,000,000; shares $1 par; $1,250,000 shares outstanding.

Gross earnings in 1918 were $265,665.

Property: 21 claims, at Rosemont, Helvetia district, Santa Rita mountains, Pima county, Ariz. Mine is 20 miles S. of Vail on the S. P. R. R.

Geology: the ore occurs in a replacement deposit between limestone and quartzite, which dips 30° E., and has a N.-E. pitch. Shoot has been opened for 1,000' along the strike. Both oxide and sulphide ores occur, and contain both copper and silver. Average of 7.01% copper, 1.15 oz. silver reported from 13,248 tons shipped during 1918. During 1915-16-17-18, reports shipping 34,331 tons with a net smelter return of $835,860.

Development: by tunnel; workings, total 3,000' to depth of 450', said to have exposed 80,000 tons containing from 2½ to 4% copper, including ore in dumps.

Production: in 1917 was 1,611,429 lb. copper. Over 1,200 tons monthly were shipped, 1918.

In August, 1919, Albert Steinfeld & Co. of Tucson, brought suit against company to recover $300,000 loaned on notes. Judgment was awarded plaintiff, plus interest, a total of $330,000. The mine and equipment were then to be sold at sheriff's sale.

NATIONAL CONSOLIDATED MINING CO. **ARIZONA**

Presumably idle. Described in Vol. XI, Copper Handbook.

NATIONAL TUNGSTEN CO. **ARIZONA**

Acquired by International Tungsten Corp., which see.

NEW CORNELIA COPPER CO. **ARIZONA**

Subsidiary of the Calumet & Arizona Mining Co. Gordon R. Campbell, sec., Calumet, Mich. **Operating office:** Ajo and Warren, Ariz. Same directorate as the Calumet & Arizona Mng. Co., with Dr. L. D. Ricketts, James Phillips, Jr. and Geo. H. Augustine. J. C. Greenway, gen. mgr.; M. Curley, supt.

Inc. Sept. 28, 1909, in Delaware, as a reconstruction of the Cornelia Copper Co. Cap., $9,000,000, shares $5 par; non-assessable; all issued and outstanding. Listed on Boston Stock Exchange. Calumet & Arizona owns 1,229,741 New Cornelia shares.

Company authorized an issue of $4,000,000 6% 12-year sinking fund gold bonds, dated Sept. 1, 1915, maturing Sept. 1, 1927, convertible into stock at $10 per share, to finance the purchase of necessary equipment and construction work. All subscribed at par. To Dec. 31, 1918, all bonds had been converted excepting $1,500.

Financial statement, years ending Dec. 31:

ASSETS

Year	Property	Construction	Investments	Current	Total
1918.....	$25,577,837	$5,205,956	$436,574	$3,789,637	$35,010,0
1917.....	26,000,000	5,895,408	111,000	2,186,004	34,192,4
1916.....	10,187,932	4,972,790	.....	628,780	15,789,5

LIABILITIES

	Capital	Bonds	Notes Payable	Reserves	Current	Surplus	Total
1918.	$9,000,000	.....	$649,564	$766,810	$643,148	$23,950,477	$35,010,0
1917.	7,024,500	$3,951,000	3,330,559	720,248	263,658	18,902,446	34,192,4
1916.	6,012,000	3,976,000	710,000	241,964	14,625	4,834,914	15,789,5

INCOME AND EXPENDITURE

	Metal Sales, Etc.	Operating Charges	Deprec., Depletion, Interest	Dividends	Net Balan
1918...	$11,073,680	$6,282,500	$2,263,374	$450,000	$2,077,8
1917...	3,810,123	2,136,483	911,229	.....	762,4

Dividends: initial of 25c per share, $450,000 was paid in Nov., 1918, no since on account of the copper market.

History: company's early history and its experiments with new pr cesses are fully described in Vols. VI, VIII, and X, Copper Handbook. In 191 the General Development Co. bought 20,000 shares for $20,000, spending t money under an option for a stock control, putting down 5 diamond-drill hol deepest 188', which showed the ground to be oxidized to a depth of about 3 followed by sulphides, estimated by the company to average 2 to 2.75% copp The option was forfeited 1910, and property was leased to H. C. Chamberlai who shipped concentrates from 800 tons of 4% ore to the Copper Queen smelte

In 1911 the Calumet & Arizona Mining Co. took an option on 76% of Ne Cornelia stock, and under the direction of John C. Greenway, general manag and L. D. Ricketts, cons. engr., proved the existence of a large body of co mercial copper ore. Laboratory tests showed that the carbonate ore could treated by leaching with dilute sulphuric acid and the sulphide ore by flotatio

Experimental leaching plants of one ton and later of 40 tons per day capaci were erected at Ajo and tests made for over a year. Results of 310 charg showed: average heads, 1.31% copper; average tails, 0.271% copper; extractio 79.36%, and 0.88 lb. per k. w. hr.

Meanwhile wells were drilled to locate a water supply, and a shaft sunk a hole 7 miles from the property found a satisfactory water stratum. In t summer of 1915 the Tucson, Cornelia & Gila Bend Railroad from Gila to Aj a distance of 43 miles, was started, and completed in Feb., 1916. Work w immediately started on a 5,000-ton leaching and electrolytic precipitation plan which started operation in May, 1917. During 1918, production of this pla averaged 85,382 lb. of cathode copper daily.

In July, 1917, the New Cornelia Copper Co. acquired the property of t adjoining Ajo Consolidated Copper Co. property, in which a substantial tonna of similar ore has been developed by diamond drilling and underground work.

Property: 55 patented and 38 unpatented claims, and one patented an 14 unpatented mill-sites at Ajo, 44 miles south of Gila Bend, Ariz. Propert comprises about 1,704 acres, 55 of which constitute the New Cornelia orebod

Property of the Ajo Consolidated, 7 patented and 52 unpatented claim totaling 1,150 acres, adjoins the New Cornelia on the south, the orebody undeveloped, a continuation of the New Cornelia, covers about 21 acres.

Geology: claims cover an area of rhyolite, lava, breccia and tuff beds, in truded by a huge mass of monzonite porphyry, which cuts and uplifts the rhyolit There were subsequent intrusions of diorite and diabase porphyry, probably co

nected with the great mass of Tertiary basalt and andesite lava flows which cover the surrounding country. Mineralization has formed a low-grade disseminated deposit with high-grade veins in monzonite and narrow rich veins in the adjoining rhyolite. The disseminated orebody, covering about 55 acres, has a pear-shaped outline. The depth of the ore varies from less than 50′ on the outskirts to more than 600′ in the center of the orebody.

In the Ajo Consolidated property the disseminated mineralization often extends beyond the monzonite into thoroughly brecciated rhyolite, but in general the ore followed the contact of the two rocks, dipping steeply S. W. and more flatly and irregularly to the S. E. For about 300′ along the contact there is a lens of ore of much higher grade than the average.

The original mineralization was chalcopyrite and bornite with comparatively little pyrite. Surface alteration has converted the primary sulphide minerals to malachite to a depth of about 20′ below the deepest arroyos and 150′ below the highest hills. The plane of demarcation between carbonates and sulphides is almost horizontal, agreeing with the present ground water level. Chalcocite is rare in the New Cornelia orebody, but locally of much importance in the Ajo Consolidated ground, particularly in the ore in rhyolite below the water level.

In March, 1919, a body of sulphide ore was opened on the 361′ level of the Ajo Consolidated ground. This ore runs from 4% to 77.7% copper, and is opened for 360′ width and 400′ long. Shipments of 300 tons daily of smelting ore were being made Dec., 1919, and the lower grade ore will go to the flotation plant.

Development: diamond drill holes and underground development work have proven the existence of 10,100,984 tons of carbonate ore carrying 1.568% copper and 41,219,437 tons of sulphide ore carrying 1.587% copper, or a total of 51,320,421 tons carrying 1.579% copper.

The extent of the orebody to the south and east has not been determined. Several drill holes on both properties stopped in ore at from 400′ to 600′.

Underground development consists of a 250′ shaft and 2,227′ of levels. On the 250′ level the orebody is approximately 400′ long by 265′ wide and varies from 4% to 9% copper.

Ore reserves: total estimated tonnage, based on a 1% minimum basis, is 56,000,000 tons, carrying 1.58% copper. Gold and silver values in the carbonate ore are negligibly small, but the sulphide ore carries between 30 and 50c. per ton in precious metals.

All the carbonate ore and about 22,500,000 tons of the sulphide ore are available for steam-shovel mining. The occurrence of ore at the surface obviates stripping and loss of ore or vitiation of grade through admixture of ore with capping. Grade of ore already mined has averaged 0.12% above estimates.

Equipment: plant is about one mile from the orebody, with which it is connected by a double-tracked standard gauge railroad. Ore is loaded into cars by three 100-ton steam-shovels, the cars dumping directly into the large crusher. Five thousand tons are now being treated daily.

Ore is crushed to 10″ size in a large gyratory crusher; 4 smaller gyratory crushers reduce it to 3″ cubes before it goes by belt conveyors to the storage bins. From the 10,000-ton storage bins the ore is carried by 4 pan conveyors to 15 Symons disc-crushers, reducing it to ¼″ in size. The ore is very hard and contains many large boulders.

Crushing practice at Ajo was described by W. L. Dumoulin, in Bull. 152, August, 1919, of the A. I. M. E. The product sent to the leaching tanks is as follows:

Mesh	%	Mesh	%
+3	26.7	+10	7.0
+4	17.3	+14	4.9
+6	12.7	+20	4.1
+8	9.0	—20	18.3

From the crushing plant the ore is carried by an overhead conveyor 100′ long to 11 leaching tanks, each 88′ square and 15′ deep, built of reinforced cement

lined with lead. The conveyor advances across the tanks at 12′ an hour. Ea tank holds 5,000 tons of ore, and each charge remains in the tank 8 days, t tailings are removed by Hulett excavators and hauled to the dump in a train twelve 50-ton cars. The acid solution is handled by two 3,500 gal. a minu horizontal centrifugal pumps.

The pregnant solution from the tanks is treated in 4 sulphur dioxide g towers, 20′ in diam. and 40′ high, to change ferrous to ferric iron, and th pumped into the 152 electrolytic tanks, holding 77 cathodes. The anodes a of lead, and the starting cathode sheet is 3′ square, weighs 16 lb., but accum lates copper by the electric current until it weighs 165 lb., when it is withdraw The discarded solution goes over scrap iron. The sulphur dioxide gas is ma by burning pyrite in 4 Wedge furnaces, and purified by the Cottrell process.

Results during the first year of leaching operations at Ajo are given great detail by Tobelman and Potter in Bull. 146, Feb., 1919, of the A. I. M.

The $1,000,000 power plant has 5 oil-fed 825 h. p. boilers, 2 steam turbin of 7,500 k. w. capacity, 4 rotary converters.

A 500-ton experimental flotation plant was built in 1919, to study the be method for treating the sulphide ores. It is believed that the company will handling 10,000 tons of this ore daily by 1922. A smelter and refinery are und consideration.

Company contemplates building its own railway to a port on the Mexic coast.

Production: until Jan. 1, 1919, when production was greatly curtaile was 1,775,000 tons of oxidized ore averaging 1.465% copper, treated in the leac ing plant and 81,417 tons of sulphide ore, averaging 3.39% copper, shipped Douglas, as against a total of 840,424 tons in 1917. Copper produced in 19 was 19,482,191 lb.; in 1918, 46,950,139 lb.; in 1919, 36,000,000 lb.

New Cornelia is a big mine in good hands, is in a strong position, and w pay regular dividends for a long time if conditions are normal.

OLD HICKORY COPPER CO. ARIZON

Address: 17½ Howe St., Passaic, N. J.

Officers: Jas. V. Parber, Prof. of Music, Passaic, N. J., pres.; J. Wigg, v. p.; John Post, v. p.; P. Wannemacher, sec.-treas. John Parber, su

Inc. in Arizona. **Cap.,** $5,000,000; $1 par; fully paid; non-assessabl issued 1,650,000 shares.

Property: 41 claims, 600 acres, 35 miles S. of Tucson, and 8 miles fro the S. P. R. R.

Development: 3,000′ of tunnels, shafts and open cuts. The main sha the Jackson, was 190′ deep in Nov., 1918. Prospectus states the vein widen from 1″ at the 110′ level to nearly 1′ at 160′ depth. On 150′ level claimed have 2′ of copper sulphide in east drift and 1′ in west drift. One shipmen 31 tons, netted $1,362.

Equipment: includes an air-compressor, drills, sinking pump, hoi and a Mack truck.

While the mine is still a prospect awaiting development to prove its valu the management seems to be sincere in its beliefs and aspirations for makin a mine.

OLD PUEBLO MINING & MILLING CO. ARIZON

See Tucson Consolidated Copper Co.

OLD YUMA MINE ARIZON

Col. Epes Randolph, owner, Tucson, Ariz.

Property: 40 unpatented claims about 14 miles W. of Tucson, Pim county, Ariz., shows a fissure vein 40′ wide in andesite, carrying gold, molybdeni and specularite. Ore occurs in 4 shoots, each about 300′ long, and is said average $3 gold and 1¼% molybdenum. Developed by vertical shaft to dep of 320′.

Equipment: includes 15 h. p. hoist, pump, 400′ tramway and 400-to concentrating mill. Concentrates said to average 21% MoO_3.

Mine was closed down in August, 1916.

PAYMASTER SILVER-LEAD CO. ARIZON

Address: Charles Blenman, pres., Tucson, Ariz.

Property: at Olive Camp, 25 miles S. of Tucson. Ore has been sent to El Paso, and a mill was planned August, 1919, to treat low-grade ore.

PIMA MNG. & SMELTING CO. **ARIZONA**

Address: G. P. Meyers, sec., Tucson, Ariz.

Inc. 1918, in Arizona. **Cap.,** $1,000,000. Company was organized to move the Socorro, N. Mexico smelter to Tucson and enlarge the output from 250 to 500 tons daily. At last accounts construction work had not been started.

PIONEER MINING & SMELTING CO. **ARIZONA**

Offices: 1178 Broadway, N. Y.

Officers: Garret B. Kip, pres.; Tarrytown, N. Y.; W. C. Moore, sec.-treas., with G. H. Corwin and Edward Benedict, directors.

Inc. Aug. 19, 1913, in Arizona, as a reorganization of the Pioneer Smelting Co., which went into bankruptcy in 1913. **Cap.,** $1,000,000; shares $1 par; $690,647 issued; non-assessable.

Property: formerly held by the Pioneer Smelting Co., 14 unpatented claims, 260 acres, included the Plumed Knight mine, sold to Mr. Barnsdall of Pittsburgh in 1917, and the Gould mine, also sold, 1917. Mines fully described in Vol. XII.

Company owned a 150-ton custom smelter, 1½ miles west of Sahuarita, and 10 miles south of Tucson, on the Twin Buttes railroad. The plant has a 106x42" blast-furnace, built by the Colorado Iron Works Co. The smelter was in blast for a short time in 1912, but has since been idle, as property could not pay expenses. Smelter reported sold, 1919.

PLUMED KNIGHT MINE **ARIZONA**

Sold in 1917 to Mr. Barnsdall of Pittsburgh, Pa.

Mine, formerly owned by Pioneer Mng. & Smelting Co., is 18 miles from Tucson, Pima county, Ariz., in the San Xavier district.

Development: by shafts to about 350′ depth shows ore rich in iron, lime and silica at and above 100′ level, succeeded by bornite at depth. Ore said to average 4% copper with small gold-silver values.

We have no information as to results obtained by the new manager.

REINIGER FREEMAN MINING CO. **ARIZONA**

Address: 57 N Church St., Tucson, Ariz.

Officers: Chas. P. Reiniger, pres.-gen. mgr..; Chas. W. Freeman, v.-p. E. Jettinghoff, sec.-treas., with Chas. E. Walker and J. E. Jones, directors. B. Richmond, mgr.

Inc. Jan., 1918, in Arizona. **Cap.,** $5,000,000; $5 par. Listed on New York Curb.

The General Balance Sheet, Dec., 1918, shows total assets of $5,169,400, which includes mining properties and options, $3,894,572; cash, $76,450; bills receivable, $100,126; development expenditures, $71,892; machinery and equipment, $8,846; warehouses and supplies, $5,515; treasury stock, $1,000,000. Liabilities now: capital stock, $5,000,000; balance due on purchase price of properties, $16,000 on Oct. 9, 1919; $22,000 on Oct. 9, 1920; $131,400 on Oct. 9, 1921. Statements of receipts and disbursements show receipts of $174,703 from sale of stock, against disbursements, $98,253; cash on hand, $76,450.

Property: the Wakefield group at Mineral Hill, also option on the copper Prince Group near Twin Buttes and Virginia Group west of Silverbell. The Wakefield or Belmer group of 21 claims, 347.97 acres adjoins the San Xavier Mineral Hill and other well known mines at Mineral Hill P. O., San Xavier mining district, 20 miles south of Tucson.

This tract covers a limestone-diabase contact in an area of sedimentary rocks surrounded by granite and altered by contact metamorphism. Mineralization occurs in contact deposits and in veins. Ore in the neighboring properties is base, consisting of lead, zinc and copper sulphides and carrying variable value in silver.

Development: work in 1918, embraced sinking the Belmer shaft to a depth of 330′ and the San Carlos shaft, 80′, a few hundred feet south of it. The Belmer shaft is reported to have cut the San Carlos veins. The "Contact" zone in the adjacent Empire Zinc Company's tract is said to carry a body of sulphide ore 40′ wide, should have been reached by crosscutting 350′ from the

Belmer shaft, had its dip been constant; but at last reports no ore had been Management claims that "for over a year we have been exploring the pro by shaft and laterals," with greatest depth of working at 330'.

The extravagant claims as to the possibilities of this Wakefield group ar to be based on statements made by others concerning the results of mine dev ment on adjacent properties. Inasmuch as the Empire Zinc tract has been down for some time, and the Reiniger Freeman is practically idle, the optimistic and very general statements issued by the company should be sidered as an opinion of what is hoped for rather than a statement of facts conditions.

The property is well equipped, has ample houses, offices, buildings, etc., it is evident considerable money has been spent on this tract, but develop appears to have been suspended before ore was found.

Company holds options on the Virginia group of claims, 20 miles W Silverbell; Belmer group of 5 claims, 20 miles S. of Tucson; Copper P group of claims 1 mile N. of Twin Buttes. Virginia group is said to contact veins, between granite and sedimentaries, that produced some co ore from shaft 50' deep in 1917. Copper Prince is said to have contact between limestone and granite with development shafts, 40' and 70' dee 1917, showing copper ore.

The amount of work done on the property does not warrant the char of the advertising matter put out by the company.

ROSEMONT COPPER CO. ARIZ

Office: 61 Broadway, New York. Is controlled by Adolph Lewi and Lewisohn Bros.

Property: 6 claims at Rosemont, Pima Co., Ariz.

In 1919 a part of the property was under lease to the Daylight Mining C Tucson company. Shipments were being made regularly until the co market became unsettled.

Geology: numerous orebodies in limestone, occurring under geolo conditions surficially similar to those at Bisbee. Company also owns clai Helvetia, and others adjoining the Tiptop mine, near Helvetia, but the bu its holdings are on the east side of the Santa Rita Mountains, west of Rosemont post office. Company has a small smelter, long idle. Propert garded as promising.

SAHUARO COPPER CO. ARIZ

Address: Mineral Hill, via Tucson, Ariz. F. Buckout, pres.; T Shacklett, v. p.; W. D. Uphaw, sec.-treas.

Property: 4 claims adjoining the Vulcan copper mine in the Mi Hill-San Xavier district.

SANTA RITA COPPER MINING & SMELTING CO. ARIZ

Office: care C. F. Elliott, P. O. Box 592, El Paso, Tex. Mine a Arivaca, Pima county, Ariz.

Inc. June, 1901, in Arizona. **Cap.** $3,000,000; shares $1 par; is $2,750,000.

Property: 12 claims, unpatented, 220 acres, in the Tyndall distri the Santa Rita mountains, 13 miles from Arivaca, shows granite, porph diorite, carrying several veins of sulphide ore, usually at the contact diorite and granite. Veins range from 4 to 12' in width.

Development: 2 shafts and several tunnels, with a total of about of workings, mostly in low-grade ore. A new tunnel, planned to give of 110', was 300' long, at last accounts. The mine is without power equi Company is a promotion of A. A. Post. No recent returns.

SAN XAVIER EXTENSION COPPER CO. ARIZ

Address: Tucson, Ariz.

Officers: E. G. Bush, pres.-gen. mgr., with Nathan Kendall and Shelton, directors.

Cap. $750,000; $5c par

Property: 6 claims, 100 acres, in San Xavier mining district, de by 200' vertical shaft, has lead-silver, copper, zinc ore.

Reported to have shipped, to September, 1919, 900 tons of ore assaying 20 oz. ver, and 4% copper. Idle temporarily, but company plans sinking to 500' level.

ESAME COPPER CO. **ARIZONA**

Address: Box 907, Tucson, Ariz.

Officers: C. M. Taylor, pres.; J. E. White, v. p.; S. A. Elrod, sec.-treas.; erald Jones, counsel.

Inc. in Arizona. **Cap.**, $1,000,000; shares $1 par. On April 16, 1917, rizona Corporation Commission allowed sale of 75,000 shares at 10c each.

Property: in Empire district, Pima county, Ariz., 11 miles S. E. of il on the S. P., and El Paso and S. W. lines.

Development: several hundred feet by shafts, opening copper ore in places. Prospectus said that "A number of theoretical and practical mining en expressed the opinion that a large body of paying ore should be encountered a probable depth of 200'," which is interesting, if true. Idle for a year.

LVER VIRGIN MINING CO. **ARIZONA**

Address: J. J. Adair, supt., Ajo, Ariz.

Officers: A. B. Murchison, pres.; J. F. Deitrich, v. p.; S. W. White, ; F. E. Caldwell, treas., with J. E. Shaw and H. D. Maynard, directors.

Inc. 1919, in Arizona. **Cap.**, $150,000.

Property: in the Quijotoa mountains, 85 miles N. W. of Tucson, ached by good road through the Papago Indian Reservation.

Development: by shaft. Reserves are reported as 10,000 tons of $56 er ore.

OUTHERN ARIZONA SMELTING CO. **ARIZONA**

Bankrupt. Property, the Sasco smelter, bought in by preferred creditors public auction, March, 1915, and reported leased, 1916, to the American Sm. Ref. Co. Sasco smelter fully described in Vol. XI, Copper Handbook.

TRATTON CONS. COPPER CO. **ARIZONA**

(Successor to Stratton Copper Co., and Old Hat Copper Co.)

Address: Tucson, Ariz.

Officers: C. N. Wilson, pres.; S. H. Keeney, v. p.; J. R. Dunseath, sec.- s.; above are directors.

Inc. April, 1919. **Cap.**, $1,500,000; $1 par; issued 200,000; non-assessable.

Property: 12 claims, in Catalina Mts., 54 miles N. E. of Tucson, said to w a contact deposit of copper ore in limestone with assays from 2 to 8% per.

Development: shallow shafts and tunnels, with a total of 1,800' of kings.

Management says operations shall be started September, 1919.

TRATTON COPPER CO. **ARIZONA**

Succeeded by Stratton Cons. Copper Co., which see.

EXAS-ARIZONA COPPER CO. **ARIZONA**

Address: First Nat'l Bank Bldg., Houston, Texas. M. M. Carpenter, r., Tucson, Ariz.

Officers: T. H. Base, pres.; J. H. Kirby, v. p.; J. M. Baird, sec.-treas.; J. G. Bass and M. M. Carpenter, directors.

Inc. 1917, in Arizona. **Cap.**, $1,000,000; shares $1 par

Property: 38 claims, 700 acres, 10 miles N. E. of Tucson, said to show per-silver ore in schist and gneiss.

Management states that $25,000 was spent in 1918 in diamond and churn- ing; that a 2-compartment shaft will be sunk and a mill built.

Production: 1,000 tons in 1907, and 3518 tons in 1917.

P TOP COPPER CO. **ARIZONA**

Office: Commonwealth Bldg., Philadelphia, Pa. **Mine office:** Helvetia, a county, Ariz.

Officers: Geo. A. Aman, pres.; S. Charles Pratt, v. p. and gen. mgr., ast accounts.

Inc. 1902, in Arizona. **Cap.**, $1,150,000; shares $1 par.

Property: 24 claims, 400 acres, also known as the Little Helvetia mine, cluding the Tip Top and Copper Duke claims, also a 100-acre mill site, about iles from Helvetia, shows 3 veins, averaging 14' width. These veins have

extensive bodies of soft black sulphide ore in altered clayey limestone a porphyry, reported to give average assays of 5% copper and 1 oz. silver ton, with a trace of gold.

Development: mainly by tunnel with about 4,000′ of workings; a the usual prospect shafts and tunnels.

Equipment: includes gasoline power. Was bonded 1907, to Gugg heim interests, for $250,000, with cash payment of $75,000, but both parties bargain were dissatisfied, and property reverted to owners.

Idle for years.

TUCSON ARIZONA COPPER CO. **ARIZON**

Office: 331 Ness Bldg., Salt Lake City, Utah. **Mine office:** J. A. Cow supt., Tucson, Ariz.

Officers: John F. Cowan, pres.; E. A. Culbertson, v. p.; B. G. H sec.-treas., with S. H. Douglas, W. H. King and L. A. Cummings, directors.

Inc. Nov. 28, 1916, in Arizona. **Cap.,** $1,000,000; shares $1 par; n assessable; 724,493 issued.

Property: 23 claims, 6 miles from Tucson, Ariz., show contacts a fissures in limestone and andesite. Orebody is said to be from 4 to 30′ wi dips 45 to 75°, and has an E.-W. course. Shoot is 400′ long, 6 to 10′ thick, a reported to contain 6% copper, 3 oz. silver and $1 gold per ton.

Development: started in Dec., 1916, by 100′ shaft and 500′ of workin

Equipment: 25 h. p. gasoline hoist and 250 cu. ft. compressor. M in 1917 was a prospect in good hands. No recent information.

TUCSON CONSOLIDATED COPPER CO. **ARIZON**

Letters returned unanswered in May, 1917, from 511 Chamber of Co merce, Milwaukee, Wis. **Mine office:** Tucson, Pima county, Ariz. Pr erty is evidently idle. Reported June, 1918, that the Black Dyke group claims would be sold at Sheriff's sale.

Officers: at last accounts, J. H. Wussow, pres.; Dr. M. A. Brandt, v F. J. Rodee, sec., Tucson; C. W. Schneider, treas.; Hon. Fred W. Fickett, g mgr.; preceding officers, J. G. Albright, C. F. Freeman, P. P. Donohue, A. F lantine, R. L. Bennett and S. W. Purcell, directors.

Inc. April 15, 1907, in Arizona. **Cap.,** $3,000,000; shares $1 par; n assessable, in one half full paid paid and one-half common stock; issued $1,5 000. Annual meeting, third Monday in March.

Property: 81 claims, unpatented, in 4 groups, 1,620 acres, in the Paga district. The property of the Old Pueblo Mining & Milling Co., 9 claims, is h in this company under an option for 51% of stock on completion of $50, worth of work. Presumably includes Purcell Grand Cons. Mng. Co. prope

The 4 groups are 8 miles W. of Twin Buttes and 35 miles W. of Tucs Claims show granite porphyry and limestone, with fissure veins and cont deposits, 5 being under development. The largest deposit is described a of ore in limestone about 50x150′ in size. The groups as a whole have 3,8 of workings, including 2 tunnels, longest 800′, the remainder including 10 shafts, deepest 5 ore is said to give assays of 2 to 3% copper, 2 to 80% lead, 3 to 125 oz. sil to 80 oz. gold per ton, with some arsenic, chalcocite, chalcopyrite and gal ore bodies are said to be 50′ wide and are blocked out for stoping, wh ... ...

... **Purcell** ... ... acres, shows 3 ... ... shaft and a 200′ tun ... ...

a number of shallow shafts, showing copper ore of 4 to 25% copper tenor, and silver-lead ore assaying up to 69% lead and 139 oz. silver per ton. This group has little development, but appears promising.

Equipment: includes a 250 h. p. steam plant, burning petroleum, with 2 hoists, and there are 6 buildings, including 2 general stores.

The **Old Pueblo Mining & Milling Co.'s** property consists of 9 claims, 5 miles W. of Tucson, developed by the 517' Quien Sabe shaft and a tunnel. A 70' shaft cut, at depth of 30', a 15-ton pocket of chalcocite, assaying 33% copper, 16 oz. silver and $2.50 gold per ton.

The reports by Wishon, 1908, and Attix, 1903, issued by the company are so old one wonders why this "sure thing" mine has been so long idle, and what work, if any, has been done in the past 10 years.

TWIN BUTTES MINING & SMELTING CO. ARIZONA

Office: 77 Michigan St., Milwaukee, Wis. **Mine office:** Twin Buttes, Pima county, Ariz.

Officers: W. A. Barber, pres.; Julius Frank and J. H. Tweedy, v. p.'s; P. C. Branner, sec.; Stephen Hoff, treas., with Ralph M. Friend, G. P. Mayer, Fred Williams, M. J. Davis, R. E. Hackett and Henry Nunnemacher, directors.

Inc. Sept. 8, 1903, in Arizona. **Cap.**, $2,000,000; increased, 1905, from $1,000,000 to $1,250,000, and again increased, January, 1910, to $3,000,000; shares $1 par; 2,000,000 shares outstanding. Capital reduced to $1,880,000 in July, 1918. Controls the Twin Buttes Railroad Co. Wisconsin Trust Co., transfer agent and registrar. Annual meeting, third Monday in February.

Property: the Glance and Queen mines, being operated by the Glance Mining Co., and Midland Copper Co., respectively, under bond and lease, on royalty basis. The Morgan mine is idle. The Twin Butte Co. also owns many other claims, partly patented, in the Twin Buttes district, in the foothills of the Sierrita Mountains, 27 miles south of Tucson. Lands carry fissure veins in limestone and contact deposits having a limestone foot and granite-porphyry hanging wall.

The Twin Buttes Railway, 10 miles in length, running from Twin Buttes to the S. P. (Nogales line), has 1 locomotive and 3 flat cars.

Production: See Glance Mining Co. and Midland Copper Co.

VALLEY GROUP ARIZONA

A group of claims 4 miles N. W. of Ajo, owned by Sam Clark. Reported that considerable development work has shown a large tonnage of low-grade copper carbonate ore similar to that at Ajo, and that the owner will build a small leaching plant.

VERDE QUEEN MINING CO. ARIZONA

Address: Pantano, Pima Co., Ariz. P. M. Hilton, supt.

Property: in central part of Empire mining district, about 12 miles from Pantano, and 15 miles W. of Benson. Shows silver-lead and copper ores, developed by a 280' two-compartment shaft, from which a little lead ore was shipped to the El Paso smelter.

Equipment: includes gasoline hoist. Idle for several years.

VULCAN CONSOLIDATED MINING CO. ARIZONA

Address: W. R. Ramsdell, 30 S. Stone Ave., Tucson, Ariz.

Officers: W. R. Ramsdell, pres.; C. E. Walker, v. p.; J. S. Kelso, sec.-treas.

Inc. March 16, 1916, in Arizona. **Cap.**, $100,000; shares $1 par; non-assessable.

Gross earnings from ore sales in 1916 were $128,753, and operating expenses $78,078. Earnings were equal to 50c per share.

Property: 9 claims, 4 patented, 20 miles S. of Tucson, Pima county, Ariz. *Examined by* F. R. Weeks.

Development: 175' vertical shaft and 560' incline shaft. Flow of water was struck and mine shut down early in 1918 on account of caving of lower part of incline shaft. Company plans on sinking new shaft, pumping out mine and mining the 6 to 7% ore, large bodies of which are said to have been under-going development when water was struck.

Equipment: 15 and 25 h. p. Fairbanks-Morse hoists, and 50 h. p. Chicago Pneumatic compressor.

Production:

	Lb. Copper	Oz. Silver	Net Smelter Returns	% Copper	Oz. Silver
1917	474,690	4,718	$84,238	7.52	1.55
1916	716,458	6,614	128,753	6.43	1.17

WAYNE DEVELOPMENT CO. ARIZONA

Property: near Quijotoa, via Weldon, Pima county, includes 49 claims, partly patented, 980 acres and three mill sites, total 1,020 acres, in the Quijotoa district, 40 miles from the Red Rock-Silver Bell railroad. Claims show mineralized zones between granite and andesite carrying several orebodies, one of which is said to be 200′ wide and characterized by gold ores. The other orebodies show copper ores containing malachite near surface, succeeded by chalcopyrite, mixed with lead and zinc sulphides beneath the oxidized zone. The ore is reported to average 10 to 30% copper and 5 to 70% lead.

Development: by 1,800′ crosscut tunnel, long abandoned, 7 shafts of 60 to 330′ depth and about 10 tunnels, longest 430′ with total workings of about 4,500′.

Equipment: includes steam and gasoline engines, aggregating 500 h. p. at the mine and mill, two 45 h. p. hoists, good for 700′ depth, Fairbanks-Morse and Leyner air compressors, with 17 buildings. The 100-ton stamp mill and concentrator has 30 gravity stamps and a 250 h. p. engine, 4 Blake and Samson crushers, one 50-ton Elspass centrifugal crusher and 3 Standard tables.

Long inactive and probably defunct.

WHITCOMB MINING & MILLING CO. ARIZONA

Office: 154 W. Randolph St., Chicago, Ill. **Mine office:** Tucson, Ariz.

Officers: H. Whitcomb, pres.-gen. mgr.; J. F. Johantgen, v. p.; T. A. Snow, treas.; A. McCallum, sec., with J. C. Freeman, directors.

Inc. March, 1914, in Arizona. **Cap.,** $100,000; recently increased to $200,000; shares $1 par; non-assessable; all issued. No bonded indebtedness.

Property: 3 unpatented claims in the Pima district, 20 miles from Tucson. The increase of capitalization was for the purpose of acquiring 6 additional claims known as the Prosperity group.

Development: by inclined shaft about 500′ deep and stopes on 3 levels. Ore is a silver-lead-bearing quartz of milling grade.

Equipment: includes a concentrating mill, shut down in 1915 for lack of water, but again operated in 1916. Company claimed $500,000 worth of ore developed on the two properties, but we cannot ascertain whether any has been shipped lately.

WHITE-VICTOR COPPER MINING CO. ARIZONA

Mail returned, 1918, from former address, Twin Buttes, Pima county, Ariz., marked "out of business."

Inc. Nov., 1916, in Arizona. **Cap.,** $500,000; shares $1 par.

Property: 6 claims, near the San Xavier mine, Mineral Hill district, Ariz. In March, 1917, 2-10% copper ore was said to have been opened near the surface and shaft sinking was started.

Prospectus said little about the property, but described the wonderful returns of other mining companies.

YUMA MINE ARIZONA

Idle.

Property: 14 miles N. W. of Tucson, is controlled by Col. Epes Randolph, Tucson, Ariz., and associates. Shipping ore containing molybdenum, with about $3 gold per ton in 1917.

Mine is described in Bull. 111, U. S. Bureau of Mines, 1916. The molybdenum occurs as wulfenite in an acid eruptive rock so highly altered that it is difficult to classify. The wulfenite is associated with cerussite, or well-crystallized vanadinite, or both. The average mine ore would be about 2 or 3% wulfenite. Ore concentrates well.

PINAL COUNTY

ALIZONE SILVER QUEEN MINING CO. **ARIZONA**

Officers: D. H. Munoz, pres.; E. W. van de Ford, sec.-treas., with A. E. Troxel, Ed. Ferguson, directors.

Cap. $1,000,000; par $1; 100,000 shares offered for sale, 1918, at 15c to provide funds for development.

Property: 11 claims, Mineral Hill district. An undeveloped prospect. Mail returned from Ray, Ariz., April, 1919.

ALTA MINING & SMELTING CO. **ARIZONA**

Idle. Mail returned, 1916, from former offices at Superior, and Florence, Pinal county, Ariz.

Officers: L. H. Sherman, pres.; Col. G. W. Griffey, v. p. and agent; H. A. Austin, second v. p.; J. C. Ferrall, sec.-treas.; preceding officers and G. R. Charters, directors.

Inc. Sept. 8. 1905, in Arizona. **Cap.,** $5,000,000; shares $1 par. Annual meeting, first Tuesday in September.

Property: 25 claims, area 470 acres, and a 200-acre patented ranch, including a water right on the Gila river, in the Mineral Creek district, at Superior P. O., near the Lake Superior & Arizona mine. Lands have veins in schist and contact deposits between schist and porphyry, ranging 5 to 50′ in width, opened by shafts of 96′, 127′ and 150′, with upwards of 3,000′ of workings, showing ore giving assays of 2 to 57% copper, with gold and silver value, also a lead vein giving assays of 2 to 57% lead, 4 to 15 oz. silver and 80c to $14 gold per ton.

Equipment: at the Black Copper shaft includes boiler house and power house, with steam hoist good for 1,000′, 4-drill Leyner air-compressor and 14,000-gal. oil tanks. There are 9 mine buildings.

A suit against H. W. Augustine, H. F. Clough and I. A. Wood, promoters, for money claimed to be illegally appropriated for their own use, was decided in favor of the present management, compromised by the surrender of 1,190,000 shares of stock to the company.

Property reported sold, 1917. No later information.

ANTELOPE MINING CO. **ARIZONA**

Property: near Kelvin, Pinal county, owned by W. E. Hanney and associates of Kansas City, Mo. Examined 1919 by Alfred Roos of Tucson.

ARIZONA CORONADO COPPER CO. **ARIZONA**

Office: E. M. Fisher, pres., Superior, Ariz.

Property: 24 claims, 9 miles south of Superior, Pinal county. Developed by 260′ shaft. Ore, copper with gold. At depth of 138′ ledge said to be 13′ wide of commercial ore, widening with depth. Shipments reported, 1917, to Wickenburg smelter. Considered of doubtful merit.

ARIZONA-HANCOCK COPPER CO. **ARIZONA**

Idle many years. **Office:** Hancock, Mich. **Mine office:** Florence, Pinal county, Ariz.

Officers: John D. Cuddihy, pres.; Alfred C. Sieboth, v. p.; Henry L. Baer, sec.-treas., with C. D. Hanchette, F. C. Mayworm and Philip Carroll, directors.

Inc. in Arizona, as successor to Arizona-Hancock Consolidated Mining Company.

Property: 4 claims, patented, 2 miles S. of Superior, showing a vein traversing 2 claims, parallel to the vein of the Lake Superior & Arizona, with diabase footwall and limestone hanging, opened by a short tunnel and a winze of 55′, with drifts on 2 levels, showing lead above and copper below.

ARIZONA HERCULES COPPER CO. **ARIZONA**

Stock control passed to Ray Hercules Mining Co., which see.

ARIZONA SILVER QUEEN MINING CO. **ARIZONA**

L. E. Troxel, mgr. and owner, Ray, Ariz.

Property: undeveloped claims in Mineral Hill, Pinal county. Reported to have a vein 4′ wide containing some gold. Regarded as a prospect of doubtful merit.

ARIZONA SUPERIOR MINING CO. **ARIZONA**

Office: 403 Fleming Bldg., Phoenix, Ariz.

Officers: A. A. Fairchild, pres.; V. E. Messenger, v. p.; James E. Nelson, sec.-treas., with Dr. Meade Clyne, directors.

Inc. Dec. 11, 1916, in Arizona. **Cap.,** $1,500,000; $1 par; issued for property 722,804 shares. Annual meeting, first Tuesday in February.

Property: 17 claims and 2 millsites, about 5 miles N. W. of the Ray Consolidated, midway between Ray and Superior, Pinal county.

Prospectus shows a contact of quartzite and limestone with 2 parallel veins dipping 43° E. and several fissures or cross fractures. Veins are 2' wide on surface, widening to 12' at shallow depth, showing traces of gold, silver, copper and lead. Developed by 100' tunnel.

A prospect. Closed during the war, but to be re-opened October, 1919.

ARMOUR MINING CO. **ARIZONA**

Owners: J. A. Armour and E. A. Williams, 311 N. First St., Phoenix, Arizona.

Property: 900 acres located 16 miles east of Florence and 5½ miles from Price, Pinal county.

Reported prospecting with churn-drills. Twelve men employed.

ATLAS DEVELOPMENT CO. **ARIZONA**

Had an option on the Lake Shore mine, near Casa Grande. Ceased operations and has gone out of business. Described in Vol. XIII.

BALL COPPER CO. **ARIZONA**

Office: 1005 Title Ins. Bldg., Los Angeles, Cal. **Mine office:** Winkelman, Pinal county, Ariz.

Officers: Chas. E. Finney, pres.; F. B. Pugh, v. p.; Robt. J. Simpson, sec.-treas., with S. F. Parrish and D. Carl Kurtz, directors.

Inc. Feb. 1, 1908, in Arizona. **Cap.,** $3,000,000; $10 par; $1,250,000 issued. Bonds, $9,000 outstanding at 6%. Annual meeting, third Tuesday in January. Company owns 40,000 shares of the London Arizona Consolidated Copper Co. and has transferred its mineral claims to that company; they are described under that title.

The Copper Exploration Co., promoted by Cameron-Michel Co., New York, has acquired a controlling interest in this company.

BLUE BIRD SILVER MINING CO. **ARIZONA**

Office: Thos. N. Wills, Winkelman, Ariz. **Mine office:** Copper Creek, Arizona.

Officers: Thos. N. Wills, pres.; Geo. C. Young, v. p.; Miles Miller Carpenter, treas. and cons. eng.; Judge S. W. Purcell, sec.; I. B. Winsor, mgr., together with Chas. E. Walker, Tucson, Ariz., directors.

Inc. 1918, in Arizona. **Cap.,** $1,500,000; shares $1 par; 750,000 shares were issued to the owners and were to have been placed in trust until one year after commencement of dividends.

Property: 10 claims, Copper Creek district, Pinal county, reports by both Young and Carpenter state that previous shipments are estimated at 1,000 tons of ore worth $150,000, in silver, besides further values in lead, copper and gold. Mr. Young stated he shipped 32 tons, which returned $4,200 net. Stock offered by Boston broker at 35c, 40c and 50c in 1918, accompanied by intensive advertising campaign of alluring claims. Reported idle, and in December 1918, machinery being removed.

BOSTON & ARIZONA MINES CO. **ARIZONA**

Mail returned unclaimed, September, 1918, from former address, Tucson, Arizona.

Officers: Geo. P. Gregory, pres.; Henry C. Young, Jr., v. p. and gen. mgr.; Gerald S. Howland, treas.

Inc. 1915. **Cap.,** $100,000; shares $1 par. Stock listed on Boston curb. Federal Trust Co., Boston, transfer agents; Exchange Trust Co., registrars.

Property: 5 claims in the Old Hat mining district, 25 miles north of Tucson, Pinal county, Ariz., said to show an orebody 25' wide and 100' long, with

copper, silver and gold. Ore occurs between grano-diorite foot and quartz lime hanging-wall. Developed by 247′ tunnel. A prospect.

Was not favorably regarded.

BROWNELL-ARIZONA MINING & SMELTING CO. **ARIZONA**

Mail returned unclaimed, March, 1919, from former address, Casa Grande, Pinal county, Ariz.

Property: formerly held by Producer Mining & Smelting Co., is supposed to include the Jack Rabbit mine, 80 acres, in Pinal county, together with the Producer and Century-Chief group of 320 acres, and Index group of 220 acres, in Pima county, all in the Quijotoa Mountains. Company sold stock, 1910, on the strength of a clever brochure, written by Alfred Henry Lewis, the talented writer, whose statements were not hampered by a knowledge of copper mining. Company not favorably regarded. Presumably idle.

BROWN WHITLOW GROUP **ARIZONA**

Mine address: Superior, Pinal Co., Ariz. Owned by J. C. Brown and J. W. Whitlow.

Property: 5 claims, in Pioneer district, near Superior; adjoins the old Silver King mine, once the richest silver property of Arizona.

Development: by tunnel, which cuts a 7′ contact vein of ore low in copper and silver. Believed to be idle.

BUNKER HILL COPPER CO. **ARIZONA**

Address: F. M. Pool, Winkelman, Ariz.

Officers: F. M. Pool, pres.; H. S. Bailey, sec.-treas; with B. H. Norton and Thos. Quarrelli, directors. G. G. Wald, supt.

Inc. in Arizona. **Cap.,** 1,500,000 shares, $1 par; 600,000 issued; non-assessable. Annual meeting in March.

Property: 39 claims, 780 acres, in Bunker Hill district, Pinal county, 5 miles from Winkelman. Vein is in diorite, and sulphide ore carries gold, silver, copper, and lead. Shoots are 4′ wide.

Development: by 150-ft. vertical shaft and 300-ft. tunnel; total workings, 600′. Shaft is to be sunk to 600′ point soon.

Equipment: 15 h. p. hoist and Sullivan 2-drill compressor.

Production: 33 tons sent to El Paso, Texas, in March, 1919, was settled for at $81.84 per ton gross and $68.15 net. More high-grade ore was opened in August, 1919. In June the owners had 60 tons of high and 300 tons of $20 ore on dumps.

CAMELBACK GOLD & SILVER MINING CO. **ARIZONA**

Address: Superior, Pinal county, Ariz.

Reported about to drive a 100′ tunnel to cut a rich gold-silver ledge.

COPPER VAULT MINING CO. **ARIZONA**

Owner: J. J. Sherwin, Bellevue, Ariz. Not incorporated.

Property: 28 unpatented claims, 8 miles N. E. of Ray Cons. Copper. a 4′ vein is said to contain 6 to 34% copper, 10 oz. silver, $3 gold per ton. Fissure vein in diabase and schist with N. E.-S. W. strike and dip of 55°.

Development: by tunnels and shaft to depth of 150′ and 500′ underground workings.

No shipments by present owners, but was worked for silver in early days.

CORONADO COPPER & SILVER MINING CO. **ARIZONA**

Office: 503-4 K. of P. Bldg., Indianapolis, Ind.; and E. W. Fisher, 35 Adams St., Phoenix, Ariz.

Officers: E. W. Fisher, pres.; J. W. Pringle, v. p.; C. A. Chambers, sec.-treas, with C. O. Patton and H. H. Dils, directors.

Inc. June 5, 1918, in Arizona. Cap., 3,500,000 shares; 1c par; 1,500,000 issued.

Property: 24 claims, 250 acres, in Pioneer district, Pinal county. Ore occurs in a fissure in schist and porphyry, and carries gold, silver, copper and lead. The outcrop is 1,500′ long. Examined by W. M. Owens of Phoenix, Ariz.

Development: by 400′ incline shaft and 1,000′ of workings. Three shafts to be sunk after Aug. 1, 1919.

Equipment: 65 h. p. hoist, compressor, pump, etc.

Production: one carload of 20% copper ore has been shipped.

CURRY MINING CO. ARIZO

Wm. Curry, mgr., Superior, Ariz.; John T. Rurey, Phoenix, sec.; J. Cox, Hornell, N. Y. and Fred. H. Schulz, directors.

Inc. 1917, in Arizona. **Cap.**, $1,000,000; authorized to sell 200,000 sha

Property: 7 claims, the Curry group, 3 miles north of Magma, n Silver King, shows a vein of silver-lead ore.

Development: mostly by open cuts and pits, which show copper lead ore.

DOUGLAS COPPER CO. ARIZO

Office and secretary: Fred L. Mason, P. O. Box 421, Globe, Ariz. T. Hendricks, pres.; H. M. Foster, v. p.; Chas. Davis, supt.

Inc. Aug., 1910, in Arizona. **Cap.**, $1,125,000.

Property: 35 claims, about 30 miles from Globe on the wagon-ro and midway between the towns of Ray and Superior, Pinal county. A Lands are traversed by several N. W.-S. E. fissure veins in limestone and qu zite, carrying gold, silver and copper in oxidized ores or as bornite chalcopyrite.

Development: by 2 tunnels, a shallow shaft and a number of open c all on one large vein. Management expects to sink shaft to 500′ in de Property lies west of the limestone uplift in which the Newman group located. From personal inspection, the claims are regarded as of highly spec tive value, but the great amount of activity in this belt, all part of the Supe district, makes the tract far more valuable than it was a few years ago.

Nothing is known of operations since 1917.

DRIPPING SPRING COPPER CO. ARIZO

Operating a lease on the Pearl group, expiring in 1921.

Address: M. G. Tarr, Mammouth, Ariz. Joe Bandhauer in charge.

Property: 9 unpatented claims in Old Flat mining district, Pi county. Fissure vein in monzonite carrying lead, copper and silver.

Development: a 4 by 6′ incline shaft, 165′ deep to be sunk further, a 500′ tunnel.

Equipment: Sullivan compressor, hoist, and a dry concentrator, wh proved to be a failure.

Production: in 1917, shipped 80 tons returning 15% lead, 11½% c coper, 83 oz. silver; none since.

Work was to be resumed in August, 1919.

EAGLE MOUNTAIN COPPER CO. ARIZO

Probably dead. Col. P. T. McGrath, gen. mgr., but his whereabouts unkno at Kelvin, Pinal county, Ariz.

Property: 27 claims, known as the Copper Queen group, in the Ri side district, is slightly developed. Idle several years and lands of doubtful va

FORTUNA CONSOLIDATED MINING CO. ARIZO

Office: Superior, Pinal county, Ariz.

Officers: H. K. Welch, pres.; E. D. Farley, v. p.; Calvert Coates, s eng. D. M. Stevenson, Patrick Miller, Sanford Makeever, directors.

Inc. in Arizona. **Cap.**, $1,000,000; $1 par; outstanding 750,000. P erty is said to be free of debts and titles cleared.

Property: 16 claims, 300 acres, 5 miles north of Superior, is a com dation of various properties, including the mines of the Fortuna Mining Ore occurs as tetrahedrite, with argentite, ruby silver, galena and chalco in fissure veins, which show faulting. An 18″ sample is said to assay 7 copper and 151.1 oz. silver. Diamond drill cores reported to show 20′ o copper-silver ore.

Development: 430′ shaft, a 620′ tunnels on E. W. vein and 1050 nel along N.-S. vein.

FORTUNA MINING CO. ARIZO

Now property of the Fortuna Con Mining Co., which see.

GALIURO MOLYBDENUM CO. ARIZO

Address: W. R. Ramsdell, Tucson, Ariz.

Property: 7 (ine on Copper

miles N. E. of Mammoth, developed by tunnels, raises, etc., totalling 850'. Ore is said to carry gold with about 2% molybdenite.

GILA DEVELOPMENT CO. **ARIZONA**

Address: Kelvin, Pinal county, Ariz.

Property shows 6 to 36" vein containing free-milling gold ore, opened by 200' shaft with drifts on the 100' and 200' levels.

GOLDEN BELL MINING CO. **ARIZONA**

Office: care E. W. St. Charles, pres. and mgr., Kelvin, Ariz.

Officers: above with E. F. Goodwin, treas.; W. R. Blackman, sec., Hibernian Bldg., Los Angeles, Calif.

Inc. 1910. Cap., $1,000,000; outstanding 550,000 shares.

Property: 56 claims, near the Southern Pacific railway, 5 miles west of Kelvin, shows gold-silver-copper ore in 2' vein in altered diorite.

Developed: by 100' tunnel, 200' shaft and crosscuts. Equipped with 25 h.p. hoist and air compressor.

GRAND PACIFIC COPPER CO. OF ARIZONA **ARIZONA**

Company address: Franklin, Pa. Mine address: L. I. Rehfus, mgr., Superior, Ariz.

Officers: J. French Miller, v. p.; with J. C. Denton, Chas. Lamb, Dr. A. Irwin, J. J. Van Dresser, and H. W. Breckenridge, directors. W. E. Harrow, sec.-treas.

Inc. August 17, 1916, in Arizona. Amended, May 14, 1919. Cap., 2,000,000; $1 par; 1,242,000 outstanding. Listed on New York Curb. Security Transfer & Registrar Co., New York, transfer agent. Income in 1919 was $3,728 and expenditures, $74,000. The company has no debts; has spent $200,000 to date. Annual meeting on April 1.

Financial statement on June 1, 1919, showed current assets of $9,548 and liabilities of $5,000. Buildings, mine equipment, roads, development, were valued at $174,000. Income account showed $265,358 from sale of shares and loans, and $38,738 from ore shipments.

Property: 35 unpatented claims, 2 miles S. of the Magma mine, Pioneer district, Superior, Ariz.

Geology: there are 5 principal and 2 lesser mineralized fault-fissures crossing the uptilted limestone and quartzite beds at right angles. The Sandal ore lode cuts obliquely through limestone with course N. 60° E., dip 60° N. and is similar in geological occurrence to the nearby Magma mine. The Sandal vein varies from 20' to 50' wide, is developed for a total length of 600', showing two main ore shoots. The ore usually occurs in the hanging-wall limestone above a clay gouge seam, the rest of the vein is oxidized and leached. Ore occurs in both bedded veins and fault fissures as shoots with 30° dip and W. course. Oxide ore shipped averaged 17% copper, with some precious metals. A bedding plane lode and a silver lode also occur on the claims.

Development: mainly on the Sandal vein by 3 tunnels; the lowest one, No. 3 branch, 1,405' long, Dec. 1919, should cut the ore-shoot if continued. 330' shaft has been sunk from No. 3 tunnel, water being found at that depth. Winze sunk in hanging of vein which appears to straighten and pitch in the ore direction, similar to an occurrence in the Magma mine. At 450' in winze, a station was cut and a crosscut driven several hundred feet, cutting a fault which has shifted the vein. Workings total 3,620'.

Equipment: includes Fairbanks-Morse hoist and Sullivan compressor, with accommodation for 25 to 50 men.

Production: 990 tons of 17% ore in 1918.

Regarded favorably as an excellent mining speculation. Geologic conditions favorable and sulphide ore should be found at water-level.

Company is controlled by Franklin, Pa., stockholders, though J. C. Denton is a large individual shareholder. These men are bending every energy to develop a mine, and not to sell stock.

GREATER MIAMI COPPER CO. **ARIZONA**

Address: Box 14, Miami, Ariz.

Officers: A. Dumontier, pres.; F. Kiernan, v. p.; J. W. Murphy, s
T. M. Jackson, treas.; with C. Stewart and E. Graham, directors.

Inc. Feb., 1916, in Arizona. **Cap.**, $1,500,000; $1 par; 8,000 outstand

Property: 32 unpatented claims, Pinal county, 9 miles N. of Ray C
Copper Co. and 16 miles S. W. of Globe and Miami, reported to have 10
tons of copper carbonate ore blocked out, also some sulphide ore.

Present earnings are from sale of shares. Installing hoist at last acco

Reported July, 1918, under bond and lease to Major A. E. Pickerel
associates, of Jerome.

KELVIN-SULTANA COPPER CO. ARIZ

Inc. April 19, 1910, in Arizona. **Cap.**, $3,000,000, increased Dec., 1
to $5,000,000; shares $1 par; non-assessable; issued 3,842,752 shares. Autho
bond issue to November 1, 1919, $200,000, $198,700 outstanding. Company
a reconstruction of the Sultana-Arizona Copper Co., financed by the Bal
Syndicate of Chicago and the entire floating indebtedness eliminated.

Property was sold by Receivers in January, 1919, to bondholders, who
reorganized under the name of Ray Boston Copper Co., which see.

KEYSTONE DEVELOPMENT CO. ARIZ

Operating the Isabella mine, 20 miles from Casa Grande, Pinal county, A
at last accounts. Reported to have some 7% copper ore. No recent retu
believed to be idle.

KORNCOB MINING & DEVELOPMENT CO. ARIZ

Care E. W. Walker, v. p. of Arizona Consol. National Bank, Tucson,

Is a dormant corporation. Bond and lease on the Apache & Del M
group of claims an eastern base of Catalina Mountains, 75 miles by road f
Tucson, has expired.

Claims show garnet containing copper pyrite, as a contact metamo
product, along a granite limestone contact.

Geological report on property made by A. F. Tolman, Jr., of Leland Stan
University, May 24, 1912.

LAKE SHORE MINE ARIZ

Address: Frank M. Leonard, owner and mgr., 3543 Third St.,
Diego, Cal. **Mine address:** Casa Grande, Ariz.

Property: 35 claims, 3 patented, 50 miles W. of Tucson and 35 mil
of Casa Grande, carries a contact deposit in granite and andesite. The ore
runs N.-S. and dips 45°. Over one million tons of oxidized copper ore, av
ing 3% copper, has been developed above water level.

Development: by 285' vertical shaft; bottomed in sulphide ore of
able tenor.

Mine produced and shipped about 3,000 tons of 5 to 6% ore in 191
regarded as a good mine, needing further capital for equipment and develop

LAKE SUPERIOR & ARIZONA MNG. & SMG. CO. ARIZ

Reported sold its properties to the Superior Arizona Copper Co., in

MAGMA CHIEF COPPER CO. ARIZ

Address: Mesa, Ariz.

Officers: C. L. Knight, pres.; K. Pomeroy, v. p.; F. T. Pomeroy,
treas., with D. D. Moffat and W. T. MacDonald, directors; C. A. Ku
gen. supt.

Inc. Oct. 4, 1913, in Arizona. **Cap.**, $2,000,000; $1 par; 1,259,916

Property: 17 unpatented claims in Pioneer district, Pinal county
amined by W. H. Hollis, F. M. Gordon, C. A. Kumke. The work on th
erty by tunnels and drill-holes gave disappointing results.

Company is now actively developing Sombrero Butte Copper Co.'s pr
in the Copper Creek district, consisting of 14 claims, near Mammoth
county, which were acquired in December, 1918. In August, 1919, new sha
down 240' in 18% ore. At 120' a tunnel was driven to connect with the
made possible by the steep hillside. At 40' from shaft, this tunnel cut
carbonate ore. The tunnel was also connected with old workings, opening
ore. Shipments of one or more cars of 16 to 22% copper and 3 to 4
ore were sent to smelter at Hayden.

The Superior property was energetically and well prospected, but is now closed down, probably for good. The Sombrero Butte mine appears to have the earmarks of a good producing property.

MAGMA COPPER CO. ARIZONA

Office: 14 Wall St., New York. **Mine office:** Superior, Pinal Co., Ariz.

Officers: Chas. F. Ayer, pres.; Theo. Schulze and Wilber Judson, v. p.'s; H. E. Dodge, sec.-treas.; preceding, with John F. Alvord and C. A. Corliss, directors; W. C. Browning, gen. mgr.; E. H. Lundquist, mine supt. J. A. Garrott, mill supt.

Inc. May, 1910, in Maine. **Cap.,** $1,500,000; shares $5 par; issued $1,200,000. Transfer agent, Guaranty Trust Co., New York. Registrar, Bankers' Trust Co., New York. Listed on New York Curb. Controls the Patagonia-Superior Copper Co., which see.

Balance Sheet:

Assets—

	Property & Plant	Investments	Cash & Copper	Other Current	Supplies	Total
1918	$1,125,360	$242,037	$911,742	$669,187	$184,731	$3,133,057
1917	1,060,129	242,037	1,073,743	381,080	165,821	2,922,810

Liabilities—

	Capital Stock	Current	Surplus	Total
1918	$1,200,000	$306,591	$1,626,466	$3,133,057
1917	1,200,000	135,695	1,587,115	2,922,810

Income Account:

	Metal Sales	Total Income	Total Expenses	Net Income	Dividends	Surplus
1918	$2,897,823	$2,916,689	$2,397,339	$519,350	$480,000	$39,350
1917	3,235,070	3,246,206	2,178,220	1,067,986	504,000	563,987

Quarterly dividends of 50c per share began September 30, 1915, were continued quarterly during 1917 and 1918 with an extra 10c Red Cross dividend during 1917.

Property: In the Pioneer district, Pinal county, Ariz., 531 acres formerly known as the Silver Queen mine. Company owns a compact group of claims of 1049 acres, of which 163 acres are patented, also 141 acres of mill sites. Owns other interests and has options on 175 acres of adjoining ground. In October, 1919, an option was taken on the Three R mine, at Patagonia. Diamond drill holes from the main crosscut on the 1,500′ level encountered the vein at depths corresponding to 1,750′ and 2,250′, indicating commercial ore containing chalcopyrite. On the east end the vein is wide and leached, and is not considered to be of commercial grade.

Geology: The known orebodies of the mine occur in a strong fault fissure filled with porphyry and cutting diabase, quartzite and limestone. The ore, with some bornite, is mainly chalcocite. Chalcopyrite appears on the 1,400′ level and in the diamond-drill holes.

Development: has been partly prospected and developed to the 1,800′ level by the old 800′ shaft and a new 2,200′ three-compartment shaft. Development work in 1918 totaled 11,122′, of which 1,243′ was sinking. Total underground workings January 1, 1919, 46,328′. The vein has been developed on the 500′, 650′, 725′, 800′, 1,000′, 1,200′, 1,300′, 1,400′, 1,500′ and 1,600′ levels. Openings to reach of the three bottom levels have exposed the main ore shoot, indicating a length of 800′. An 1,800′ tunnel is being driven to connect with the workings at a depth of 500′. It is 12 by 12′ in cross section, is being concreted and will serve as main haulage level. Completion is expected by January, 1920. On the 1,800′ level there is a partly developed ore-body 500′ long, 9.7′ wide, assaying 5.35% copper, 3.6 oz. silver, and 20c gold per ton. Minerals are principally bornite and chalcopyrite. In September, 1919, a drill-hole was down 400′ below the 1,800′ level, the last 47′ assaying 5% copper and 4 oz. silver per ton.

Ore reserves: estimated Jan. 1, 1919, as 235,000 tons copper sulphide ore assaying 5.7% copper, 4.2 oz. silver and .02 oz. gold per ton; 20,000 tons of lead-zinc ore, assaying 13.5% zinc, 2% lead and 12 oz. silver per ton.

Equipment: is electrical throughout, but includes a 160 h. p. steam hoist, now driven by compressed air, at No. 3 shaft a Nordberg-Westinghouse hoist, good for 3,000' depth, 2 air compressors, one of 1,500, the other of 900 cu. ft. capacity, driven by a 225 h. p. motor and 3 vertical Aldrich pumps, each driven by a 75 h. p. motor.

In August, 1914, the company completed a concentration and flotation mill, having a monthly capacity of 6,000 tons. Mine and mill are connected by a 2,600' aerial tram. The Callow flotation process is used in the mill and treats the tailing from the finishing tables. Recovery was 95.33%. Ore and concentrates are shipped to the plant of the A. S. & R. Co. at Hayden, Ariz. Alleging infringement of its flotation patents, Minerals Separation started suit against Magma early in 1919.

The company owns substantially all the shares of the Magma Arizona Railroad Co., completed in 1915, a 30.4-mile narrow gauge road from Superior to Magma Junction, a station on the Arizona Eastern R. R. This line was profitably operated in 1918.

A 15-mile electric power line, with steel towers, connects with the line from Roosevelt Dam at Miami. The company has a contract for several years with the U. S. Reclamation Service for electric power, at an approximate cost of $49 per year and has constructed a 32-mile power line, connecting at Goldfield.

Production: in 1918 was 10,968,556 lbs. of copper, 463,503 oz. silver, 5,699 oz. gold. The average selling price for 60% of the copper produced was 25.05c per lb and cost 16.425c, the remainder, 40% is carried at 15c per lb.; 1919 production is between 9 and 10 million pounds copper and close to 500,000 oz. silver.

Crude ore shipped, 15,888 tons, assayed 16.675% copper, 13.186 oz. silver, and $2.10 gold per ton. Mill ore, 74,441 tons, averaged 4.496% copper and 3.803 oz. silver. Tailing contained .3482% copper and .43 oz. silver per ton.

Magma is regarded very favorably, for while the amount of ore actually blocked out is not very large, its drill holes indicate large reserves of copper ore. Development work now in progress will insure an output of 15,000,000 lbs. copper annually, with at least 750,000 oz. silver. It is one of the lowest cost copper producers of this country.

MAGMA EXTENSION COPPER MINING CO. ARIZONA

Address: 110 N. First Ave., Phoenix, Ariz. **Mine office:** Superior, Ariz.

Officers: John Cowan, pres.-treas.; Geo. A. Mauk, v. p.; H. F. W. Lampker, sec, with J. W. Spray, directors.

Inc. 1917, in Arizona. **Cap.,** $1,500,000; shares $1 par; non-assessable.

Property: 135 acres in Pioneer district, Pinal county; said to be between and near the Magma Copper, Magma Chief and Silver King mines. Geological conditions are reported to be similar to the Silver King and the Magma Copper Co., but this is doubted. A mineralized prophyry dike 700' wide is said to be intrusive in diorite.

MAGMA QUEEN COPPER CO. ARIZONA

J. C. Callaghan, C. R. Bone and G. A. MacDonald of Phoenix, incorporators.

Inc. Dec. 2, 1916, in Arizona. **Cap.,** $1,500.000; shares $1 par.

Property: 10 full and 2 fractional claims, 208 acres, known as the Black Diamond and Magma King groups, at the northern end of the Pioneer or Superior mining district, Pinal county, Arizona.

Geology: the Black Diamond ore deposit is a gently dipping bed of garnetized limestone, 12' to 20' thick, containing scattered grains and clusters of oxidized copper ore. This occurs at the contact between the limestone series of the region and the Silver King stock or body of monzonitic, i. e., granitic rock. The ore is flecked and spotted with stellate masses of micaceous hematite. Selected material for shipment shows 15% copper, 34.5% insoluble and 25% iron, but the average copper content of the deposit, so far as opened, is less than 2%. The Black Diamond orebody is 225' long.

Other claims show geological conditions which warrant prospecting work.

Development: work is limited to an incline, 48′ long and various open-cuts. The 450′ Black Diamond tunnel, 100′ below the ore bed, had not reached ore at last accounts.

Regarded as worthy of limited prospecting, but not at points thus far attacked. Presumably idle.

MAGMA RAY COPPER CO. **ARIZONA**

Address: A. H. Woollacott, 261 I. W. Hellman Bldg., Los Angeles, Cal.

Property: 420 acres, known as the McSherry group, near Ray Junction, Pinal county, Ariz. Probably idle.

MAGMA-SUPERIOR COPPER CO. **ARIZONA**

Address: care of Samuel Newhouse, Salt Lake City, Utah.

Property: situated south and adjoining what was originally known as the Lake Superior & Arizona claims, now owned by Magma Copper at Superior, Pinal county, Ariz. Geological conditions said to be favorable. Development proceeding, 1917, but no news since.

MAGMA SURPRISE MINING CO. **ARIZONA**

Address: Superior, Ariz.

Officers: G. J. Stone, pres.; V. B. Andreas, v. p.; J. L. Boyce, sec.-treas., with R. Krakauer and P. Howle, directors.

Idle.

Cap., $1,000,000; shares $1 par.

Property: 21 claims, 1½ miles S. W. of Superior, Pinal county, Ariz.

MAGMATIC COPPER CO. **ARIZONA**

Address: 514 Mill Ave., Tempe, Ariz. Mine at Superior, Ariz.

Officers: J. C. Goodwin, pres.; T. J. Goodwin, v. p.; G. A. Goodman, sec.-treas.

Inc. 1917, in Arizona. **Cap.,** $100,000; shares 10c par; non-assessable. Recently sold 70,000 shares stock at 10c per share.

Property: 21 claims, 440 acres, 1½ miles S. of the Magma Copper Co. mine, Superior, Pinal county, Ariz.

Present work, resumed in October, 1919, consists in driving a tunnel.

Geological conditions are similar to the other parts of the district. Shaft 140′ deep, is said to have passed through 20′ of rock carrying 18% of manganese, 34% of iron, with small gold, silver and copper. This shaft was being deepened in August, 1919.

MAJESTIC COPPER CO. **ARIZONA**

Office: First National Bank Bldg., Kansas City, Mo. **Mine office:** Oracle, Pinal county, Ariz.

Officers: E. A. Hosier, pres.; W. A. Neiswanger, v. p.; E. T. Wilder, sec.-treas.

Inc. as Inspiration Mining Co., but sold its property, in the Globe district, to the Inspiration Copper Co., and changed its name, March, 1909, to present title, to avoid misunderstanding. **Cap.,** $3,000,000; shares $1 par; $2,707,000 oustanding; bonds authorized, $25,000; $14,350 outstanding.

Former property: 6 claims near Oracle, on which assessment work was done for several years, has been abandoned and company is now inactive. Company received from the sale of the Inspiration mine about $1,500,000. Idle since 1917.

MAMMOTH COLLINS MINE **ARIZONA**

Care of Young Bros., Shultz, Ariz. See Great Western Copper Co.

MAMMOTH DEVELOPMENT CO. **ARIZONA**

Now St. Anthony Mining & Developing Co., which see.

MANIFEST COPPER & SILVER CO. **ARIZONA**

Address: Box 494, Globe, Ariz.

Officers: W. Kitzmiller, pres.; W. R. Henry, v. p.; W. W. Crawford, sec.-treas., with J. W. Morrell and (Mrs.) C. Kitzmiller, directors.

Inc. in Arizona. **Cap.,** $3,000,000; shares $1 par; non-assessable; 35[illegible] outstanding.

Property: 43 unpatented claims in Pioneer district, Pinal county, 20 miles from Globe and 12 miles from Hayden. Was a silver producer i[illegible] 80's. Under bond for 3 years, from 1917, to W. J. Porter and W. Kitzmiller

Development: to 85′ depth, totaling 2,000 feet.

Geology: sulphide ore occurs in a contact fissure in quartzite. It is reported to carry 10 to 30 oz. silver, $1.50 gold, 10 to 35% lead, and 1½ to 6% copper.

MANITOU HILL COPPER CO. ARIZONA

Idle and probably dead. Mail returned unclaimed, 1919.

Office: care W. H. Brown, sec., 110 S. Third St., St. Joseph, Mo. **Mine office:** Globe, Gila Co., Ariz. A. T. Hammons, pres. and mgr.

Inc. 1911. **Cap.,** $1,250,000; shares $1 par. Company is a reorganization of the Pinto Creek Mining & Smelting Co., and by consolidation later acquired the property of the Five Points Copper Mining Co.

Property: 70 claims, at the head of Pinto Creek, about 10 miles S. W. of Miami, Pinal county, shows pre-Cambrian schists cut by granite and granite porphyry. Ore is low-grade.

Equipment: includes small steam plant and hoist at the Five Points mine, 6 h. p. gasoline hoist, 6-drill air-compressor, and 250-ton concentrator at the Pinto Creek mine. Assessment work done, 1914. Company, in 1917, endeavored to raise $25,000 for sinking shaft to prove ore in commercial quantities.

MAVERICK COPPER CO. ARIZONA

Address: Florence, Pinal county, Ariz. Geo. Lobb and Eugene Woodbury, managers.

Property: 35 claims, known as the Iron Spring mine, shows a strong outcrop, carrying finely disseminated chalcocite, estimated to average 3% copper.

Development: by a shallow shaft and a number of prospect pits and shafts. Annual assessment work only has been done since 1910, when the Copper Queen Co. relinquished its $100,000 bond on the group.

Reported sold to the Pillsbury interests, who intend to test by churn-drilling. Wm. Gordon, mgr.

Presumably idle, June, 1919, as mail not answered.

MT. TURNBULL COPPER CO. ARIZONA

C. B. Barnhard, mgr., Phoenix, Ariz.

Adjoins Inspiration Central. Is a prospect that is under development.

NEWBURY MNG. CO. ARIZONA

Property near Cochran, on Ariz. Eastern R. R., east of Florence. To save property from sale, Makeever Bros. of Boston put up $10,000, but after their engineers had examined it, the firm abandoned the property.

NORTH PINAL MINING CO. ARIZONA

Address: C. W. Cisneey, pres., 228 E. Jefferson St., Phoenix, Ariz.

Property: formerly held by La Coronado Development Co., is in the Mineral Hill district, 10 miles from Price, Pinal county, Ariz.

Development: by a 300′ shaft, shows a lens of copper ore at depth of 260′ in the shaft, said to carry up to 70% copper. Ore is mainly bornite.

Equipment: included a 25 h. p. gasoline hoist and an air-compressor.

No recent information.

OHIO ARIZONA COPPER CO. ARIZONA

Address: Silver Hill mine, via Sasco, Pinal Co., Ariz.

Property: in the Silver Bell range, 15 miles from railroad at Sasco, has been worked intermittently for years. A 400′ shaft was to be sunk in 1919.

OWL HEAD COPPER CO. ARIZONA

Office: Cameron Michel & Co., 8 West 40th St., New York. Mine near Red Rock, Pinal county, Ariz.

Officers: Wm. P. Michel, pres.; Jas. P. Harvey, v. p.; E. I. Chapman, treas.; J. B. Wright, sec., with Ralph Cameron, directors.

Inc. 1910, in Arizona. **Cap.,** $10,000,000; shares $1 par; 3,160,000 issued. Registrar & Transfer Co., transfer agent.

Property: 24 claims, the Apache Princess group, in the Tortillita mountains, Owl Head mining district, 16 miles N. E. of Red Rock. Lands said to show a zone, 150′ wide, of Pinal schist with porphyry dikes, the conditions being said to resemble those of the "porphyry" or disseminated deposits at Miami and Ray. The workings show copper impregnations in the schist and to some extent

the adjoining granite, said to give assays of 0.5% to 3% copper and 1 to 3 oz. silver per ton.

Development: by shaft, 150′ deep in May, 1916. Management states that shaft will be sunk to 500′ level and that arrangements have been made to underwrite 100,000 shares of treasury stock at $2.50 per share to provide funds for this and other development purposes. The Owl Head Co. is controlled by the Cameron, Michel & Co., 100,000 shares being owned by the Copper Exploration Company.

OXIDE COPPER CO. **ARIZONA**

Office: A. C. Burrage, owner, 85 Ames Bldg., Boston, Mass. Mine at Silver Bell, near Red Rock, Pinal county, Ariz. Albert C. Burrage, pres.; Chas. A. Burrage, sec.-treas. Company believed to be defunct.

Property: 46 claims, patented, known as the Copper Prince group, in the Silver Bell district, 7 miles south of the Imperial mine, shows contact metamorphic deposits carrying argentiferous copper sulphides in limestone gangue.

Development: by a 500′ shaft and a 350′ tunnel, with about one-half mile of workings.

Equipment: includes gasoline power and an air compressor. Churn-drilling was done in 1910, to locate disseminated ores, but apparently results were not especially encouraging. Production was 49,676 lb. copper and 103 oz. silver in 1908, and less than $3,750 worth of ore in 1910; none reported since.

PINAL DEVELOPMENT CO. **ARIZONA**

Address: 1401 No. 3rd St., Phoenix, Ariz.

Officers: J. C. Devine, pres.-treas. and mgr.; E. A. Tovrea, v. p.; C. T. Carpenter, sec.; E. M. Blake, J. H. Robinson, E. P. Palmer and Arthur Luhrs, directors.

Inc. Dec., 1915, in Arizona. **Cap.**, $1,500,000; $1 par; non-assessable; 700,000 shares issued.

Property: 47 claims, 940 acres, known as the Renfro group, near Hayden, Ariz., adjoins the Troy-Manhattan at Troy, nearly due E. of Ray, Pinal county, Ariz.

Geology: ore occurs on contact between limestone and shale, as irregular replacements on bedding plane. Ore horizon is 15′ thick, and ore carries oxidized copper minerals, no sulphides being found; also carries low gold-silver value and 10 to 20% copper.

Development: by several tunnels, main one 1,600′ long, with about 2,500′ of workings to depth of 600′. In June, 1917, a 3′ streak of high-grade copper ore was struck, and a raise and winze were driven on it. Production started September, 1917.

Property is under excellent management, and was regarded as a legitimate mining venture in 1917. No recent returns available.

POMEROY-PRUDENTIAL COPPER CO **ARIZONA**

Offices: Hornell, N. Y., and Superior, Ariz.

Officers: K. Pomeroy, pres.; J. T. Rurey, v. p.; E. Pomeroy, sec.; F. N. Brill, treas.

Inc. 1917, in Arizona. **Cap.**, $1,500,000; 750,000 in treasury; 50,000 shares sold at 25c each; 50,000 more offered the public at 50c a share, March, 1917.

Property: 9 claims, Pioneer district, 3 miles W. of Silver King, and known as the Silver Bell and Sulphide group, in the Pioneer district, 3½ miles S. W. of the Magma mine.

Development: by 130′ tunnel said to show some copper glance ore with silver values.

Is a prospect. No returns since 1917, probably idle.

POTTS CANYON MINING CO. **ARIZONA**

From our files it appears that an attempt to sell some of the worthless shares of this concern resulted in F. D. Ryan of 1482 Broadway, New York, and two others being indicted by the Grand Jury at Baltimore, Md. Supposed to have owned a property in Pinal county.

QUEEN COPPER MINING CO. **ARIZONA**

Property sold to Magma Copper Co., and company liquidating.

QUEEN CREEK COPPER CO. **ARIZONA**

Address: Phoenix, Ariz.

Officers: A. Mackay, pres.; W. C. Foster and F. S. Stephens, v. p.'s Arthur J. Smith, sec.-treas, with J. C. Devine, J. W. Crenshaw and C. M. Shannon, directors; C. H. Smith, supt., Superior, Ariz.

Inc. May 3, 1916, in Arizona. **Cap.,** $1,000,000; shares $1 par; 564,96 shares outstanding. Listed on New York Curb as a prospect. Equitable Trus Co., New York, transfer agents; U. S. Corporation, registrars. Annual meeting first Monday in May.

Property: 17 claims on Queen Creek, 1 mile from Superior, Pina county, said to have a contact fissure carrying gold-silver-copper values

Development: 800' shaft, with 1,200' of drifting on contact vein a various levels. On 600' level a vein is now being developed that is said to sho bunches of $32 galena ore. Company may sink shaft to 1,200' level.

RED CHIEF MINING CO. **ARIZONA**

Address: Casa Grande. T. P. Copening, mgr.

Last report from this company, June, 1918, stated that a 50-ton Elsol typ dry concentrator plant for milling silver-lead ore had been completed.

SADDLE MOUNTAIN MINING CO. **ARIZONA**

Office: 902 Chapel St., New Haven, Conn.

Officers: Frank M. Travis, pres.; C. M. Robinson, sec.-treas.

Inc. 1902, in Arizona. **Cap.,** $2,500,000, increased from $1,000,000; share $1 par; outstanding, 1,306,585 shares. Bonds: none.

Property: consists only of $300,000 par value of the capital stock o the Gila C. Sulphide Co., which acquired in October, 1909, the property of th Saddle Mountain Mining Co., subject to the latter's authorized outstanding firs mortgage bond issue of $1,000,000, all of which was exchanged for an equal issu $1,000,000 first mortgage 6% bonds of the Gila Copper Sulphide Co., due Apr 1, 1918, convertible at par into stock of the Gila Copper Sulphide Co., at the optio of the bondholder. Interest payable April 1 and October 1. Of this issue, prio to December 1, 1917, $248,600 par value were retired out of earnings, leaving ou standing, December 1, 1917, $751,400, due, principal and interest, April 1, 1918.

For description of the property, see Gila Copper Sulphide Co.

SAINT ANTHONY MNG. & DEV. CO. **ARIZONA**

Address: 1023 Investment Bldg., Los Angeles, Cal. **Mine office** Schultz, Pinal county, Ariz.

Officers: R. C. Gillis, pres.; A. H. Fleming, v. p.; Epes Randolph, treas. C. L. Bundy, sec. Horace Pomeroy, gen. mgr.

Cap., $1,000,000; $1 par; 300,000 issued.

Property: the Mammoth and Collins group at Schultz, near Mammoth and south of Ray, developed by 833' shaft. A strong vein shows gold, lead an wulfenite ore. An 1,800' drift on the 700' level connects both groups.

Equipment: 200-ton concentrator and flotation plant. Shipping gol and molybdenum products at last accounts.

SASCO SMELTER **ARIZONA**

Sasco, Ariz. Operated by A. S. & R. Co.

SILVER KING OF ARIZONA MINING CO. **ARIZONA**

Office: 1 Broadway, New York. **Mine office:** Superior, Ariz.

Officers: A. W. Hillebrand, pres.; John Fowle, v. p.-mgr.; W. F. Ainsworth, sec.-treas., with E. J. Stern, E. S. Booth, G. D. Christy and W. W. Lawhon directors.

Inc. May, 1916, in Arizona. **Cap.,** $2,000,000; $1 par; 1,999,290 issued non-assessable. Security Transfer & Registrar Co., New York, transfer offic Annual meeting, second Tuesday in January. Listed on New York Curb.

Financial statement, December 31, 1918, shows: Total assets, $2,271,83 which includes mining property, $2,000,000; equipment and development, $214,01 current assets, $57,818. Liabilities: Capital stock, $1,999,290; accounts an notes payable, $56,784; surplus earned, $18,551; surplus property, $197,210.

Operating account for 6 months ending December 31, 1918, shows: Incom $54,938; operating costs, less ore and concentrates in process, $36,387; net, $18,55

Property: the Silver King mine, 11 lode claims, over 170 acres, 3 miles from Superior, on the Stoneman grade. It is an old silver mine, popularly credited with a production of $10,000,000, and known to have paid $1,950,000 in dividends up to July, 1887. Opened to a depth of 1,000′, the mine was originally worked for gold and silver, copper ore in the form of tetrahedrite coming in at a depth of about 310′ and continuing to depth of 510′.

Geology: the conditions are described in Bull. 540, U. S. Geol. Survey. Though currently spoken of as a vein, the ore-body is a stockwork, in which the extraordinary rich ores, carrying various silver arsenical and antimonial sulphides of silver, with argentite and stromeyerite, apparently gave out at the bottom levels. Below this level, lower grade but payable concentrating ore, amenable to flotation may be expected and lateral development is also expected to develop more ore. Old records show that copper ore was mined on the 800′ level.

Development: in August, 1917, the mine was reopened, and by July 1, 1918, the 980′ shaft was unwatered to 417′, and production commenced.

Company is sinking a 3-compartment 1,000′ shaft and upon its completion plans erecting a 500-ton mill. The shaft was down 245′ at end of August, 1919, and small veins of ore were being cut.

Equipment: includes Fairbanks-Morse gasoline hoist, Ingersoll-Rand compressor, Cameron pump, 5-ton auto-truck and a 25-ton plant using a Marcy mill and flotation apparatus. The mill started operating in November, 1918, and is said to be recovering 95% of the 20 oz. ore.

SILVER REEF MINE **ARIZONA**

Owned by Frank M. Leonard and associates, 3543 Third St., San Diego, Calif. Former company, the Silver Reef Mining & Smelting Co., dead.

Property: 12 claims, surveyed for patent, including the Silver Reef mines, at Vekol, 12 miles S. of Casa Grande, in Pinal county, Ariz., originally worked for silver ore. Vein 35′ wide, between granite and rhyolite carries 12 to 20 oz. silver ore, also some lead and copper.

Development: by a 375′ shaft and 425′ tunnel.

Equipment: includes a gasoline hoist, air-compressor, and 20-stamp all-slime cyanide plant.

SOUTHWEST INSPIRATION COPPER CO. **ARIZONA**

Mail returned, 1919, from former office, 8 W. Adams St., Phoenix, Ariz. **Mine office:** Copper Creek, Pinal county, Ariz.

Officers: H. H. Temple, pres.; J. J. Sweeney, v. p.-treas.; J. W. Crenshaw, sec.; C. J. Price, gen. mgr.; also directors, with Louis Huber.

Inc. 1917, in Arizona. **Cap.,** $5,000,000; shares $1 par; non-assessable; 2,500,000 issued.

Property: 69 claims, 1,200 acres, adjoining Calumet & Arizona and Copper State companies' holdings on E., in Bunker Hill district, 12 miles E. of Mammoth, Pinal county, Ariz. Examined by C. J. Price, N. R. Logue and Louis Huber.

Claims are said to show 5 chimney deposits in diorite, also disseminated porphyry. Ore carries copper, gold, and silver.

Development: commenced in May, 1917; tunnel 1,500′ and shaft 400′. Proposed to drive 1,115′ crosscut tunnel, sink 2 shafts and churn-drill at three points. No recent returns.

SUNSET COPPER MINING CO. **ARIZONA**

Address: Hayden, Ariz.

Officers: Geo. H. Parsons, pres.; J. E. Steele, v. p.; Chester Bertolette, v. p.; F. W. McQuiston, sec.; T. A. Ball, treas., with F. M. Pool and E. C. Hight, directors.

Inc. in Delaware. **Cap.,** $3,000,000: shares $1 par; issued 1,570,000 shares.

Property: 14 unpatented claims, in Bunker Hill district, 14 miles E. of Mammoth and 34 miles from Hayden, Ariz. Company also has 12 claims in Riverside mining district said to have gold-silver-copper ore, developed by two shafts, 140′ and 190′ deep, and tunnels, 75′ and 290′ long.

Geology: ore-bearing rock is a quartz diorite that cuts the sedim taries and volcanic breccias. Ore shoots are found as chimneys, or pipes, f 25' to several hundred feet in diameter. Ore usually occurs as a filling betw fragments of breccia.

Development: by 175' shaft and 590' tunnel, said to show a body 3½% to 5% copper carbonate ore.

Resumed work in May, 1919, and shipping ore in August.

SUPERIOR ARIZONA COPPER CO. ARIZO

Office: 14 Wall St., New York City. **Mine address:** Superior, Ariz.

Officers: Wilber Judson, pres.; D. E. Thomas, v. p.; F. V. Muns sec.-treas.; above, with F. W. Holmes and A. E. Peterman, directors; W. Browning, mgr.

Inc. March 22, 1916, in Maine. **Cap.,** $250,000; $1 par; non-assessal 180,010 issued. Annual meeting, fourth Monday in May.

Company purchased the property of the Lake Superior & Arizona Min & Smelting Co., together with some claims formerly owned by the Mag Copper Co., at Superior, Pinal county, Ariz., adjoining the latter compar mines.

Property: 15 patented, 11 unpatented, claims, 323 acres at Superior, the Pioneer district. Claims show thickly bedded, steeply upturned limeste resting on quartzite, underlaid by diabase. Several vertical cross fissures cutt both sediments and diabase occur. Ore occurs along contacts of Upper Lower Carboniferous limestones and at contact of limestone and quartz especially near cross fissure. Ore which is oxidized to greatest depth reacl by development occurs in a gangue composed largely of iron and mangan oxides in which occur bunches of oxidized ore with occasional sulphides. H is felt that good grade sulphides may be found in depth.

Development: the principal working is the Charlton tunnel, which 2,000' follows the mineralized fracturing along the bedding plane betw Devonian limestone and quartzite. This tunnel is 130' vertically below Holt tunnel, is connected with the latter by a 165' winze on the dip of the v and is 3,000' long, showing ore assaying up to 30% copper. At the north end of this long tunnel, there is an incline shaft sunk along the bedding pl at 26° inclination for 1,800' with short levels at various intervals.

Some development was done during 1917 and 1918.

Production: in 1917 and 1918, 768,673 lbs. copper from 4,130 tons 10.08% ore, mainly by lessees; 90 tons of 43.78% manganese ore was shipp Ore extraction still continues on small scale.

SUPERIOR-BONANZA MINING CO. ARIZO

Mail returned, 1918, from former address, J. T. Muller, Superior, Ari reported several months later that property would be reopened.

Officers: J. T. Muller, pres.; Chas. Brittonham, v. p.; H. D. McPh sec.-treas., with G. J. Camsler and Geo. Dogan, directors.

Inc. in Arizona **Cap.,** $500,000; shares 50c par; non-assessable; 485,(issued.

Property: 6 claims, 110 acres, ½ mile N. of the Magma Copper C Pioneer district, Pinal county, Ariz., said to show a fissure vein in diaba dipping 72° N., with E. W. course. Ore contains gold, silver and lead. Sh said to be 300' long.

Development: by shaft to 52'. Only assessment work done in 19 Shaft sinking to 700' proposed.

A prospect of no particular merit.

SUPERIOR RAY COPPER CO. ARIZO

Mail returned, 1918, from former address, A. L. Emberson Co., 112 Central Ave., Phoenix, Ariz.

Inc. in Arizona **Cap.,** $1,500,000; shares $1 par; non-assessable; 700,(issued.

Property: 11 claims in Pioneer district, 30 miles from Florence, and mile from Superior, Ariz. Examined by John Armstrong, in Dec., 1916, w considers that the ground is well within the famous east and west faul system upon which the great mines of this section have been opened.

Apparently no work of consequence has been done and claims are a pure

UPERIOR SAFFORD COPPER CO. **ARIZONA**

Mail returned, 1918, from former address, Miami, Ariz. Mine near Superior,

Inc. in Dec., 1916, by A. M. Bernstein, W. D. Wiley and B. W. Fauble, Miami. Cap., $2,000,000; shares $1 par.

Property: in Pioneer district, Pinal county, Ariz., near Magma Extension property. Shaft sinking said to have revealed 8 to 12% copper ore. Company also had 23 claims, 9 miles W. of Safford, Graham county.

PERSTITION CONSOLIDATED MINING CO. **ARIZONA**

General office: mail returned, 1919, from former office, Phoenix, Ariz. Officers: J. P. Bickell, pres.; Louis Ford, v. p.; A. W. Scott, sec.-treas.-mgr.

Inc. Jan. 7, 1915, in Arizona. Cap., $2,000,000; shares $1 par; outstanding, $500,000. Security Transfer & Registrar Co., New York, transfer office and registrar. Listed on New York Curb as a prospect. Liabilities in 1915, a 2-year 6% note of $10,000, dated Jan. 20, 1915.

Property: 7 claims, Arizona King group and 2 adjoining claims in the Superior mining district, Pinal county, 60 miles E. of Phoenix and 7 miles from railroad. Said to show schist and intrusive porphyry with a vein outcropping 3,000', from 5 to 40' in width; strike N. W., dip 65° E. The ore is gold mined to assay from $3 to $48 per ton, with very little copper present.

Development: a 400' shaft with several hundred feet of workings. Ore reserves not given. A 50-ton flotation mill was built in 1915.

Is considered a meritorious prospect. Evidently idle.

TABLE MOUNTAIN COPPER CO. **ARIZONA**

Near Mammoth, Ariz. Was controlled by Arimex Consolidated Copper Co., defunct; a Thos. W. Lawson promotion. Fully described, Vol. XI., Copper Handbook.

TORTILLITA COPPER CO. **ARIZONA**

Office: 8 W. 40th St., New York. Western office: care Hon. J. B. Wright, 32 N. Stone Ave., Tucson, Ariz.

Officers: Wm. P. Michel, chairman; Robinson V. Thompson, pres.; Thos. Rowland, v. p.; Leon N. Salmon, sec.; J. W. Edward Michel, treas., with Geo. P. Jeffrey, directors.

Inc. March, 1912, in Arizona. Cap., $1,000,000; $1 par; 600,000 issued. Annual meeting in January, at the Tucson office.

Company claims to have sufficient funds on hand for continuation of systematic development work. Management said to be in hands of the Eastern Stockholders Committee, a group of 10 stockholders, business men, who, according to their own statements, form "A Committee of Progress and Development—not Grievance." Is controlled by Cameron Michel Co. of New York, who report in May, 1919, "that the property will be put in operation about Oct. 1, 1919, with important changes in the personnel."

Property: 37 claims, 750 acres, about 15 miles N. E. of Redrock, Pinal county, Ariz., includes the Cloudburst and Yankee Girl mines, purchased under foreclosure in May, 1912. Property is an old-time silver producer.

Development: the "Yankee Girl" double-compartment vertical shaft, 6' wide and 500' deep, said to show some quartz carrying copper glance and native copper at the bottom; also a large flow of water. A large hoist and compressor have been installed. A N. crosscut was cut 600' from No. 5 station, with the main ore channel not far distant, where "large volumes of heavily mineralized ore" should be encountered.

Equipment: includes an oil-driven air compressor, drills and a gasoline

Whether the property has a large ore deposit or not has not yet been proven, reports by various engineers are favorable.

TROY ARIZONA COPPER CO. **ARIZONA**

Address: A. K. Sloan, sec.-treas., 15 Maiden Lane, New York City.

Mine office: Kelvin county, Ariz.

Officers: John F. Galvin, pres.; Calvin Page, v. p.; Brackley Shaw Henry Rudolph, directors. John C. Devine, mgr.

Cap., $3,000,000; shares $10 par. Company is a reconstruction of old Troy Copper Co., succeeded by Troy-Manhattan C. Co., which in turn succeeded by the Troy Consolidated Mining Co., fully described in Vol. Copper Handbook. Operations of all these "Troy" companies proved appointing.

Property: 85 claims, 1,600 acres, 3½ miles N. E. of Erman, on the zona Eastern R. R., known as Troy, Climax and Manhattan groups. The T group said to have 12 and Manhattan group 6 veins.

Development: reported to aggregate over 5 miles, including sev shafts, deepest 500', and tunnels; the Pratt tunnel has been re-opened. 1 Company's engineer stated that while a large tonnage of ore is not bloc out, yet with a moderate amount of work several hundred thousand tons c readily be made available. Examined and reported on by Leon Von Rosenb but inspection proves the work very superficial and conclusions, in our opin unwarranted.

A 500' shaft has recently been sunk on the Climax claim, to explore sulphide zone. Mine is producing and shipping. Teaming costs are h which makes it necessary to sort ore carefully.

Present management considered good and property promising.

UNITED MAGMA MINES CO. **ARIZO**

Out of existence, and Harry Lefkovits (name changed in Sept., 1918 Lefko), with his first aide, R. V. Stuart, were finally convicted in Dec., 1919 using the mails to defraud the public. A swindle from beginning to end. Vol. XIII.

WHITE METALS MINING CO. **ARIZO**

Address: J. C. Devine, mgr., Pioneer, via Globe and Kelvin, Ariz. T. Crowe, largest shareholder.

Property: an old silver mine on the south side of the Pinal ra south of Globe. Dumps are said to contain 100,000 tons of $20 ore. Devel ment is under way, and a Doak gas engine and compressor have been installe

RAY DISTRICT, PINAL COUNTY

ARIZONA & BUTTE COPPER MNG. CO. **ARIZO**

Address: care Edw. W. McKay, 701 Union Bank Bldg., Pittsburgh.

Mine office: Ray, Ariz.

Office: G. H. Harn, pres.-mgr. Eva G. Titus, sec.

Inc. in Arizona, 1916. **Cap.,** $1,000,000; par $5; 155,000 shares issu 45,000 shares in treasury. Shares offered, 1917, at $3; 5,000 offered at $10 Feb., 1919. Pittsburgh Trust Co., transfer agent and registrar.

Property: 32 clams, 560 acres in one group, on west side of Ray trict, Ariz., adjoining Ray Cons. ground. Ore, chalcopyrite and tetra drite occurs as cementing material in granite breccia and as boulders streaks of sulphide in quartz and clay matrix filling crush zone or fa vein in altered Pinal schist cut by wide diabase dikes and intruded by shoots of the Ray granite mass. Surface indications are regarded as fav able at granite contact, on Overlook claim in S. W. part of group.

Development: by 670' Overlook shaft with 800' of workings on 450' and 550' levels. On upper level oxidation has leached the ore; on level a crosscut 28' long across the deposit and still in it shows 3.6 silver per ton, 1.46% copper and 50c gold, across a 10' face. Ore occur a cementing material between fragments of granite, as film plates specks in crushed schist and being primary values should not play out d ward. On 550' level a 150' drift shows 50' of milling ore carrying bonid and bunches and streaks of high-grade chalcopyrite ore and tetrahed

The Overlook shaft encountered ore at 412' that extended down for 30'. says running as light as 17% copper and 80 ounces silver. Stringers of h grade ore were also cut at 620' extending down to 670', where water level was

...d work and several shallow shafts on other claims show values, but ...ions are less promising than at Overlook.
...ompany expects to install new hoist, compressor, drills and pumps and ... sinking and crosscut work in 1920.
Equipment: 15-h. p. gasoline hoist, buildings, etc.
Property regarded as an attractive prospect that has a chance to de... a commercial orebody near the igneous contacts.

BROKEN HILLS MINE **ARIZONA**
Address: L. D. Huntoon, mgr., via Ray, Pinal county, Ariz. Company ...eloping a lead-silver deposit in the Ray district.

GREAT RAY COPPER CO. **ARIZONA**
Address: C. A. McDonald, Citizens Bank & Trust Co., Bisbee, Ariz.
Property: 44 claims on both sides of Sulphide canyon, about 1 mile W. ... town of Ray, Pinal county, Ariz., adjoining holdings of Ray Consolidated ...er Co. and the western group of the Ray Hercules Co.
Geology: Great Ray is outside the area of secondary enrichment—un... the developed deposits of the district—but shows abundant copper stains ... some copper sulphide in both the granite and schist rocks exposed in the ... of Sulphide canyon. The area of most intense primary mineralization is ...st 1,500′ broad and 3,000′ long. This ground warrants drilling to determine ... copper content. Recent reports state this is being done.
Considered a speculative mining venture to see if the ground contains a ... deposit with 1% or better copper in it.

LITTLE BOBBIE MINING CO. **ARIZONA**
Office: I. J. Lipsohn, sec.-treas., Phoenix, Ariz. Scott Lintner, mgr., ..., Ariz.
Officers: W. J. Graham, pres.; J. Pollard, v. p.; S. J. Ross, sec.-treas., ... with Geo. Hershman and J. A. Ganz, directors.
Inc. 1917, in Arizona. **Cap.**, $450,000; shares $1 par; 312,500 issued.
Property: 9 unpatented claims, known as the Bisbee group, 175 acres, ... miles S. E. of Ray, Pinal county, Ariz., adjoining the Ray-Broken Hill and ...-Silver-Lead mines.
Ore: silver-lead in limestone, with some gold and copper.
Development: by 300′ tunnel.
Reported June, 1919, that control of company was bought by Ray-Broken ... Mining Co.

NEW ARIZONA RAY COPPER CO. **ARIZONA**
Address: 115 N. First Ave., Phoenix, Ariz.
Officers: W. A. Stuart, pres.; F. M. Dorsey, v. p.; J. L. Milligan, sec., ... Fred. E. Young, L. L. Wallace and W. Laurence Barnard, directors.
Inc. in Arizona. **Cap.**, $1,000,000; shares 10c par; 5,000,000 shares paid ...moters for the claims.
Property: 12 claims, adjoining the Ray Consolidated, at Ray, Pinal ..., considered to be outside the ore-zone and valueless.
Former company was exposed and denounced by the California Corpora... Commission, by the "Mining & Scientific Press," and by the "New York ...une." The exposé drove the promoting firm out of California and to ...enix, Ariz., where its business is said to have been bought out by the Arizona ...rities & Trust Co.
Arizona Ray was considered a fraud of the worst type.
Nothing new is known of operations, if any, since name of company was ...ged.

RAY-ARIZONA COPPER CO. **ARIZONA**
Address: 828 Chestnut St., Milwaukee, Wis.
Officers: Fritz Bock, pres.; M. A. McCabe, sec.; Fritz Bock, Jr., mgr., ...vin, Ariz.
Property: 42 claims, on the south side of the Gila river, opposite Kel... shows monzonite porphyry in mineralized granite with impregnations and ... carrying copper ore.

Development: by tunnel shaft and churn-drilling. F. L. Underwood reported to have financed the company under an option on 51% of the st for $250,000.

Equipped with Leschen tramway. Lessees shipped several cars of cop ore in 1916 to Hayden smelter. No recent information, probably idle.

RAY BOSTON COPPER CO. **ARIZO**

A reorganization of the Kelvin-Sultana Copper Co.

Address: 732 Monadnock Bldg., Chicago, Ill. C. E. Hart, mgr., E 995, Miami, Ariz.

Officers: A. H. Westfall, pres.; O. M. Gale, v p; G. O. Swarts, s G. P. Baldwin, treas.; C. E. Hart, gen. mgr.; E. P. Worthington, supt.

Cap., $5,000,000.

Property: 21 claims and 3 fractions, 530 acres; all patented but 2 clai and fraction, in Ray-Kelvin district, Pinal county, Ariz., formerly owned Kelvin-Sultana Copper Co. Company also owns 30 acres of gold and silver la in Ures district of Mexico.

The Arizona mines were formerly known as the Riverside and Bryan grou and are across the Gila river from 1½ miles S. E. of Kelvin. Management repo 21 contact deposits, between granite and diorite, of which 5 veins have b developed; reported as 18" to 6' wide, and estimated to average 5' in wi with a generally N. W. trend. The property also was said, formerly, to sh a 6' vein carrying chalcopyrite in the lower workings, from which shipments the Humboldt smelter returned 8.7 to 10.6% copper. Average tenor of ore all veins is estimated by the company as 6% copper and 3 to 4 oz. silver per t From published reports the deposits appear to be gash veins, pinching out shallow depth.

Development: by 6 shafts, deepest 590', and the Hunter and Agnes t nels, with about 10,000' of underground work.

Crosscuts on the 540' level, driven 2,000' and 1,267' in Feb., 1916, are repor to have intersected 3 veins.

Equipment: includes a 575 h. p. oil-burning electric plant, a 1-m aerial tram across the Gila river, to the railway station of Kelvin and a c centrator of 200 to 300 tons daily capacity.

Production: of old company, to end of 1909, was 422 tons of ore, yie ing $12,450. Production in 1907 was 45,838 lb. fine copper and 653 oz. silv Daily shipments of 20 tons to the Hayden smelter were made in summer 1913. The mill has been closed down until sufficiently large reserves have b blocked out to insure profitable operation. Lessees were working on the surf and have made shipments said to average 8-14% copper.

The new owners are to do several thousand feet of diamond-drilling. C workings are described in Vol. XIII of this book.

RAY BROKEN HILL MINING CO. **ARIZO**

Address: Ray, Ariz.

Officers: Frank Schilling, pres.; H. H. McDonald, sec.-treas., with T. Ferguson, W. F. Gordon and Dr. Crawford, directors. Scott Lintner, m

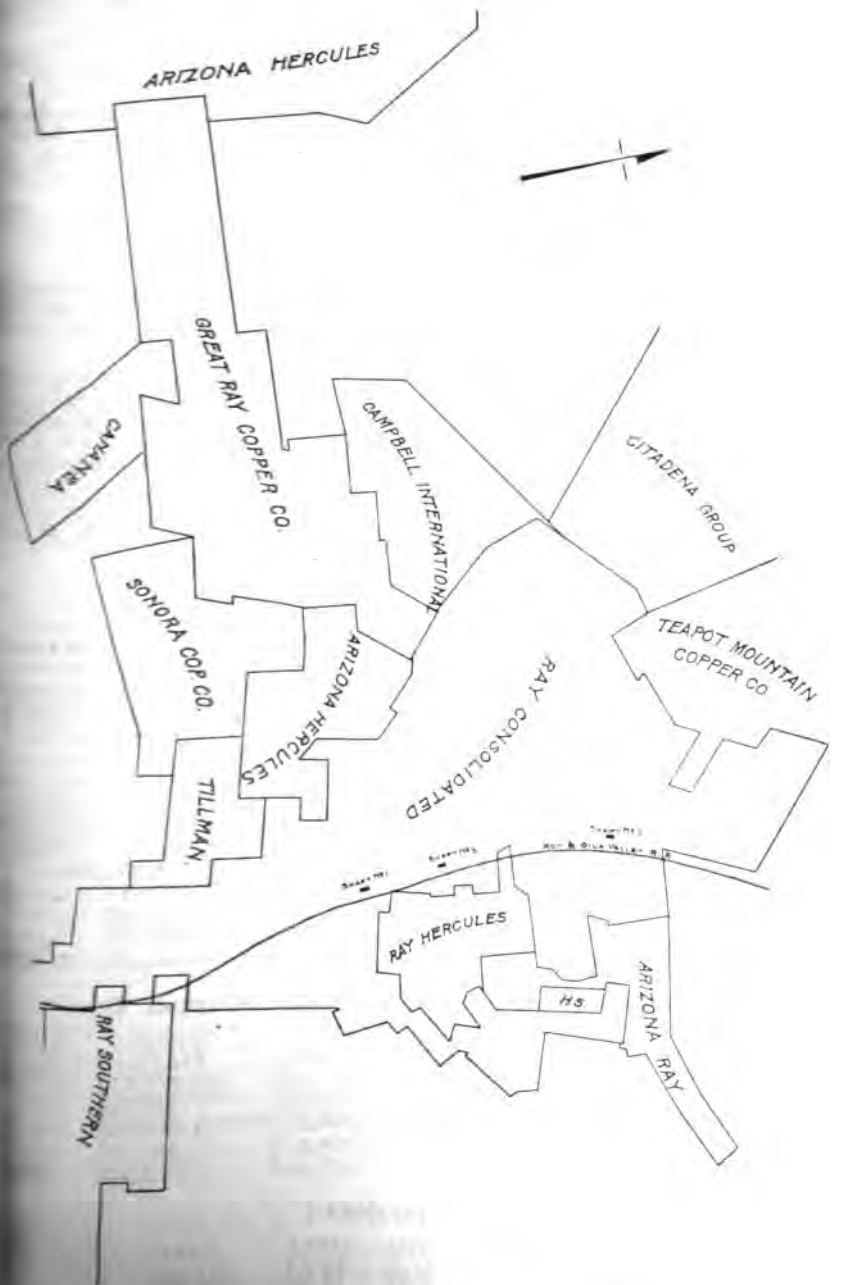
Property: 8 claims, unpatented, adjoins Ray Cons. on the east. June, 1919, acquired control of adjoining 9 claims of the Little Bobby Mini Co., also 10 claims in the Alma group. The ore is gold and copper.

Development: by a 1,200' tunnel. June, 1919, said to have cut an o body 100' in width.

Reported, Oct., 1919, that work had been suspended on original holdi after an unfavorable report by C. P. Berkey, and L. D. Huntoon.

RAY CENTRAL COPPER MINING CO. **ARIZO**

Company conveyed by direct deed all assets to Ray Consolidated C Co. in June, 1912.



PROPERTY MAP OF THE RAY DISTRICT, ARIZONA

RAY CONSOLIDATED COPPER CO. ARIZON

Office: 25 Broad St., New York. **Mine office:** Louis S. Cates, ge mgr., Ray, Pinal county, Ariz. **Mill office:** Hayden, Gila county, Ariz.

Officers: Sherwood Aldrich, pres.; D. C. Jackling, v. p. and managin director; Chas. Hayden, second v. p.; preceding, with Chas. M. MacNeill an W. Hinckle Smith, executive committee; Eugene P. Shove, sec.-treas.; L. Cates, gen. mgr., preceding officers with Spencer Penrose and Seeley W. Mud directors. W. S. Boyd, asst. gen. mgr.; C. A. Smith, supt of mines; D. Moffatt, cons. engr. for mills; E. A. Thornton, asst. supt. of mines; R. Thomas, chief engr.

Inc., May 11, 1907, in Maine. **Cap.,** $16,000,000; shares $10 par; $15,71 790 issued, Dec. 31, 1918. Original capital, $6,000,000, increased to $8,000,000 1908; increased 1909 to $10,000,000; increased May, 1910, to $14,000,000. T increase to $16,000,0000, March, 1912, was to provide shares for absorption the Ray Central Copper Mining Co., giving 1 share of Ray Cons. for 8 of R Central. Company absorbed the Gila Copper Co., through exchange of stoc giving 1 share for 3. Company owns entire capital stock of the Ray & Gila Vall Railroad Co. cap., $1,767,100. Bankers' Trust Co., New York, and Boston Sa Deposit & Trust Co., Boston, registrars; Guaranty Trust Co., New York, a Old Colony Trust Co., Boston, transfer agents. Fiscal year, formerly endi June 30, now ends with the calendar year. Shares are listed on the New Yo and Boston Stock Exchanges. Annual meeting, formerly held 4th Tuesday September, is the 3rd Friday in April.

Comparative Gen'l Balance Sheet, including Ray & Gila Valley R. R. C

Assets:

	Property	Const. & Equip.	Devel.	Metals in Transit	Other Current Assets	Total
1918.....	$8,657,620	$8,141,719	$6,218,529	$4,067,781	$8,791,496	$36,426,0
1917.....	8,719,313	7,927,277	6,044,968	6,101,606	6,944,158	36,047,6
1916.....	8,715,888	9,252,188	4,655,381	8,084,998	2,941,300	33,649,7
1915.....	8,917,573	7,373,768	4,076,250	3,823,834	1,253,492	25,444,9
1914.....	8,917,407	6,961,660	4,024,120	1,753,695	912,892	22,569,7

Liabilities:

	Capital Stock	Bonds	Current	Reserves, Ins. Bond Redemp. and Deprec.	Total Surplus	Total
1918....	$15,771,790	.....	$1,109,298	$1,573,483	$17,971,500	$36,426,0
1917....	15,771,790	.....	833,007	1,045,540	18,397,315	36,047,6
1916....	15,771,790	.....	1,037,962	1,519,700	15,320,303	33,649,7
1915....	15,712,790	$160,500	709,132	974,078	7,888,417	25,444,9
1914....	14,549,290	2,708,000	316,911	905,217	4,090,356	22,569,7

Comparative Income Account, Ray Cons. Copper Co.

	Operating Revenue	Operating Expenses	Net Optg. Profit	Total Income	Total Deduct	Balan Dec.
1918...	$19,209,311	$14,795,200	$4,414,112	$4,803,455	$5,275,832	$16,417,7
1917...	21,278,071	11,299,415	9,978,656	10,416,303	7,339,284	16,880,1
1916...	20,060,783	8,200,633	11,860,150	12,264,265	4,895,792	13,813,1
1915...	10,498,962	6,125,590	4,373,371	5,004,731	2,348,708	6,434,7
1914...	7,597,724	5,281,484	2,316,240	2,[illegible]	[illegible]	3,776,1

Earnings and Dividends

	1919	1918
Earned .....$.....		
Paid 2,80		

The total [illegible]

Present rate, $2 per share per annum, payable quarterly, March 31, etc., at Guaranty Trust Co., New York.

A sinking fund of 10c. per ton of dry ore treated was in effect from 1914 to 1916, increased to 12½c. a ton after 1916. It seems improbable it will ever be needed.

For the first 9 months of 1919 the operating profit was $724,346, plus $616,535 from miscellaneous income. Dividends amounted to $2,365,769, so the net deficit was $1,269,555, including the deficit for the first quarter.

Property: 126 patented claims, 2,143 acres of mining claims, at Ray, 130 acres at Ray Junction for railroad purposes, and a tract of 4,164 acres in Gila and Pinal counties, at Hayden and 21 miles from the mines, for milling and power-plant and tailing disposal; 536.5 acres of this are leased to the A. S. & R. Co. for its smelter.

About 580 acres of the Ray property have been proven to be mineralized, and about 183 acres have been developed, with a certainty that more or less of the additional mineral ground will be found to carry workable deposits.

Geology: The ore deposit is almost identical with that of Miami, and geologically similar to those at Bingham, Ely, and Morenci. It is a flat orebody 150 to 500' thick, 1,000 to 3,000' wide and about 9,000' long, through the property. This zone consists essentially of a highly metamorphosed iron-stained schist, intruded by a granite mass, whose borders and tongues are also mineralized and cut by diabase dikes. A fault east of the orebody brings the orebody against quartzite and limestone, while unaltered schist is found to the west. The silicified and whitened rock is leached to a considerable depth, the oxidized zone being succeeded by impregnations and seams of chalcocite and pyrite. Oxidized copper ores are found near surface, though in much of the ground the top of the belt is leached to depths varying from 30 to 400' and averaging 225', this leached zone being succeeded by ore carrying copper sulphides, greatly enriched by the secondary redeposition of chalcocite, latter constituting the main ore value. At the bottom of the orebody the transition from the ore to rock mineralized with primary sulphides takes place in a few feet. This primary mineralization averages about one-half of 1% copper, whereas an average sample of ore on the 50' level gave 2.4% copper, 3.4% iron, 2.6% sulphur and 90.3% insoluble matter.

The many drill-holes bored have shown an average capping of 240' depth, succeeded by an average of 118' thickness of ore, on the Ray proper, with 315' of capping and 171' thickness of ore on the Gila ground. The Ray mine has been developed by both underground workings and extensive churn-drill borings. Six churn-drills have been employed, averaging about 50' each daily, boring several hundred holes to an average depth of nearly 400' each, with a total of 140,000' of drilling, holes being bored checkerboard fashion, in 200' squares.

Development: by shafts Nos. 1 and 2 about 4,000' apart, and No. 3, the Ray Central shaft, near No. 1. No. 4 Man shaft, 547' deep, sunk in the western portion of the mine and capable of handling 37 men per trip, went into commission in 1918. There are many less important workings. The ore supply now comes almost equally from the No. 1 and the No. 2 mines. The No. 3 mine furnishes a smaller tonnage of high-grade ore. No. 1 shaft is 400' deep and has 3 levels at 171' and each succeeding 100' in depth. The shafts are connected by a drift, on the second level, which is run for more than 1 mile, practically through commercial ore. By the side of each shaft is an incline shaft, with a series of cages used by the men and a haulage way used for the hauling of material, the

RAY CONSOLIDATED COPPER COMPANY

Our Statistical Department will furnish complete information upon application.

HAYDEN, STONE & CO.

Boston and Philadelphia Stock Exchanges.

87 Milk Street, BOSTON

main shafts being used solely for ore extraction. The greatest depth from whi ore is to be hoisted will be about 300′ for years to come, and the greater p of the tonnage will be taken from the 170′ level and above for some years.

The Ray mine, of which the Ray Central or Globe-Isabella mine is now integral part, has been developed for a maximum width of 3,500′ and length 8,000′. Total underground workings Jan. 1, 1919, amounted to 134 miles, which mining operations have destroyed about 69 miles. In 1918 new wo totaled 61,711′, compared with 84,915′ in 1917, and 66,863′ in 1916.

Ore Reserves: Dec. 31, 1918, total ore reserves to date were 86,383,6 tons, averaging 2.061% copper and underlying an area of 205.2 acres. T higher grade orebody developed by No. 3 shaft, contained Jan. 1, 1914, appro mately 540,000 tons of ore averaging slightly over 5% copper. This tonna ensures a life of about 24 years on basis of present production, averaging 10,(tons per day. There is a large area tributary to No. 2 shaft where there a good reasons to expect additional tonnages.

The mine is operated electrically throughout, taking current over a tra mission line from Hayden to Ray. There is a crushing plant at the mine, reduci ores to about 1″ size before shipping to the mill.

The company owns and operates its own railway, known as the Ray & G Valley, from Ray to Kelvin, the trains continuing over the tracks of the Arizo railway (S. P. R. R.) to Hayden Junction and thence over a branch line, belon ing to the Ray & Gila Valley to the Hayden concentrator. This line betwe Ray and Kelvin is standard gauge and is operated as a common carrier. It h 80-lb. rails, Mogul locomotives and 60-ton steel ore cars. The company has very favorable freight contract with the Phoenix & Eastern for the transportati of ores partly over that line.

Concentrator: occupies a 4,000-acre site at Hayden, about 16 mil from the mine. In its essential features it is a duplicate of the Garfield mill the Utah Copper Co.

The mill, of 10,000 tons daily capacity, has eight units, and is so design that it may be enlarged, on the unit plan. The crushing department has 16 s of 42x16″ rolls, and 24 six-foot Garfield Chilean mills. Sizing is done by impact screens, and Janney classifiers, and concentration is effected by Garfi roughing tables, Harz single compartment jigs, Wilfley tables, and Isbell vanne Water, derived from the Gila river and the adjacent hills, is sent to a 4,000,000-g reservoir at the mill site through a 30″ pine, by pumps having a capacity of 7,5 gals. per minute.

The mill started in March, 1911, treating an average of 850 tons of c daily. The concentrates are well adapted to smelting, as regards sulphur a iron contents, only a small amount of limestone being required for fluxi Concentrates are treated in the Hayden smelter, owned by the American Sme ing & Refining Co.

The power-plant at the mill-site, of 10,000 h. p. capacity, supplies elect current for the operation of the entire property. The plant has water-tu boilers, and running four 2,500 h. p. Allis-Chalmers triple-expansion engin direct-connected to four 1,750 k. w. electric generators. Oil and coal we formerly used for fuel, but a sure and steady supply of fuel oil for the futu being uncertain, the company jointly with the Chino Copper Co. and the A. S. R. Co., took over July 1, 1917, the coal fields formerly owned by the Victo American Fuel Co., in the Gallup district, N. Mexico. The Gallup-Americ Coal Co., with capital of $4,000,000, was organized to handle this property.

Production:

	Tons Treated	Mine Cts.	Cost per Ton Mill Cts.	Total	% Cu.	% Rec.	% Cu. in Cncts.	Lbs. Cu. Rec. per T. Ore	Net Prod. Lbs. Cu.	Cost Cts. per Lb.	Se Pri Ct
1919*..	1,224,500	174.50	127.00	.....	1.810	78.00	.....	.....	35,810,399	15.20	...
1918...	3,411,000	176.00	101.00	.....	1.612	74.92	18.198	24.17	83,599,160	17.695	22.
1917...	3,560,900	109.00	82.86	.....	1.635	74.53	18.985	24.87	88,582,649	12.649	23.
1916...	3,382,340	80.073	55.35	$2.46	1.607	72.20	19.91	22.56	74,963,540	10.134	20.
1915...	2,848,969	62.08	50.86	2.115	1.673	64.11	19.29	21.45	60,398,396	9.497	17.
1914...	2,427,700	62.42	49.88	2.174	1.760	67.86	19.25	23.89	57,004,281	8.839	15.
1913...	2,965,296	78.23	51.93	2.284	1.719	66.09	18.55	22.72	52,841,029	9.374	15.
1912...	1,565,875	77.56	46.88	2.334	1.677	68.28	18.94	22.9	35,861,496	9.523	15.
1911...	681,510	81.09	50.45	2.65	1.89	68.01	20.04	23.0	14,065,047	10.025	15.

* 9 months. For 12 months the total was 47,000,000 lb.

Mine cost includes coarse crushing and loading on cars at mine, 6.5c. per ton in 1918. Total cost calculated from income statement includes all operating charges. Cost per pound does not include credits for gold and silver, nor for miscel. income, equal to 0.5c. per lb. in 1918. Low recovery in 1915 due to construction work in mill improvements at a time when the price of copper made it more profitable to overload such sections as were not undergoing repairs.

In 1918 production of silver was 8,395 oz., sold at 97.24c. per oz., and 1.145 oz. gold at $20 per oz.

With the signing of the Armistice, Nov., 1918, the demand for copper ceased abruptly, and to avoid a large surplus of unsold metal, production and operations were reduced approximately 50%, beginning the year 1919. Operating costs have decreased slightly. Production during the last two years has surpassed that of Chino and Nevada Cons., both older mines. The company has more constructive possibilities than any of the four porphyries. Equipment in every department is now practically complete and construction expenditures hereafter will be relatively small.

The tonnage already developed places the Ray Consolidated among the great copper mines of the world, standing sixth in point of ore reserves, with a certainty that the present enormous ore tonnage will be increased, and a possibility that it may be doubled. The management is practically the same as that of the Utah Copper Co., the pioneer among the so-called porphyry mines of the world, and is thoroughly experienced, strong and capable.

RAY HERCULES COPPER CO. **ARIZONA**

Office: 25 Broad St., New York. Mine at Ray, Ariz.

Officers: Frank C. Armstrong, pres.; J. G. Hopkins, v. p.; R. C. Greene, treas.; Wm. P. Maloney, sec. Directors: Frank C. Armstrong, J. G. Hopkins, E. P. Earle, Geo. A. Huhn, W. F. Bartholomew, August Heckscher, Jos. B. McCall. A. A. Wren, gen. mgr.; J. T. Shimmin, mill supt.

Inc. August, 1915, in Maine. **Cap.,** 1,500,000 shares $5 par; 1,263,000 outstanding. Company owns over 99% of the issued Arizona Hercules Copper Co. stock. No bonded debt, no preferred stock. As the 500,000 shares sold at $3.75 yielded $1,875,000, and $1,000,000 was put in the treasury, the difference must represent part of the purchase price.

Property: 207 acres, in the heart of the Ray district, at Ray, Ariz., surrounded by the holdings of the Ray Consolidated Co. Tract shows Pinal schist, in part capped by dacite, conglomerate and wash and invaded by diabase. Ore developed is an extension and part of the Ray Consolidated orebody. It is crossed by a fault with 350′ drop to the east, which fact long retarded development.

Development: in Sept., 1915, Henry Krumb made an examination after drilling 27 drill holes; 17 drill holes showed ore averaging 73.6′ thick over 13½ acres with a 257′ capping. The total ore developed by these holes was 3,428,774 tons assaying 2.36% copper. Ore reserves: recent estimates place reserves at 10,000,000 tons of 2% ore, and a total of 25,000,000 tons is expected.

Company has sunk one 862′ and one 543′ shaft at N. W. corner of property and will mine orebody by methods formerly used by C. E. Addams at De Beers diamond mine in Africa. 125-volt locomotives are used for underground haulage. At first and second levels of No. 1 shaft there are reinforced concrete ore pockets, capacity each pocket, 400 tons.

Equipment: at the mine includes a double-drum, electrically-driven Nordberg hoist, capacity 300 tons per hour; an Ingersoll-Rand class P. R. E. 2, electrically-driven compressor. The coarse crushing plant has one No. 8 Gates gyratory crusher and one set of Traylor rolls, product from here goes to the sampling mill and main ore bin, capacity 5,000 tons. The crushing plant can handle 1,200 tons in 8 hours. The ore is transported 5½ miles to the mill, 3¼ miles over Ray & Gila Valley R. R. to Hercules Junction and from there over tracks of the Ray Hercules Co., 2½ miles to Belgravia, and dumped into a 2000-ton bin.

The power plant, installed by the McIntosh & Seymour Corporation, has 3 of that company's 1,045 h. p., 164 r. p. m., 6-cylinder, 4-cycle Diesel engines. These engines are direct connected to G. E. Co. 720 k. w., 0.8 power factor, 2,200-

volt, 3-phase, 60-cycle generators. Power is transmitted to mill at 2,200 vol Water for power plant and mill is obtained from shallow wells along S. ba of Gila river.

Mill: 3 units with rated daily capacity of 400 tons each. First secti went into commission August 12, 1918; the third about the middle of Septemb Equipment includes 3 Marcy mills, 3 Hardinge mills, 15 Deister-Overstrom tabl 42 Callow flotation cells, 9 Dorr classifiers, 3 Oliver filters and 2 Connersvi blowers for the flotation machines. The mill was designed for an 80% recove of total copper content. At present the plant is treating almost 1.000 tons dai The output has been somewhat hampered because of lack of power, caused the experimenting necessary with such a large type Diesel engine.

Production: in June, 1919, there was milled daily 854 tons of 1.84% co per ore with a recovery of 75%. In July, 25,487 tons were treated, of which 72 was saved. The year ended August 31, 1919, yielded a total of 4,994,355 lb. copper. Costs are around 17c. per lb. In September, the output was 800,000

Since starting milling a year ago, many factors have interfered with regul operations, one being a suit by the Minerals Separation Co. for infringeme of patents.

The company started production August, 1918, too late to enjoy the w prosperity of the copper producers. It has therefore had to contend with t listless copper market of 1919. It can easily produce 800,000 lb. of copper month, or 1,000,000 if crowded, and in a reviving market can soon pay off debts due to construction costs, increased by war conditions. It is managed experienced copper men, and has good prospects.

RAY-KELVIN MINING CO. **ARIZON**

Address: 418 National Bank of Arizona Bldg., Phoenix, Ariz.

Inc., March, 1918, in Arizona, by Wm. E. Cogdell, A. L. Kelly a John L. Pascale, for the purpose of operating a lead-silver property of unpatented claims, 6 miles N. of Kelvin. In Nov., 1918, H. E. Easterday ask that a receiver be appointed for the company. No later information.

RAY SILVER LEAD MINING CO. **ARIZON**

Address: 215 Noll Bldg., Phoenix, Ariz.

Officers: William McDermott, pres.; J. E. Rowlands, v. p.; J. H. Pag treas.; H. H. Smith, sec.-asst. treas., with A. W. Lautz, directors.

Inc. Dec., 1916, in Arizona. **Cap.,** $1,500,000; $1 par; 723,805 shares ou standing; $94,950 8% convertible mortgage bonds outstanding.

Property: 48 claims, 960 acres, 2 miles E. of Ray, Pinal county, on t of high limestone mountains. Shows replacement deposits of high-grade le carbonate ore in fissures and along porphyry dikes intrusive in limestone, t ore occurring just above quartzite series.

There are three or four mines on the property, all showing ore.

Production: began in June, 1917, and totaled 2,005 tons shipped to Ja 31, 1919, contained 4,145,327 lbs. lead, 544 oz. gold, and 20,422 oz. silver wi gross value of $270,784. Shipments, June 1 to Dec. 31, 1918, averaged 27.5 lead; shipments in Jan., 1919, averaged 33% lead.

Property leased to Chas. E. Addams, formerly gen. mgr. of Ray Hercul Mng. Co., to May 31, 1920, for half net earnings. First 8 months' operati under lease resulted in earnings of $65,251.

Employs 35 men. Uses over 100 burros for packing ore into Ray. Sh ments made to El Paso smelter.

RAY VERDE COPPER CO. **ARIZON**

Office: 52 Vanderbilt Ave., New York. **Mine office:** Kelvin, Ariz.

Officers: W. B. Duvall, pres.; L. H. Bradshaw, sec.; F. W. Nye, tre

Inc. Oct., 1919, in Arizona. **Cap.,** $500,000; par $1.

Property: 140 acres, 12 miles S. of Ray, said to show disseminat chalcopyrite in a large porphyry dike, the whole being low-grade copper o Management states, Nov., 1919, "Operations are expected to begin shortly."

SOUTH RAY COPPER MINING CO. **ARIZON**

Office: 52 Vanderbilt Ave., New York. **Mine office:** Kelvin, Ariz.

Officers: A. N. Rice, pres.; F. W. Nye, v. p.; S. H. Bradshaw, sec.-tr

Inc. 1917, in Maine. **Cap.**, $3,000,000; par $10. Also $300,000 of 3-year 7% notes.

Property: 600 acres, 9 miles S. of Ray, worked 20 years ago under name of "Old Ripsey" and subsequently as the "Norman." Ore is copper, gold, silver. Has a 500' shaft. Management states, Nov., 1919, "the shafts of the mine were unwatered in June, 1919, and operations are expected to be resumed shortly."

SULTANA-ARIZONA COPPER CO. **ARIZONA**

See Kelvin-Sultana Copper Co., and Ray Boston Copper Co.

UNITED STATES VANADIUM DEVELOPMENT CO. **ARIZONA**

Address: 306 Goodrich Bldg., Phoenix, Ariz. B. S. Wilson, supt., Kelvin, Ariz.

Officers: E. P. Palmer, pres.; O. E. Plath, v. p.; Wm. Turner, sec.-treas., with H. B. Holloway, and W. J. Horspool, directors.

Inc. Dec. 31, 1915, in Arizona. **Cap.**, $1,500,000; $1 par; issued 1,350,000 shares; non-assessable.

Property: 40 claims, 800 acres, 3 miles E. of Kelvin, Ariz. Development by 250' and 400' tunnels is said to have opened considerable ore, and early in 1918, a 50-ton mill was completed. The Bryan dry sizing and concentrating process was used; the plant never proved successful.

In May, 1917, H. S. Bryan, of the Minerals Recovery Co. of Denver, reported that a low-grade sample of ore showed 3.68% vanadium, an equal content of "molybdate," gold and silver worth $76.27 per ton and about 48% "metallic" lead. A process had been evolved to treat this ore at Tucson.

Reported in July, 1918, that the Allied Metals Co. of Denver, had taken a 10-year lease on the mine. Property is said to have reverted to the owners after the lease had run for one year.

Late in 1919 mine was to be re-opened, and ore was to be treated by a new process.

SANTA CRUZ COUNTY

AMERICAN BOY MINE **ARIZONA**

Owned by Geo. Clarke, J. Petersen and J. B. David, Patagonia, Santa Cruz county, Ariz., but bonded to A. F. Gross of Duluth, Minn. Harry Armstrong, supt.

Property: 6 claims near Patagonia, shows several veins from 6" to 18" wide. Ore contains gold, silver, copper and lead, and is said to average $5 gold, 12 oz. silver and 10% copper.

Development: by an 80° incline shaft, 120. deep and a 370' tunnel that cuts the bottom of shaft. On the 40' level 200' of drifting has been done, on the tunnel level 250'. The small shipments made have consisted of ore extracted by development work. New machinery was being installed in August, 1919.

ARIZONA EUROPEAN MINING CO. **ARIZONA**

Office: Nogales, Ariz.

Officers: Manuel Escalada, pres.; W. M. Schuckman, sec., with Geo. Samuel, directors. Jas. Ritchie, supt.

Property: the Buena Vista group, 2 miles from Patagonia, at an elevation of 5,500', said to show a 6' ledge of high-grade copper-gold-silver ore.

Development: by shaft 115' deep and 700' of drifts. Average of 36' of drift opened, reported as 2.58% copper. During 1918, shipments of about 30 tons of ore monthly are stated to have carried 12% copper, 40 oz. silver and $3 gold per ton.

Employs 16 to 20 men.

AUSTERLITZ GROUP OF MINES **ARIZONA**

Owned by A. H. Noon, Nogales, Ariz. Under lease and option to Camphius S. Rives, of El Paso, Texas.

Property: 5 claims, about 100 acres, in Oro Blanco mining district, Santa Cruz county.

Development: by 150' shaft and 2 tunnels, 600' and 300' long, said to show quartz fissure vein in porphyry assaying from $4 to $40 in copper, gold and silver. Steady work continued during 1918-10. Ore shipments, totaling over

$200,000, said to have been made to date. The property has been an intermitt producer.

BACHMAN-MERRITT METALS CO. ARIZO

A close corporation owned by Dr. O. S. Bachman, Los Angeles; L. Merritt, Pasadena, Cal.; and Miss L. M. Kennedy, Nogales. Operates the Tres de Mayo property, 10 claims, in Palmetto mining district, 14 miles N. of Nogales, said to contain vanadinite and silver ores. Main vein is a w defined fissure in monzonite, with a width of 10 to 50'. Reserves are estima at 8,000 tons of vanadinite. Shaft, down 129' in August, 1919, is to be sunk 600' and a mill is to be erected.

BLACK EAGLE GROUP ARIZO

Address: C. A. Pierce, Patagonia, Ariz.

Property: 6 claims, 84 acres, in Santa Cruz county, Arizona.

Geology: fissure vein in limestone, dipping 45° N. E., and pitching S. Ore occurs as shoots, and said to assay 36 oz. of silver and 1.2% copper. also carries manganese.

Development: by 110 ft. incline shaft and 600 ft. of workings. I serves estimated at 500 tons. Only equipment is a 10 h. p. Fairbanks-Morse ho

Production: $30,000 received from ore sales during 1918, of which $20, was expended.

BLAND MINING CO. ARIZO

Address: Patagonia, Santa Cruz Co., Ariz. Company reported to building a mill, August, 1919.

BLUE EAGLE MINE ARIZO

Address: John Gleason, supt., Patagonia, Ariz. **Owner:** E. A. Sha New York.

A lead-silver property in the Santa Rita mountains, 8 miles N. W. of Pa gonia, Santa Cruz county, reported sold to Mr. E. A. Shaw. Planned to co mence operations, April, 1918.

BRADFORD MINE ARIZO

See Sonoita Copper Co.

CASANEGA-DALY MINING & REDUCTION CO. ARIZO

Amadoville, Santa Cruz county, Ariz. A. D. Daly, supt.

Property: 7 claims, 140 acres, in the Tyndall mining district. Santa R mountains, Santa Cruz county. Sulphide ore said to contain copper, gold, silv lead and molybdenum, occurs in orebodies 3 to 8' wide in monzonite.

Development: by 600' tunnel, said to have blocked out 50,000 tons o

Equipment: includes a 50-ton concentrator, that started operating Dec., 1915. Management planned driving a 1,000' development tunnel and creasing mill equipment. Presumably idle, March, 1918.

CASTLE BUTTE MINE CO. ARIZO

Address: Patagonia, Ariz.

Under lease and bond to J. C. Miller and H. S. Scheerer of Tucson, Ariz

Property: 2½ miles S. W. of Patagonia, Santa Cruz county, Ariz. Sh 65' deep. Several cars of carbonate ore shipped during 1918. Indications s to be good.

CLINTON COPPER CO. ARIZO

Idle and practically dead.

John F. Campbell, pres., 40 Court St., Boston, Mass.; A. F. Parker, treas

Inc. in Arizona. **Cap.**, $5,000,000; par $5.

Property: the O'Connor mine, about 20 miles E. of Nogales and mile N. of the Mexican border.

COMET MINE ARIZO

Small producer of manganese near Mowry, Santa Cruz county, operated John F. Campbell, during 1918. Is a prospect.

COMMONWEALTH DEVELOPMENT CO. ARIZO

Office: Pearce, Ariz. **Mine office:** Patagonia, Ariz.

Officers: Andrew Y. Smith, pres. and gen. mgr.; F. L. Bryant, se treas.

Property: the Commonwealth mine, near Pearce, Cochise county, ported to be shipping several cars of silicious silver-gold ore a week to

uglas smelters. Also operating the World's Fair mine (13 claims), near rshaw, in the eastern end of the Salero mountains, Santa Cruz county. This ne has a 600′ main shaft, with about 2 miles of workings, developing a 8′ body, carrying silver-lead ore. The mine has been a shipper since about 3, of high-grade silver ore, and is credited with past production of about 000 worth of ore. Concentrator was installed during 1918, and regular kly shipments of ore amounting to 250 tons were being milled in Sept., 1919. e Commonwealth M. M. Co.)

NSOLIDATED ARIZONA COPPER CO. **ARIZONA**

W. J. Mitchell, supt., Mowry, Ariz.; J. A. Ritsler, pres., Kansas City, Mo.

Property: 12 claims, in Patagonia district, comprising the El Paso and ive groups; has a 60′ shaft, said to show high-grade chalcopyrite and chalcoite ore. Stock underwritten by Mid-Continent Securities Co. of Chicago.

Equipment: includes 25 h. p. gasoline hoist.

UQUESNE MINING & REDUCTION CO. **ARIZONA**

Main office: 53 State St., Boston, Mass. **Mine office:** Duquesne, Santa uz county, Ariz.

Officers: Geo. Westinghouse, Jr., pres.; H. H. Westingham, v. p.; W. osvenor Calkins, sec.-treas.; Murray G. Day, gen. mgr.

Property: the Duquesne or Westinghouse mines, comprise half a dozen ims, 84 claims, patented, 1,000 acres, near the Pride of the West and 5 miles uth of the Mowry, in the Washington camp, Patagonia mining district, Ariz. Mine shows a contact deposit between limestone and granite-porphyry, carrying argentiferous and auriferous chalcopyrite, sphalerite, galena and pyrite, ned by a shaft 650′ deep. The Pride of the West and the Washington mines e large bodies of complex ore which have been the subject of numerous periments in wet, electrolytic, magnetic, dry and other systems of concentrain for many years past.

Development: workings on the Bonanza mine are 650′ deep and the uquesne shaft is 120′ deep.

Equipment: the Bonanza shaft is equipped with a 50 h. p. electric hoist d an Ingersoll compressor. The Duquesne shaft has a 12 h. p. gasoline hoist. mill and oil-flotation was installed in 1917.

The mine, in 1917, was shipping to the Douglas, Arizona, smelter, shipments aming about 16% copper and 5 oz. silver per ton. Operations in 1917 were ry successful, the company's debts being paid off and a surplus acquired. The operty and its history, geology, etc., is fully described in U. S. Geological rvey Bull. 582, pp. 321-334, 1915.

In 1919, Curry & Pannick had a lease on the mines, and in August were ping 400 tons of ore monthly to Douglas. The Phelps Dodge Corporation ently examined the property, which is said to be on sale at $150,000.

LEPHANT HEAD MINING & MILLING CO. **ARIZONA**

Address: Ben Daniels, pres., Nogales, Ariz. Copper-lead property near k Hopkins, Santa Cruz county, Ariz.

Lands: about 40 miles from Tucson, and 6 miles from the Calabasas road, near Elephant Head Butte, in the Santa Rita mountains. A vein, said have a 40′ outcrop, carries a complex of argentiferous lead, copper and zinc phides of low average grade, and there also is a 20′ vein of quartzite, said give surface assays of $10 gold per ton.

No recent returns. Probably closed down. Mail returned unclaimed, March,

X MINE **ARIZONA**

Address: F. B. Kollberg, mgr.; Thos. Safford, supt.; John McGregor, reas, Patagonia, Ariz.

A syndicate of Bisbee and Douglas men are reported to have a 5-year bond 150,000 on the property from R. R. Richardson, the owner.

ine was formerly owned by Hardshell-Flux Mng. & Dev. Co., dissolved **Worked by owner in 1917, and shipping 300 tons of lead-silver ore**

Development: by 130′ shaft and 5,000′ of workings, including a 130′ wi
There is said to be 60,000 tons of carbonate ore assaying 5 oz. silver and
of lead, and 40,000 tons of sulphides blocked out.

Mr. Kollberg was building a 200-ton mill using tables and flotation at
accounts. A 100-ton smelter in contemplated for 1920.

HAPPY JACK MINING & REDUCTION CO. **ARIZO**

Office: 530 Land Title Bld., Philadelphia, Pa.

Mine office: Patagonia, Santa Cruz county, Ariz.

Officers: Alfred W. Barnett, pres. and gen. mgr.; W. H. Barnett, v.
Henry W. Scattergood, sec.-treas,; preceding, with Martin Stotz and T
Myers, directors.

Inc. Oct., 1908, as successor of Happy Jack Mining Co., in Arizo
Cap., $1,000,000; shares $1 par, fully paid and non-assessable; issued 3
709 shares.

Property: 9 miles from Patagonia, shows several veins, carrying sil
lead ore with gold and copper.

Development: by 3 tunnels, longest 950′. Total development w
4,000′.

Has shipped considerable ore averaging 42% lead, 2½% copper, 20 oz. si
and $2 gold. Several hundred tons of concentrating ore reported on dump

Assessment work only done. Was considered promising in 1917, no
since.

HAVALINA MINING CO. **ARIZO**

Sold its Santa Nino property, Patagonia mountains, S. W. of Duque
Santa Cruz county, Ariz., to J. Wells Smith, Feb., 1913. Property was b
developed by 800′ crosscut tunnel to reach a rich copper shoot said to
been found in the mine. Claims said to show molybdenum ore. Litigation
stopped work.

HARDSHELL MINE **ARIZO**

Address: H. K. Welch, mgr., Patagonia; Mr. Pierce, supt.

R. R. Richardson, owner. Mine formerly worked by the Hardshell-
Mng. & Dev. Co., dissolved in 1910. Bond and lease given in 1917.

Ore carries silver, with some lead, copper and gold, containing about
manganese. Jig concentrates average 40% manganese, 12% silica, 15 oz. si
10% lead. Sinking shaft at last accounts, Oct., 1919, when it was down 400′.

HENRY FORD MINE **ARIZO**

Owner: J. A. O'Toole, Patagonia, Santa Cruz Co. Company in pro
of incorporation.

A silver-lead property near Patagonia, adjoining the World's Fair min
the Commonwealth Development Co. Vein is 2′ wide.

HOSEY GROUP **ARIZO**

Owned by W. B. Ramsdell and operated by Colin Timmons. J. McDo
supt., Patagonia, Ariz. See Marguerita M. & S. Co., p. 331.

Property: 7 claims, including the Hosey and Augusta mines, 12
from Patagonia. The Augusta has 1,000′ of development showing 3
3-15′ wide, carrying copper, gold and silver. Assessment work in
opened several rich payshoots and the management is sinking a new
about 300′ east of the old one. Equipment includes compressor and
chine-drills.

HUACHUCA TUNGSTEN MINING & MILLING CO. **ARIZ**

Mail addressed to Canille, Ariz., returned March, 1919.

Property located 8 miles from Canille, Santa Cruz county, in the Hua
mountains, said to be producing some tungsten from a quartz vein 1-5′
containing scheelite.

IVANHOE MINE **ARIZ**

Address: Patagonia, Santa Cruz county, Ariz. Formerly owne
Ivanhoe Mining Co., which has been dissolved. Property now owned by
Ives, of Minneapolis, and J. E. Hurd, who, in 1915, did assessment work on

Property: the Ivanhoe mine and various claims, 25 in all, unpate
500 acres, in the Wrightson district, 4 to 6 miles S. W. of Patagonia, the n
rail point. The group shows rhyolite, andesite and diorite, with bre

ones carrying orebodies, of which 5 are estimated by owners to average 27′ in width, carrying silver chloride ore, gray copper and chalcocite, estimated by management to average 16% copper, 6% lead and 225 oz. silver per ton.

Development: by the 200′ Commercial shaft, with considerable crosscutting, developing, it is said, large bodies of milling ore. There are also several tunnels, with 2,700′ of workings, estimated to show 100,000 tons of ore.

Equipment: includes a 70 h. p. steam plant with a 50 h. p. hoist good for 1,000′ depth. There are 5 buildings, and water is supplied by a 6 h. p. gasoline pump.

Believed to be idle.

LAYMAN SYNDICATE **ARIZONA**

Address: Van Nuys Hotel, Los Angeles, Cal. B. B. Smith, mgr., Patagonia, Ariz. Not an incorporated company.

Property: owned by Jas. M. Layman, consists of 13 unpatented claims, 220 acres, in Harshaw mining district, Santa Cruz county, Ariz., known as the "Blue Nose," and also as the Abe Lincoln mine. The mine has been closed for about 30 years, it is said to have produced $250,000 in lead-silver ore. Developed to 160′ depth. See p. 278, Bull. 582, U. S. G. S.

Present management cleaned out the old shaft, added a new compressor, and by Nov., 1919, was shipping 4 cars of silver ore per week, yielding $1,000 per car. There were 30 men employed.

LOWER CALIFORNIA METALS CO. **ARIZONA**

Owned and controlled by the Sociedad Anonima de Metales, of Mexico City.

Address: F. M. Moore, asst. mgr., P. O. Box 365, Nogales, Ariz.

Property: 100-ton flotation plant, using K. & K. machines, located 3 mi. N. of Nogales. Treats custom ores as well as ore from Del Pilar and Los Charcos mines in Sonora, owned by the Soc. Anonima de Metales. During the war was purchasing molybdenum ores. Idle about half the time.

MANSFIELD MINING & SMELTING CO. **ARIZONA**

Office: 317 Ridge Bldg., Kansas City, Mo. **Mine office:** Patagonia, Santa Cruz county, Ariz.

Officers: Frank D. Reasor, pres.; H. A. Sutermeister, v. p.; C. E. Sweet, Chas. L. Cookson, treas.; preceding with Harry J. Richards, A. W. Safford, and A. E. White, directors.

Inc. May 26, 1906, in Arizona. **Cap.,** $8,000,000; shares $1 par, nonassessable; issued $7,156,905. Bonds, $100,000 authorized, at 6%, all outstanding. Annual meeting second Monday in January. Company owns no mining property, but in the reorganization proceedings, 1914, acquired stock interests in the Ray Copper Co. and Southern Arizona Mining Co. See Vols. VIII and XI, Copper Handbook, for early history.

MARGUERITA MINING & SMELTING CO. **ARIZONA**

Address: A. R. Grund, pres.-mgr., Patagonia, Ariz.

Property: the Hosey mine and the Trenton-Georgia mines, in the Mina-Float land grant, Santa Rita Mountains, 12 miles W. of Patagonia. These mines have produced some silver-copper and silver-lead ore.

Mine operated by Colin Timmins; see Hosey Group, p. 330.

MORNING GLORY MINE **ARIZONA**

Address: Chas. B. Wilson, owner and manager, Patagonia, Santa Cruz County, Ariz. The Southern Arizona Mining Co. is reported to be developing property. E. R. Shaw in charge.

Property: 12 claims, 240 acres, 12 miles from a railway, in the Harshaw district of the Patagonia mountains. Claim said to show 4 veins 6′ wide in limestone and porphyry, carrying sulphide ore, estimated by owner to average 4% copper, 3 oz. silver, 60c. gold, 35% iron and 35% sulphur per ton. A shoot of zinc-copper ore is reported to have been opened in 1916, from which shipments were made in 1918.

Development: 2 shafts of 80′ and 200′, with about 1,475′ of workings, estimated by owner to give 50,000 tons of 3½% copper ore blocked out for stoping. Ore is hand-sorted. Crosscut tunnel is in over 700′ with good indications.

Equipment: includes a small hoist.

Production: over 10,000 tons to date. Mine has been worked for ov 30 years. Two hundred and seventy-five feet of work done in summer of 19

MOWRY MINING CO. **ARIZON**

Owner: A. J. Hazeltine, Warren, Pa.

Property: 21 patented claims, near Mowry, 12 miles from Patagon operated during the Civil War by Lieut. Mowry, who was accused of furnishi lead from this mine to the Confederates. The ores are lead-silver. The mi closed down in 1907, after producing several million dollars, was re-opened 1916. Average ore contains about 20% lead, and 20 oz. silver per ton. Report to have crosscut a lens of ore 25′ wide on the 250′ level, containing carbona and sulphides. In August, 1919, there were 35 men employed, and in Novemb the daily output was a carload of lead carbonate and galena daily.

MUMME MINING CO. **ARIZON**

Office: 1502 S. Flores St., San Antonio, Tex. **Mine office:** Patagon Santa Cruz county, Ariz.

Officers: T. E. Mumme, pres. and gen. mgr.; E. J. Mockert, v. p.; P. Mockert, sec.; Geo. F. Wieland, supt.

Inc. Sept. 20, 1019, in Arizona. **Cap.,** $100,000; shares $1 par; issu 61,000 shares. Alsc has $10,000, debentures authorized, but unissued.

Property: 7 claims, patented, in the Harshaw district, 6 miles fr Patagonia, shows 2 veins of about 7′ average width, carrying ore said to aver 9% copper, 22 oz. silver and $4 gold per ton.

Development: 50′ shaft and 3 tunnels, longest 320′. Mine has no pow equipment. No returns since 1913.

NEW STATE MINING & REDUCTION CO. **ARIZON**

Office: 316 New England Bldg., Topeka, Kan.

Property: near Amadoville, Santa Cruz county, Ariz., 26 claims. sho ing veins said to carry lead-zinc-copper ores, with gold and silver values.

Development: by 150′ shaft with 950′ tunnel.

Equipment: includes gasoline hoist and Ingersoll compressor. W planning to erect a 100-ton dry concentrator to treat low-grade ores in 1917.

ORO MINE **ARIZO**

G. B. Williams, owner, 316 Meigs St., Rochester, N. Y. A. J. Fraser, s

Property: the Oro mine, 10 claims, unpatented, at Old Glory, in Oro Blanco district, 30 miles west of Nogales, Santa Cruz county, Ariz. M shows 3 parallel fissure veins from 6 to 30′ wide. Vein on which most of work has been done is 16′ wide, with a 5′ paystreak of silicious sulphide carrying copper, lead and gold.

Development: carried on since 1911, consists of a 350′ shaft with levels and ground opened for stoping. In 1916, a drift on vein at 350′ said have followed a paystreak assaying 3% copper, 5% lead and $20 gold.

Equipment: includes pumps, tramway, mill and dam. Mine has p duced about $50,000 worth of ore to 1916.

Owner planned sinking winze and continuing drift on vein at 350′ leve 1916. No later returns.

PATAGONIA MINES & DEVELOPMENT CO. **ARIZO**

Office: formerly at Patagonia, Santa Cruz county, Ariz.

No information since 1914; probably idle; described in Vol. XIII.

PATAGONIA-SUPERIOR COPPER CO. **ARIZO**

Subsidiary of Magma Copper Co., 14 Wall Street, New York. Organ October, 1919, to exploit the Three R mine. W. C. Browning, mgr., Patag Arizona.

Property: the Three R. mine formerly owned by R. R. Richardson A. E. Crepin. From 1912 to 1914, inclusive, mine was worked under op and ore shipped by N. C. Amster of Boston. In August, examined and bon by W. C. Browning and T. A. Etlinger for the Magma Copper Co. Shipm have ranged from 9 to 12% copper for many years past.

The property consists of 55 claims, about 1,000 acres, unpatented, on westerly slope of the Patagonia mountains, 9 miles S. of Patagonia, Santa county, at an elevation of 5,000

Geology: Claims show alaskite with small, irregular areas of trachyte and rhyolite porphyries. Ore occurs mainly along several lodes in a N.-S. shear-zone as chalcocite in high-grade shoots and also disseminated low-grade values. The first orebody opened had stopes 70 to 80′ long and 40′ wide, extending from the 50′ to the 400′ level. a second parallel ore-shoot, 100′ from the first, was 20′ wide and carried 8% ore.

Development: the Colossus tunnel, Evening Star tunnel, and the 260′ Colossus shaft, with total underground workings of 10,000′. Practically all the high-grade ore has been mined.

Equipment: includes a 50 h. p. Fairbanks-Morse oil-type hoist at the Colossus shaft, 40 h. p. and 60 h. p. oil-type engines operating individual belt-driven Sullivan air-compressors, dwellings, etc.

RED MOUNTAIN COPPER MINING CO. **ARIZONA**

Property: 60 claims, 1,200 acres, includes the Four Metals mine at Mowry, Santa Cruz county, Ariz. Was worked unsuccessfully by Oscar A. Turner, 1914-15.

Development: by several tunnels, longest 1,300′, said to show pyrite and chalcopyrite ore, assaying from 1-3% copper for over 300′. No recent report.

Idle for years.

RUBY COPPER CO. **ARIZONA**

Office: 317 Ridge Bldg., Kansas City, Mo. **Mine office:** Patagonia, Santa Cruz county, Ariz.

Officers: F. D. Reasor, pres.; E. Theilman, v. p.; C. E. Sweet, sec.; C. L. Cookson, treas., with H. J. Richards, F. P. Greenwood, A. E. White and R. W. Pierce, directors. C. A. Pierce, gen. mgr.

Inc. 1912, in Arizona. **Cap.,** $2,000,000; shares $1 par; issued, 1,735,659; non-assessable. Debentures, $200,000 at 6%; issued, $119,760. Annual meeting, third Monday in January.

Property: the Lee group of 9 claims, 6 patented, about 13 miles N. W. of Patagonia, on Benson Branch of S. P. R. R.

Geology: claims show remnants of Tertiary lavas capping a series of limestones and other sedimentary rocks, altered by metamorphism and underlain by a dense black crystalline rock that carries ore. This rock, though seemingly devoid of crush zones or fissures, contains disseminated particles of chalcopyrite with occasional bunches and patches of high-grade ore assaying as high as 27% copper and 100 oz. silver per ton. This rock also holds kidneys, or nodular masses of primary copper, glance and bornite. Ores are estimated to average 6% copper, 12 oz. silver and 11 cts. gold per ton.

Development: by 460′ shaft and a drift tunnel, with about 5,000′ of workings. The shaft is dry, unlike that of the Hosey mine to the N., and the Savoy Jack to the S., both in higher ground.

Equipment: includes 30 h. p. gasoline hoist, Cameron pump, and Leyner compressor.

Company has recently prospected its disseminated deposits by a number of core-drill holes and plans to sink a shaft upon the strength of drill results.

SOUTHERN ARIZONA MINING CO. **ARIZONA**

Officers: H. A. Sutermeister, pres.; F. D. Reasor, v. p.; C. E. Sweet, sec.; Chas. L. Cookson, treas., with A. E. White, Emil Thielman, H. J. Richards, F. P. Greenwood and R. W. Pierce, directors. C. A. Pierce, supt., Patagonia, Santa Cruz county, Ariz.

Inc. 1912 in Arizona. **Cap.,** $4,000,000; shares $1 par; non-assessable; 1,000,999 shares outstanding. Authorized bond issue, $400,000; $84,160 outstanding. Annual meeting third Tuesday in January.

Property: the Sweet group, 23 claims, 3 patented, in Wrightson mining district, 10 miles N. W. of Patagonia, shows gold-bearing copper ore, occurring in contact deposit between granite and monzonite. Mine has 365′ shaft equipped with steam hoist and air-compressor.

See Manfield M. & S. Co.

STANDARD METALS CO **ARIZON**

Address: Security Bond Co., 530 Title Insurance Bldg., Los Angele California.

Officers: O. B. Bachman, pres.; A. G. Kohnhorst, sec.; W. J. Mitchel supt.

Inc. in Arizona. **Cap.,** $1,000,000; shares $1 par.

Property: over 1,000 acres, including the Denver, Standard, Tres d Mayo, Bob Lee, Mowry and North Mowry mines, in Santa Cruz county, Ari Ore carries silver and lead.

Development: workings said to aggregate 12,000′ to 15,000′. In th Denver, G. R. Hay estimates an output of $400,000 for 10 years. The Mowr has a large past production, and is said to have 100,000 tons on dumps wor $5 per ton net. E. W. Brooks considers the Bob Lee "one of the most promisi undertakings of its kind."

It is to be hoped that those interested are not banking too much on pa production of the mines. No recent information.

THREE R MINE **ARIZON**

Acquired in Oct., 1919, by the Patagonia-Superior Copper Co., a new su sidiary of the Magma Copper Co.

TRENCH CONSOLIDATED MINES CO. **ARIZON**

Address: care of Chas. W. Clark, Jerome, pres.; John Hoy, mgr.

Property: known as the Farrel mine, is near Patagonia and Harsha Santa Cruz county, Ariz. The mines were acquired in 1913 by Senator W. Clark at a price said to be $250,000. A double compartment shaft has be sunk 600′. Reported that good grade ore has been opened upon the 500′ lev

VICEROY MINING CO. **ARIZON**

Office: Janesville, Wis. Mine near Patagonia, Santa Cruz county, Ari

Officers: Frank H. Baack, pres.; M. G. Jeffris, v. p.; M. O. Mouat, sec treas., Janesville, Wis.

Inc. Oct., 1912. **Cap.,** $1,000,000; shares $1 par; non-assessable; issue $600,000.

Property: 8 claims, unpatented, 164 acres, in the Tyndall district miles N., N. W. of Patagonia, shows a number of fissure veins, traversi porphyry or following contacts between diorite and porphyry and dipping 4 The vein is said to range from 6 to 75′ in width. Ores are principally silve bearing, but show occasional bornite and a little lead ore above the water lev reported to carry from 16 to 199 oz. silver per ton.

Development: by shafts of 40′ and 100′ with about 400′ of tunnel wor ings in leached ore.

Idle for lack of funds, but company planned to resume operations in 19 but whether it did we cannot say.

WANDERING JEW MINE **ARIZON**

Comprises a group of four claims in the Tyndall district on the W. slo of Santa Rita mountains, near Alto, Santa Cruz county, Ariz., owned by & L. Lulley and R. R. Richardson. At last accounts G. W. Vanderwalker, su and operated under bond and lease by E. B. & W. E. Holt and M. L. Kaiser Nogales. First shipments made February, 1916.

Development: to 100′ depth by 2 shafts, 300′ apart, drifts and cro cuts aggregating about 2,000′ of workings. Country rock is gray diorite. Ve varies from 6″ to 4′ in width and contains argentiferous galena. About the deposit is said to be shipping ore, the rest, concentrating grade. Ore galena from the surface down, but in places contains a little copper carbonate chalcopyrite. Property has a 75-ton flotation mill.

WORLD'S FAIR MINE **ARIZON**

Patagonia, Santa Cruz county, Ariz.

Operated by Commonwealth Dev. Co., which see

YAVAPAI COUNTY

ALADDIN MINING CO. **ARIZONA**

W. A. Kent, mgr., Prescott, Ariz., writes: "I do not feel at liberty to fill out blank you send. All those entitled to receive the information asked for receive it direct." Company had a 5-year lease on Paymaster mine and 8 other claims, the property of the Oriental Mining Co., in Big Bug district, near Poland. Lottie mine of same group has 4,400′ tunnel and 20-stamp mill.

ALGONKIAN MINES CO. **ARIZONA**

Promoted by Cameron, Michel & Co., Inc.

Office: 8 W. 40th St., New York City. **Mine address:** Crown King, Yavapai county. A. J. Heath, mgr.

Officers: Geo. F. Shurtleff, pres.; John B. Frich, v. p.; John L. Schellenberg, sec.; J. Edward Michel, treas., with Ralph H. Cameron, directors.

Inc. 1910, in Arizona. **Cap.,** $1,000,000; $1 par; 402,645 outstanding. Registrar & Transfer Co., N. Y., transfer agent.

Property: 17 claims, 5 patented, 335 acres, in Bradshaw mountains, 4 miles east of Crown King, Yavapai county. Fourteen claims are said to be along a shear zone, paralleling a diabase monzonite contact. The schist is intruded by several porphyry dikes or sheets parallel to the schistosity. Mineralization is said to occur in the porphyry at the diabase contact.

Development: by tunnels and shaft totals 2,400′. The lower or Algonkian tunnel, 1,100′, runs along the dike contact, on the Anaconda claim. For 350′ it is reported to follow the apex of an ore shoot; a raise run from the tunnel to the surface at 322′, is said to be on the orebody. This air shaft continues as a 50′ winze below the tunnel and a drift N. from the bottom shows galena with occasional bunches of glance and chalcopyrite.

On the Sterling Silver claim a small cross vein, recently discovered by new work, said to show 8-10″ of high-grade silver ore, one sample carrying 180 oz. per ton. Property examined by Jas. P. Harvey.

Equipment: old equipment sold. Company officers report intention of building power line and installing electrical equipment.

AMULET MINE **ARIZONA**

C. M. Brown, supt., Walker, Ariz.

Property: in old abandoned silver mine. A new 200′ shaft is being sunk deeper and will enable owners to drift under the old workings.

ANDERSON & BIRCH **ARIZONA**

Property: 2 miles west of Humbolt, Yavapai county.

Reported having made shipments of high-grade lead-silver ore during 1917 and 1918. Milling ore treated by flotation, averaged about $15.00 per ton.

ANGLO SAXON SMELTING & REFINING CO. **ARIZONA**

Officers: J. E. Russell, managing director, Bank of Ariz. Bldg., Prescott, Ariz. Hugh Rose Croup, pres.; Robt. L. Service, sec., with G. G. Lemons, directors.

Inc. 1916, in Arizona. **Cap.,** $1,500,000. The company was to be financed in England.

The corporation had a lease on 200 acres of land from the City of Prescott for a smelter site and had also acquired several water rights. During the war, no active work was carried on. Reported June, 1919, that the company died during the war.

ARGENTA MINING COMPANY **ARIZONA**

E. J. Bessett, Prescott, Ariz.

Property: 13 claims in the Turkey Creek district, said to have a 3′ vein carrying gold and a 6″ streak with silver. Reported under option to E. J. Bessett, at last accounts.

ARGONNE COPPER CO. **ARIZONA**

Box 462, Prescott, Ariz. Mine near Cordez P. O., Ariz.

Inc. 1919, in Arizona. **Cap.,** $500,000; 50c par; 320,000 issued for property. Hall and Finlayson, incorporators. Personal promotion stock held by Mines Corp. Comm. Company was granted permission to sell 300,000 shares at 50c in 1919, less 15% selling commission.

Property: 27 claims including the Gil Ferguson group and 4 oth claims near the Stoddard mine. Shows a blow-out 20 to 100′ across with of shipping ore in a 60′ shaft, and 4½′ of 20% glance ore in a new foot shaft sunk in 1918-19. A promising prospect, bonded in 1919 by Argonne Cop Company, which see.

ARIZONA-BAGDAD COPPER CO. **ARIZON**

Formerly Bagdad Copper Co.

Office: Suite 926, 111 Broadway, New York City. Mine at Bagdad, Hillside, Yavapai county, Ariz.

Officers: E. B. Bronson, pres.-treas.-mgr.; L. H. Taylor, Jr., v. Frederick C. Hart, sec.; H. A. Geisendorfer, supt., with Wm. L. Austin, G W. Carpenter, E. A. Julian, H. B. Richardson, F. C. Hart, P. Chrystie, directo

Inc. March, 1919, in Delaware. **Cap.,** $1,750,000;$1 par: outstandi 785,000 shares. No bonds. Security Transfer & Registry Co., New York C transfer office; The New York Trust Co., registrar. Annual meeting, Tuesday in March.

In Oct., 1912, a 2-year bond on the property was given to the General Devel ment Co. of New York (Lewisohn), and this company at once began drill operations to develop more ore. Work with 3 churn drills was carried on to April, 1913, when the bond was relinquished, but a new option on cont of the company was taken in Oct., 1913, which has now expired. In order secure funds to equip property, the Bagdad Copper Co., in 1918, with the c sent and approval of its stockholders, sold all of its property to the Ariz Bagdad Copper Co.; 785,000 shares of the new stock were issued to the Bag Copper Co. for distribution to its stockholders after two years.

Property: 53 patented claims and 17 unpatented, over 1,000 acres, in Copper Creek region, Eureka district, Yavapai county, 26 miles by wagon r from Hillside, on the Santa Fé line to Phoenix. The old company had s over $600,000 on the property in purchase and development.

Development: by tunnels and churn-drilling. There were about 8 of underground workings and 33,255′ of drilling Oct., 1915. In 1911 Allen Rogers estimated 4,324,500 tons of ore, averaging 1.93% copper. In 1912 H. Clark estimated 4,833,600 tons, averaging 1.934% copper. In 1914 H. Geisendorfer made detailed estimates of 6,031,000 tons of blocked ore, aver 1.77% copper and 7,246,200 tons probable ore, averaging 1.60% copper, a total 13,277,200 tons of ore, averaging 1.68% copper, underlying 67.88 acres. Aver thickness of ore is estimated at 58.4′.

A reconnaissance survey for a branch railroad proves the project feas at a cost of about one and a half million dollars, or less, if a narrow g road be built. Work planned for 1919-1920 includes a branch railroad, w power installation, mining equipment and erection of a 200-ton concentra plant, for an initial unit, using flotation equipment. Reported on by A. H. R W. H. Weed, J. Parke Channing, F. H. Clark, H. A. Geisendorfer and o

ARIZONA BINGHAMTON COPPER CO. **ARIZO**

Address: 405 Lexington Ave., New York. **Mine:** Stoddard, Y county, Ariz. Company absorbed the Stoddard Mines Co. and Stoddard M Co., described, Vol. XII.

Officers: Wm. H. Reynolds, E. W. Wells, v. p.; Geo. W. Johnson, mgr.; E. V. Davies, supt.

Inc. Feb., 1917, in Arizona. **Cap.,** $1,700,000; $5 par; changed l 1918 to $2,000,000; $1 par; 1,713,250 shares issued; exchange basis 5 of ne 1 of old. Stock listed on New York Curb. Security Transfer and R Co., New York, transfer agent.

Dividend: an initial dividend of 2c. a share was paid Jan. 20, 19

During year ended, May 31, 1919, there was an operating profit of changed to a loss of $6,306 on deducting other charges, the result o settlement for 1,000,000 lb. of copper on hand.

Property: 10 claims, 6 patented, about 175 acres, in the Copper

silicified schist, oxidized to the 600' level. Main ore-shoot has been opened from the 100' to 600' levels, and yields 5% ore, though the mill feed averages but 2.2% copper. Reserves are reported as 100,000 tons 3% ore and 150,000 tons of a lower grade.

Development: by 1,000' tunnel and 600' shaft, with about 4,000' of workings. The new 3-compartment shaft is to be sunk to 1,200' and was down 900' in Sept., 1919. At 750' the orebody is 15' wide and averages 5% copper. In 1918-19 $38,626 was spent on development.

Equipment: includes double-drum electric hoist, a 10-drill compressor, pumps, and 150-ton flotation mill, to be enlarged to 350 tons. New shaft equipment is to cost $40,000.

Production: during year ended May 31, 1919, the mill treated 36,605 tons of ore yielding 1,873,358 lb. of copper at a total cost of 19.84c. per lb. Concentrates contain about 25% copper; extraction is reported as 92.5%.

ARIZONA CALIFORNIA MINING CO. **ARIZONA**

Officers: Dr. E. A. Butler, pres.; G. W. Lavender, v. p.; H. G. Wilhelm, sec.-treas.; William S. Wilhelm, mgr.

Inc. April, 1915, in Arizona. **Cap.**, $250,000; $1 par; outstanding, $200,000.

Property: 6 claims, 122 acres, patented, in the Hassayampa mining district, 6 miles S. of Prescott, show a quartz vein containing gold, silver, zinc and lead ore.

Developed by the Shamrock and Ruth mines, latter having a 300' vertical shaft.

Equipment: includes a 10 h. p. hoist and a 40-ton mill, with Hunting- mill and Wilfley tables. Mill concentrates said to assay 36% zinc, 55% lead and 30 oz. silver. Driving a 1,200' tunnel in June, 1918. An oil flotation plant is planned for 1918. Letters returned unclaimed from Prescott in 1919.

ARIZONA COPPER BELT MINING CO. **ARIZONA**

Office: 25 Broad St., New York, N. Y. **Mine office:** Constellation, Yavapai county, Ariz.

Officers: Wm. J. Dilthey, pres.; H. F. E. Gamm, v. p.; R. A. Camp, treas.; E. Rappold, sec.; Samuel Bloom, directors; C. R. Dilthey, supt.

Inc. Feb., 1906, in Arizona. **Cap.**, $1,000,000; $1 par; issued 719,242. No bonds.

Property: 17 claims, exclusive of water right and millsite, in two groups, known as the Texas and the Wren groups, in the Black Rock district, Yavapai county, about 15 miles N. E. of Wickenburg, the nearest railroad station on the Santa Fé Railroad.

The two groups are 2 miles apart and work is mainly on the Texas group, containing the Monte Cristo silver mines, some 2 miles nearer the railroad. The working shaft is about 320' deep; a crosscut on the 300' level is reported to have cut a mineral ledge more than 50' wide. The ore carries copper, with gold and silver values, said to assay from $28-$40 per ton. The company has a well-established camp on grounds, 25 h. p. gasoline engine, air-compressor, machine shop and camp buildings.

ARIZONA COPPER-GOLD MINES CO. **ARIZONA**

Office: 1011 Pabst Bldg., Milwaukee, Wis. **Mine office:** Cherry, Yavapai county, Ariz. R. H. Burmeister, pres-gen. mgr, at last accounts.

Inc. Oct. 12, 1903, in Arizona, as Gold Lode Mines Co., and reorganized April 10, 1906, under present title. **Cap.**, $1,500,000; $1 par. Company went into receivership and property acquired February, 1914, by bondholders, who planned reorganization and continuation of development work.

Lands: 17 claims, 340 acres, in the Cherry Creek district, 15 miles N. of Humboldt, including the Bugler group of 4 claims. Development: by several short tunnels, and the Leghorn shaft of 600' depth, with about 3,500' of workings, on a 2' fissure vein. The ore apparently averages about 2% lead, with gold values.

Equipment: includes a 40 h. p. hoist, good for 1,000' depth, and a 3-drill compressor. A 40-ton mill, at the Leghorn shaft, has a 10' Lane slow-speed ball mill. For early history, see Vol. XI, Copper Handbook.

ARIZONA COPPER MINES CORPORATION ARIZON

Address: F. J. Hobson, mgr., Mayer, Ariz.

Property: the Pentland mine, 1 mile N. W. of Mayer, Yavapai count Principal mineral is chalcopyrite. Conflicting reports are afloat regarding me of concern.

Development: by shaft, down 700′ at mid-1919.

Equipment: includes hoist, air-compressor, steam and semi-Diesel e gine power-plant. Flotation plant contemplated.

ARIZONA COPPER & MINING CORPORATION ARIZON

Office: Prescott, Ariz.

Officers: A. W. Davis, pres.-mgr.; F. J. Hobson, cons. engr.

Property: 2½ miles N. E. of Mayer, Yavapai county. Reported have opened up a 10′ vein of commercial copper-silver ore on the 500′ lev Ore averages about 2% to 40% copper, as chalcopyrite, country rock is schi Shaft 30′ deep, March, 1919, is to be deepened 200′ more.

ARIZONA COPPER QUEEN MINING CO. ARIZON

Address: 814 New York Life Bldg., Kansas City, Mo.

Officers: S. C. Douglass, pres.; E. S. Herider, sec.-treas., with E White, W. D. Coldren, W. Burr Douglass, W. E. Trossell and S. C. Cas directors.

Inc. July 24, 1907, in Arizona. **Cap.,** $5,000,000; $1 par; 2.641,000 shar outstanding. Annual meeting, first Tuesday in October.

Property: 8 claims, 160 acres, in Yavapai county, about 26 miles S. of Mayer, shows a number of narrow quartz veins in granite. The ore is qua carrying copper sulphides and their oxidation products with fair gold-silv values.

Development: by 325′ shaft and some crosscutting. Shaft in o nearly entire depth.

Equipment: includes 75 h. p. boiler, 2 hoists, one good for 1,500′, 8-dr compressor and steam power.

The company has been idle since September, 1918.

ARIZONA HILLSIDE DEVELOPMENT CO. ARIZON

Address: 926 Kearns Bldg., Salt Lake City, and Hillside, Ariz.

Officers and directors: E. R. Pembroke, pres.; Philip Clark, v. p.; J. Winwood, sec.-treas.

Inc. Sept., 1917, in Arizona. **Cap.,** $1,500,000; $1 par; 934,000 issu 750,000 syndicate shares under option to W. J. Davis of Salt Lake City. Ann meeting, first Monday in January, Prescott, Ariz.

Property: 730 acres (140 recently purchased) in Eureka district Yava county, 30 miles by new road to rail at Hillside; also has 186 acres under opti Examined in April, 1919, by J. W. Neill of Pasadena, California.

Deposit is a fissure vein in a crush or sheeted zone in schist, dipping 40° with N.-S. course. Orebody is up to 14′ thick. Ore carries zinc, silver, cop and lead, shipments returning 47% zinc, 5 oz. silver, 4 to 6% lead, and 1 to copper.

Development: work has been concentrated on the Copper King cla in center of the group, by 424′ incline shaft. Reserves are estimated by Neill to be 15,000 tons of shipping ore, worth 6.25c. per lb. for spelter, $71.07 ton gross, also 10,000 tons of second-class ore. These ores carry 47.5 and 3 zinc, respectively. This tonnage is to a depth of 380′. The 400′ level does show any sulphide ore. Whether the copper content will improve at de remains to be seen. It is suggested that a winze be put down 200′ below bottom level, at a point near the raise.

The Rudkins-Pinto claims, 3 miles S. E. of the Copper King, are conside a good prospect for copper; while the Pinafore group, 20 miles from the Cop King, carries zinc and copper.

Equipment: gasoline hoist, compressor, fan, shops, orebins, and livi quarters. Power plant is insufficient for deeper exploration and company m be financed for new hoist, etc., if deeper development is to be done to prove existence of the masses of copper ore indicated by geologic evidence.

ARIZONA MERGER GOLD & COPPER CO. **ARIZONA**

Idle. H. C. Hillwell, S. L. Herron, Henry Reefson, Alonzo Hall, Robert M. Bazel and Geo. D. Birch, directors, at last accounts.

Inc. 1909, in Arizona, as a reorganization of the **Lyon Copper Co.** Cap., $5,000,000 $1 par.

Property: 64 claims, near Mayer, Yavapai county, shows fissure veins developed by a number of tunnels and crosscuts with 250′ shaft.

ARIZONA NATIONAL MINING CO. **ARIZONA**

Address: Humboldt, Ariz.

Inc. July, 1916. **Cap.,** $250,000; increased March, 1917, to $500,000 $1 par.

Operates the Anderson silver-lead mine, about 2 miles west of Humboldt. Has a small mill. Shipped some ore and concentrates in 1917-1918.

ARIZONA PORTLAND MINES, LTD. **ARIZONA**

Taken over by the International Syndicate of Mines & Smelters, which see.

ARIZONA SILVER MINE **ARIZONA**

Owners: F. M. Anderson and Sidney Birch, Humboldt, Ariz.

Property: near Humboldt, Yavapai county, reported to have shipped several cars of silver ore during 1918.

ARIZONA SMELTING CO. **ARIZONA**

Merged with Consolidated Arizona Smelting Co. in 1914.

ARIZONA VICTORY MINING CO. **ARIZONA**

Address: R. B. Cross, treas., Room 916, 30 Broad St., New York.

Company is connected with U. S. Continental Mines Co. (which see), as on Sept. 11, 1919, the latter advertised that there was to be a stock distribution of Arizona Victory shares totaling 25% of the outstanding capital of U. S. Continental on Oct. 1, 1919.

Property: that of Mark Bradley in the Walker district, opened by a 300′ of workings showing gold, silver and copper ore.

ARIZONA VIRGINIA COPPER CO. **ARIZONA**

Office and mine: Castle Hot Springs, Ariz. Selling agent, T. D. Hosmer, 306 Colorado Bldg., Colorado Springs, Colo.

Officers: G. W. Lewis, pres.; E. C. King, sec.-mgr., with George S. Elstrum and George Birdsell, directors.

Cap., $1,500,000; $1 par; outstanding 550,000 shares; including 250,000 shares paid to former owners for property; $20,000 cash still due.

Property: 14 claims in the Castle Creek district, Yavapai county, said to show two fissures, 40′ to 50′ wide, traceable for 3,500′, forming a junction at the N. W. end of the property, on which small prospect holes have been sunk. Now driving two tunnels at depths of 250′ and 350′. Shipments reported of 269 tons ore yielding 15% copper. Wagon haul 32 miles to railroad at Hot Springs Junction.

Reported on by Louis S. Noble.

AZTEC MINES CO. **ARIZONA**

Apparently dead.. If so, R. I. P., as it is ill form to criticise the defunct. See Vol. X of the Copper Handbook.

BAGDAD COPPER CO. **ARIZONA**

Name changed to Arizona Bagdad, which see.

BANNIE MINING CO. **ARIZONA**

R. M. Garrett, gen. mgr., Prescott. W. L. Comer, supt., Prescott, Ariz.

Property: in Walker district, about 20 miles S. W. of Prescott, company reported to have let contract to sink shaft from the 200′ to the 500′ level, and to be installing boiler and 5-drill compressor.

BEE HIVE GOLD CO. **ARIZONA**

Office: Hotel Zeiger, El Paso, Texas. Chas. Zeiger, pres.

Cap., $100,000; 25c par.

Property: 9 patented claims, adjoins the Octave mine, near Congress Junction, Weaver mining district, Yavapai county. **Ore** is quartz carrying gold values in quartz vein on contact between granite and schist.

Management claims to have spent $60,000 in development work, drivin tunnels, 1,000′ and 2,000′ long respectively, and to have 10,000 tons of $8 ore o the dump besides 500,000 tons in sight and blocked out above tunnels and betwee two winzes sunk below the tunnel level.

Equipment: engine, compressor and drills.

Reported idle 1918-19.

BEEMER CONSOLIDATED GOLD & COPPER CO. ARIZONA

Owns the Stormcloud Mine at Mt. Union, 12 miles S. of Prescot Yavapai county, Ariz. Idle.

BELCHER MINE ARIZONA

Formerly part of the Belcher Mining Co., but bought at tax sale by Georg Demain, Prescott, Ariz.

Property: 5 claims including the Belcher, Mammoth and the Eugen in the Big Bug district, 13 miles south of Prescott. Vein carries gold and silve reported to average $5.90 per ton.

Said to be under option to John R. McEwen and E. C. Evans representin Phoenix parties, for $100,000.

BELCHER MINING CO. ARIZONA

Defunct and assets reported sold for taxes. Fully described, Vol. XI See Belcher Mine and Red Rock Mine.

BIG BLUE MINING CO. ARIZONA

Mail returned unclaimed, March, 1919, from Constellation, Arizona.

Inc. 1911, in Arizona. **Cap.**, $1,000,000; $1 par. Col. E. F. Brow owner; J. A. Caskey, supt.

Property: the Big Blue and Copper Prince mines on the Hassayamp river, 14 miles from Wickenburg, Yavapai county, showing fissure veins i schist, that yield high-grade silver-gold-copper ore.

Development: by 2 shafts, connected on 200′ level, drifts, crosscut an tunnels.

Equipment: includes crusher, pump, gasoline engine, hoisting plan and a concentration mill. Probably idle.

BIG BUG COPPER CO. ARIZONA

Office: Mayer, Ariz.

Officers: Frank Thornton pres. gen. mgr.; Carl Raab, v. p.; A. E. Ric sec.-treas.; Uri Embody, asst. sec.-treas.; with Marshall Stoddard, director

Property: 6 claims, 5 miles east of Mayer, Yavapai county; 21 claim adjoining the Blue Bell, 2 near the smelter at Mayer, and 2 on Copp mountain.

Development: work on the Copper mountain property consists o shaft now 100′ deep, reported in ore assaying from 15 to 45% copper. Or is a sericite schist containing lime spar shot through with chalcopyrite an black oxide of copper. A 30′ shaft, 1,000′ away, is stated to show the sam ore with more glance and gray copper. Machinery was erected in Aug 1919. Property attracting attention and is regarded by competent engineer as promising.

BIG BUTTE COPPER CO. ARIZON

Address: H. E. Shumate, sec., Prescott, Ariz.

Officers: Geo. L. Reed, pres.; Ed. Shumate, v. p.; Geo. C. Ruffner, trea

Inc. April, 1917, in Montana. **Cap.**, $1,500,000; $1 par.

Property: 43 claims in Copper Basin district, 12 miles from Prescot developed by tunnel, shafts and open cuts, from which some copper an silver ore has been shipped. Reported driving tunnel to cut vein at pos below rich outcrop.

BIG COPPER CHIEF CO. ARIZON

Address: care Thomas Boyd, pres., Mound City, Ill.; S. E. Jorda sec.-treas., Phoenix, Ariz.; R. E. Grace, v. p. **Mine address:** Cany via Bumblebee, Ariz.

Property: the Jasper N. Nellis groups, 1½ m. S. W. of Bumblebe Yavapai county, shows schist mineralized by copper glance, etc., in a zon 300′ wide.

Developed by 50′ shaft, 250′ tunnel and many pits.

BIG DOME MINES **ARIZONA**

Owner: C. Benjamin Hayes, care Walker Stage, Prescott, Ariz.

Property: 4 patented claims, about five miles W. of Prescott, Walker district, Yavapai county. Reported showing an 8′ fissure vein in prophyry and schist, with gold, silver and lead values from $8 to $200 per ton in a 10-inch streak. Developed by vertical shaft 85′ deep, equipped with 3 h. p. gasoline hoist made by owner, small compressor and pump.

Expended $1,800 in 1918; plans to continue sinking during 1919.

BIG LEDGE COPPER CO. **ARIZONA**

Office: 512 Sellwood Bldg., Duluth, Minn., and 61 Broadway, New York. **Mines** at Big Bug (Huron P. O.), near Mayer and Humboldt, Yavapai county, Ariz.

Officers and directors: Milie Bunnell, pres.; M. G. Rodearmel, v. p.; mng. director; J. A. Percival, v. p.; A. L. Warner, sec.-treas.; with S. S. Titus, J. B. Cotton, directors. W. W. Lytzen, mgr.

Company is the successor of the Big Ledge Development Co.

Inc. in Arizona, Jan. 20, 1915. **Cap.,** 3,000,000 shares; par value $5; fully paid and non-assessable; increased from $1,500,000, Aug. 31, 1917; outstanding, Dec., 31, 1918, 2,865,587 shares. Listed on New York Curb. The Development company was converted into an operating company, Feb., 1916, the name being changed to Big Ledge Copper Co. and the par value of shares increased to $5, the number of shares remaining the same and exchange made share for share; 200,000 shares of this new issue were paid for the Tredwell or Great Western smelter at Mayer, said to be a junk heap. In June, 1918, new interests, known as the Interstate-Callahan crowd, took control.

The annual report states that all payments on the Henrietta and Butternut mines have been made; on O'Brien, Laurene and Treasurer groups only $13,500 remains unpaid. Shipments of ore for 6 months realized $102,278, a sum sufficient to cover operations and meet deferred payments.

Property: consists of 3 groups of claims aggregating approximately 1,900 acres. The Black Hills group consists of 43 unpatented claims about 4 miles east of Humboldt, Ariz. The Butternut group consists of 2 patented and 22 unpatented claims; the Henrietta group consists of 7 patented and 7 unpatented claims. In July, 1919, the Good Luck group of 6 claims was purchased for $30,000. They are said to be promising.

There is a spur of the railway line to the Henrietta orebins, and a 3,800′ aerial tram, costing $12,000 was partly erected in 1917, to convey Butternut ore to the railroad, but was not completed June, 1919.

Henrietta Mine

This property shows a fissure vein averaging 5′ thick, cutting through hornblendic schists near a diorite intrusion. The vein carries several shoots whose ore contains copper-pyrite with pyrite and zinc sulphides in quartz. The claims cover 4,000′ along the Henrietta vein and a considerable distance along a split or intersecting vein. The ore shoots so far developed an average width of 2′ of ore reported to average $20 in value.

Development: comprises a main haulage way, 2,300′ long called the Henrietta, or lower tunnel. From this level the Le Duc shaft has been sunk 650′ below the tunnel floor at a point of 2,000′ from the portal. A new double-drum electric hoist good for 1,500′ was installed in 1919, and the shaft is to be sunk to 850′ This shaft has 3 levels on the vein at 300′, 450′ and 650′ below the tunnel.

Still farther west and over the hill workings, made in former years, and recently reopened, comprise shaft No. 1 with hoisting equipment to 300′ depth and by No. 2 shaft to 450′ level and below. An old upper tunnel 327′ above the Henrietta is connected with it by a raise. At 150′ below the main tunnel, the Henrietta vein is opened by over 550′ of drifting. This will eventually be connected with the west workings noted above.

An interesting vein, the Invincible, meeting the Henrietta where the

Le Duc shaft is sunk, shows several inches of high-grade ore, making workable ore shoot at the intersection. This vein is reported to be open by a 100′ drift south on the 150′ level of the Le Duc shaft, with an uprai to the tunnel. The Henrietta vein is reported to be about 2.5′ wide on t 300′ and 4.5′ wide on 450′ level, values varying from $15 to $40 per ton.

The Butternut Mine

This mine has a zone of silicified, pyritized schist over 20′ wide, which large lenticular masses of pyrite occur, showing low average valu in copper and silver. A foot-wall band 2′-3′ wide carries high zinc conte The mine output will, it is believed by us, average less than 2% copp being largely iron pyrite and quartz. This does not accord with the pre reports sent out by the LeDuc-Batre clique of 48′ of 4% ore on the 300′ lev and of 10% ore on the 425′ level.

Development: includes two old 1-compartment shafts, only 150′ apa one 300′, the other 425′ deep, and the new 3-compartment, Batre shaft deep. Principal development is on the 300′ and 420′ levels, drifts runnin along the vein showing 6′ to 12′ of pyrite ore. Mine has electric powe compressor, hoists, etc., and aerial tram 3,000′ long will take ore to t railway.

The Black Hills or Big Ledge group of claims, 4 miles east of Hun boldt, comprises an extensive acreage of land not considered worth payin taxes on.

Opinion: in Volume XIII an opinion was given based on a carefi examination and report on the property made by our Mr. Weed. Sin then Walter Lytzen, an engineer formerly of Butte, Mont., is reported have made a more optimistic report of the present and future of the co pany. This report has not been made public, nor furnished this offic Personnel of the company is worthy of respect, but company will ha to live down its former reputation, by developing ore and adhering to fact if it is to get public confidence.

BIG LEDGE DEVELOPMENT CO. **ARIZON**

Merged into Big Ledge Copper Co., which see.

BIG PINE CONSOLIDATED MINING CO. **ARIZON**

Prescott, Ariz.

Officers: A. Bjorkman, pres.; Richard Lamson, sec.; A. Bergquis treas.; with Felix Durocher and C. H. Dunning, directors. C. H. Dunnin supt.

Inc. April 30, 1915, in Arizona. **Cap.**, $500,000; shares $1 par; outstan ing, $400,000. Annual meeting 1st Monday in April. Commercial Tru & Savings Bank, Prescott, registrar. Is a consolidation of the Big Pi Mng. Co., and the Lake Superior & Western Mng. Co., each of companie receiving 200,000 shares for its property.

Property: 14 claims in Senator district, 12 miles south of Prescott.

Ore: gold occurs in 3 parallel veins, which cross the claims.

Development: by 7 tunnels, principally on a vein claimed to show o for 700′ in one tunnel, 1,100′ in a second, 1,600′ in a third, and 400′ in fourth. Company claims ore reserves of 10,000 tons, average grade $9 p ton.

Mill: the 100-ton cyanide plant of the Mascot mine, Lake Sup. & We ern Co. was moved to the Big Pine property and erected near portal tunnel No. 6. Electric power is obtained from the Arizona Power C H. C. Shotwell, who sampled the mine and assisted in the promotion the company, reported that there was ample ore of milling grade to ke the mill supplied, but mill returns from two months' run were unsatisfa tory owing to unexpected low grade of ore and mine was shut down fo while. Reported April, 1918, to have resumed operations and repaired da ages caused by fire.

BIG REEF COPPER CO. **ARIZON**

Office: Mayer, Ariz.

Officers: John Frank, pres.; Dell Riggins, sec.-treas.

Inc. in Ariz. **Cap.**, $1,000,000; $1 par; 519,997 shares in treasury.

Property: 19 claims, 380 acres, located 2¼ miles from Mayer, in Big Bug mining district, Yavapai county, Ariz. The mines of the Cons. Ariz. Smelting Co. and Big Ledge Copper Co. are but a few miles distant. Claims cover an area of Yavapai schist traversed by a wide zone of silicification containing disseminated copper ore chiefly oxidized, with segregations in quartz veinlets.

Development: about 300′ of shallow work has been done to date and chalcopyrite ore reported shown in 60′ shaft. Property favorably reported on, 1917, by J. H. Shockley, of New York.

Treasury issue of 50,000 shares offered the public, April, 1917, at 35c a share, proceeds to be used in developing property to 200′ depth and drifting 1,900′ north to get under 100′ ledge seen on surface. Is regarded as a promising prospect.

Idle, 1918. Expects to resume soon.

BIG SEVEN GROUP **ARIZONA**

Near Harrington, Yavapai county, Ariz. Mine, developed by 1,200′ tunnel, shows a well-defined vein with high value in gold, silver and copper.

Mail returned unclaimed, March, 1919; presumably idle.

BLACK CANYON MINING CO. **ARIZONA**

Address: Claude Baker, gen. mgr., Turkey, Yavapai county, Ariz.

Officers: W. A. Moses, pres., Kansas City, Mo.; A. L. Harroun, v. p.; Edna Harroun, sec., Kansas City, Mo.

Property: the Black Canyon, or J. D. Thompson mine, 10 miles south of Mayer and 2 miles from Turkey. Claims show a vein reported as 8-16′ wide, opened by 800′ drift, with 300′ back. Ore carries silver, lead and zinc and is of milling grade.

A flotation mill was planned for 1918. No recent returns.

BLACK CHIEF COPPER CO. **ARIZONA**

Mine near Dewey, Yavapai county, Ariz. John Milligan, pres.; J. M. Sullivan, Welsh, La., v. p.-mgr.; Eugene Milligan, sec.-treas.; preceding officers are the directors.

Inc. 1908, in Arizona. **Cap.**, $2,000,000; $1 par; 1,170,000 shares issued. Annual meeting, 2nd Tuesday in July. About $30,000 expended to date.

Property: 6 claims, 10 miles south of Jerome, known as the Uncle Sam group, has tunnel, 200′ shaft, drifts and crosscuts, with a total of 1,300′ of underground workings, showing ore said to give assays up to 25% copper, $4 gold, $3 silver, 6% zinc and 10% lead. Has a hoist and 2 pumps.

BLACK DIAMOND MINING & DEV. CO. **ARIZONA**

Address: J. Irwin, P. O. Box 403, Prescott, Ariz., supt.; .C N. Brown, mgr.

Property: located in the Walker district, 7 miles south of Prescott said to be producing gold-silver-lead ore from a vein 24-36″ wide, worth $50 per ton. Shaft 200′ deep with short drifts on the 100′ and 200′ levels. Report purchasing steam hoist, compressor and pumps. Intention is to sink to the 250′ level and to build small mill.

BLOCK MINES CO. **ARIZONA**

Address: Prescott, Ariz.

Officers: A. J. Head, pres.; E. Block, v. p., treas.-mgr., with H. Brinkmeyer and M. Goldwater, directors.

Inc. August, 1913, in Arizona. **Cap.**, $1,000,000; shares $1 par; 500,000 shares in treasury.

Property: owns the Billy Boy and Christmas group of mines on the Hassayampa river, Yavapai county. Billy Boy mine developed by 225′ tunnel showing 14″ paystreak carrying gold, silver, lead and copper ore, said to assay $70 per ton.

Is a prospect with some merit but needs financing and competent management to prove its possibilities.

BLUE BELL EXTENSION COPPER CO. **ARIZONA**

Office: L. A. Denman, sec., Humboldt, Arizona. **Mine address:** C. J. Murdock, mgr., Mayer, Ariz.

Officers: J. E. Garber, pres.; C. J. Murdock, v. p. and mgr.; L. A. Denman, sec.

Property: adjoins the Blue Bell, on south. Was sinking shaft 1919 in expectation of finding ore on an extension of the Blue Bell vein of the Consolidated Arizona Smelting Co. of Humboldt.

BLUE BELL MINE **ARIZONA**

See Consolidated Arizona Smelting Co.

BONNIE MINING CO. **ARIZONA**

Address: R. M. Garrett, Prescott, Ariz.

Mine on upper Lynx Creek, Yavapai county, Ariz., is an old one reopened in 1916. The shaft is nearly 300′ deep. Drifts will be opened on the 300′ level to connect with the orebody. The ores formerly carried gold-silver values, but are now mined for copper.

BRADSHAW COPPERMINES CO. **ARIZONA**

Office: 229 Broadway, New York City.

Officers: W. J. Peterman, pres.; John J. McNamara, sec.-treas. and supt.; J. G. M. Browne, asst. sec.-treas.

Inc. Dec., 1916, in Arizona.

Property: 21 claims near the Senator mine, Copper Basin district, Yavapai county.

It is said that this is a rank promotion floated by a New York house, investigation proving that the company did not own the mines; that over $17,000 was missing from the treasury, and that the officers were merely dummies acting for a clever crowd of apparently unscrupulous men.

Reported June, 1915, that Mr. Alex. Ratcliff, apparently the real owner, had taken over the property of the now defunct Bradshaw copper mines, intending to operate the mines.

BRADSHAW REDUCTION CO. **ARIZONA**

Office: Crown King, Ariz.

Officers: F. S. Viele, pres. and treas., Prescott; D. B. Gemmill, sec and mgr., Crown King; J. F. O'Brien, F. W. Stehr, G. D. Morris, directors; Mark Gemmill, supt. **Transfer office:** Prescott, Ariz.

Inc. Aug., 1916, in Arizona, to take over properties of the Yavapai Cons. G. S. C. Co., and to establish a custom mill at Crown King and Old Tiger mines. **Cap.,** 1,000,000 shares; $1 par; non-assessable; 400,000 shares outstanding; no bonds. Annual meeting in August.

Property: 78 claims, 34 patented, about 1,500 acres, includes the Wildflower and Crown King mines.

In 1916 the 480′ Crown King shaft was retimbered. Two upraises, 40′ and 60′, have been made on the orebody 600′ from the shaft on the 480′ level, blocking out 20,000 tons of $20 ore. According to old reports there is between 40,000 and 60,000 tons of similar ore blocked out.

Equipment: company has rebuilt 150-ton Crown King mill and a 3-mile tramway between it and the Wildflower mine and will remodel the mill at the Old Tiger mine.

Company made considerable money treating the old tailing dumps of the district and evolved a process which promises to be equally successful with the Wildflower ores. It is the only important producer of the district, has capable management, and directors able to finance the company's undertakings.

Reported closed down 1919, owing to high costs.

BROOKLYN ARIZONA MINING CO. **ARIZONA**

Address: care of J. B. Hill, sec., Andover, Mass. Mine near Mayer, Yavapai county, Ariz. Beni. B. Tuttle, v. p.; Jas. S. May, treas.

Inc. March, 1907, in Me. **Cap.,** $2,500,000; shares $10 par; non-assessable; fully issued. Bonds authorized $500,000;

Was promoted by the American Securities Co. Annual meeting first Wednesday in April.

Property: 82 claims, about 1,600 acres, including the Brooklyn group of 14 claims, in the Squaw Creek district, about 20 miles S. E. of Mayer, carries auriferous and argentiferous copper sulphides.

Development: by 750′ main shaft and 2,500′ tunnel.

Equipment: includes compressor, double-drum hoist, 3,000′ cable and Partridge smelter. Former rank mismanagement fully described in Vols. X and XI. Company reported in new hands, 1915, but no later returns received.

BUCKEYE COPPER & GOLD MINING CO. **ARIZONA**

Bankrupt. Property near Turkey, Yavapai county, under execution on a judgment.

BUCKEYE GROUP **ARIZONA**

Address: Sam Parker, Turkey, Yavapai county, Ariz. He and others bought the mine, formerly owned by the Buckeye Copper & Gold Mining Co., under execution of judgment.

Property: 35 claims, 720 acres and a 20-acre smelter site, in 3 groups, is 2 miles from Turkey, in Black Canyon district of Bradshaw mountains. Claims show chloritic schists and diorite, carrying fissure veins with occasional native copper and malachite, but mainly azurite, chalcopyrite and bornite, estimated to average 4% copper, 3.5 oz. silver and from a trace to $6 gold per ton.

Development: 726′ two-compartment shaft on the Columbia claim, 520′ two-compartment shaft on the Sullivan claim, with 2 other 200′ shafts, various pits of 10 to 40′ depth and tunnels of 87′ and 314′, with about 5,000′ workings.

Equipment: includes 15 h. p. and 40 h. p. gasoline hoists a small air compressor and several mine buildings.

Property idle in June, 1919, but a deal was pending for a bond and lease.

CACTUS QUEEN **ARIZONA**

Office: Phoenix, Ariz. **Mine office:** Congress Junction, Ariz.

Officers: H. H. Barbee, pres.; H. Borders, v. p.; A. G. Barbee, mgr.; with P. B. Wing, P. A. Hildebrand, R. H. Carrick, directors.

Inc. 1906, in Arizona. **Cap.,** $5,000,000; shares $1 par.

Property: 130 claims, located about 50 miles west of Congress Junction, Yavapai county. Developed by shaft 200′ deep, drifts on this level are reported to be in ore averaging 6% copper with some gold. Reported on by E. A. Ritter.

CASH MINE **ARIZONA**

Address: Prescott, Ariz.

Property: leased to N. E. Getchell, Maxton, Yavapai Co., Ariz., shows veins with gold-silver-copper-lead ore. Developed by a shaft with extensive workings.

Equipment: includes a 10-stamp mill. Six men employed. Shipments of concentrates made in 1915, but more since.

CASTLE COPPER CO. **ARIZONA**

Property: 11 claims, known as the Dunkirk or Mt. Tritle group, 12 miles south of Prescott, on the southern slope of Mt. Tritle, near the head of Slate creek, in the Hassayampa district. Formerly owned by Dunkirk Gold & Silver Mining Co., later by Mt. Tritle Copper Co., and purchased in 1914 by D. M. Clark of Prescott, Ariz. Is an old mine, with tunnels of 150′, 160′, 170′ and 300′, driven at vertical intervals of 100′, showing copper and lead sulphides, with value in copper, gold, and silver, in about the order named.

Equipment: includes steam and gasoline power, air compressor and electric light plant. A 40-ton mill has 4 Nissen stamps, 3 Wilfley tables, 100-ton ore bin and a 10,000-gal. water tank. Oil flotation unit installed

1915, reported to be an unqualified success, saving as high as 98% on assa value of ore, but no figures available.

C. B. S. MINING CO. **ARIZON**

Office: care Granite Securities Co., Citizens Natl. Bank Bldg., Lo Angeles, Calif.

Property: near Prescott, Ariz., in the Copper Basin district, Yavap County. Claims show several veins with 62' shaft developing a 6' orebod assaying 9% copper, $10 silver and $3 in gold. Vein dipped out of sha and bottom of workings show a 10" ore streak of native silver. Shaft ha been sunk 100'. Owned by same people as the Climax Mining Co., nea Prescott, Ariz.

CHAPARRAL MINING CO. **ARIZON**

Officers: J. F. Rogers, Columbus, Ohio sec.-treas.; W. H. Jone Chaparral, Ariz., supt.

Company has a lease on the Little Jessie gold mine, owned by the Ohi Mines Co., at Chaparral, Yavapai county, Ariz.

Property has not produced much since 1897. Production at that tim was $800,000. Active operations have been discontinued.

Management states that lack of capital prevented development and pr duction in past, and that operations were to be resumed in 1917, but nothin has been heard since.

CHERRY CREEK MINES CO. **ARIZON**

Believed to be dead.

Former office: Cherry, Yavapai county, Ariz. Main shaft, 115' said t show a vein with 3' paystreak giving assays of about 12.5% copper, 4 oz. si ver and $9.60 gold per ton.

CIRCLE PEAK MINING CO. **ARIZON**

Mail addressed to John A. Peacock, Fort Worth, Texas, returned u claimed, 1919.

Property: 10 copper claims known as the Old Corkscrew, 8 miles we of Mayer, Yavapai county, stated to be a porphyry dike, 1 mile long, wit some gold and silver.

Presumably idle.

CLIMAX MINING CO. **ARIZON**

Working under lease to Stewart Duncan.

Address: Prescott, Ariz. Owns the Climax gold mine on the Ha sayampa river, near Prescott.

Development: by 5 tunnels, longest 1,000', having a pay shoot 2" to in width. Average grade of mill ore, oxidized, is said to be $35. Sulphi ore in No. 5 tunnel is said to average $21 per ton. It is claimed the mi has paid for itself since 1904. Company claims to have a large vein, 4 to 150' wide, and 7,000' long, with ore that mills $4.54 per ton in gold. Pro erty is equipped with 10-stamp mill, air compressor and good camp buil ings.

CONSOLIDATED ARIZONA SMELTING CO. **ARIZON**

Office: 15 Broad St., New York City. **Mine office:** Mayer and Mi dleton, Yavapai Co., Ariz. **Smelter and works office:** Humboldt, Ari G. M. Colcleugh, gen. mgr.; W. V. de Camp, supt.

Officers: C. A. Kittle, pres.; E. S. Hooley, v. p.; F. A. Dillingham, v. p with A. E. Cope, J. A. Hertenstein, R. W. Kelley, H. E. Rogers, J. H. Flagler and R. M. Thompson, directors; F. W. Thompson, sec.-treas.; O. J. Jansen, asst.

Inc. Dec. 22, 1908, in Maine. **Cap.** $9,200,000; $5 par; 1,635,000 issue 1,200,000 reserved for bond conversion. Bonded debt: $1,200,000 5% 30-ye income bonds authorized, $800,000 outstanding, and $1,000,000 6% 20-ye gold bonds, $800,000 outstanding. In June 1917 it was decided to pu chase at par $800,000 of the income bonds, the full amount outstan ing on this issue. Payment will be given over 5 years. Notes payab $1,000,000 Union Bank of [illegible]

Dividends: initial dividend was declared in 1917. Payments have been as follows: 10c in 1917, 20c in 1918, none since.

Acquired at foreclosure sale the properties of the Cons. Ariz. Sm. Co. (see Vol. X), and the Ariz. Sm. Co. The intricate relationship of the old company and its subsidiaries is fully described in Vol. X.

Columbia Trust Co., trustee of 6% bonds; Equitable Trust Co., trustee of 5% bonds; Guaranty Trust Co., transfer agents; all of New York City.

Balance sheet of Dec. 31, 1918, showed: current assets of $627,539; current liabilities, $342,549; surplus $55,824 and net profits of $264,555. Total assets, $10,454,709, including property, $9,612,170; profit and loss account showed net profit of $703,656 derived from gold, silver, and copper produced, valued at $5,108,110 at a production cost of $4,404,453. Interest charges were $54,887.

Property: 40 claims, 20 patented, 725 acres, near Mayer and near Middleton, Yavapai county, Ariz. The most valuable mines owned are the Blue Bell and De Soto mines. The smelter and concentrator are at Humboldt.

The Blue Bell Mine: 3 claims, carries composite fissure veins in Yavapai schists; the ore has quartzite foot and sheared granodiorite hanging wall.

Development: 6 shafts, deepest, 1,200' and 2 short tunnels, with about 7,300' of underground workings. Ore contains pyrite and chalcopyrite, both slightly argentiferous and auriferous. The deposit has been opened to the 1,200' level and explored by underground workings and by diamond drill holes. Nine lenses of ore have been worked, six extending from near the surface to the 1,200' level. Ore lenses vary from 100' to 400' in length and from 5' to 25' in width, the ore averaging about 2.8% copper, 1.2 oz. silver and .04 oz. gold. Shrinkage stoping is used wherever practicable.

New work in 1918 totaled 4,638' at a cost of $14.68 per foot, developing about 69,290 tons of ore. Produced 131,090 tons with average content of $1.76 in gold and silver and 2.77% copper. Reserves estimated at 470,000 tons carrying 2.80% copper and $2.50 in gold and silver in Dec., 1918. With increasing depth the gold-silver content is increasing while the copper values are decreasing.

Mine is connected with the Bradshaw Mountain R. R. by a tram line, and has electric machinery taking current over an 18-mile transmission line.

The De Soto mine: also in schist and in the Bradshaw range a few miles from the Blue Bell, is developed by 4 tunnels, 5,000' in length, to depth of 1,000' with total workings of 14,400'. New work, in 1918, totaled 975' at a cost of $19.39 per foot, and was disappointing in its results. Reserves estimated, Dec. 31, 1918, at 33,000 tons. Production in 1918 was 2,800 tons, carrying $2.74 silver and gold and 2.57% copper.

Ore reserves: for both the Blue Bell and De Soto mines are officially given as 503,000 tons, but are currently believed to be larger if partly developed ore be included.

Equipment: the reduction plant, well placed for custom business, includes sampling, concentrating, roasting, smelting and converting departments, with a machine shop and smithy. All buildings are of structural steel frame, with brick walls or corrugated-iron sheathing, floored with cement. This plant was reconstructed in 1914, and many improvements and additions have been installed since then at a cost of over $1,597,266; it is considered a modern and efficient plant in every respect.

A 250-ton Minerals Separation flotation plant was installed in 1913. The concentrator has two 200-ton units, each having one 10x20" and two 7x10" Blake crushers, 1 Symons disc crusher, 3 elevators, 2 sets of rolls 2 ball-mills, 10 Wilfley tables, 8 Overstrom tables, 8 vanners, 4 trommels, 8 Callow tanks, classifiers and flotation machines. The mill has a large slime pond, and overflow water is returned to the mill for re-use.

During 1918, 104,633 tons of ore and old tailings were treated, making

an average recovery of 89.52% copper; 67.16% gold and 71.9% silver value The ratio of concentration was 3.34 to 1; the mill produced 31,369 tons co centrates. Average cost of milling, including flotation royalty was $1.9 per ton in 1918, as against $1.77 in 1917.

The remodeled smelter has four 7-hearth Wedge roasters, 22' 6" dar fitted with auxiliary oil-burners and supported on step bearings instead trunnion. There are two reverberatory furnaces, burning oil and rated 400 tons daily capacity. Matte from the reverberatory furnaces is tappe into a launder, which delivers it to a ladle in the converter room. Pr duction averages 1,800,000 lbs. blister copper per month from com pany ore and custom material. Smelting is done in a 250-ton water-jack blast-furnace for copper. Slags are granulated. The stack is of rei forced concrete, 180' high, 18' in diameter at the base and 11' at the top.

The converter department has 2 stands, with shells of barrel typ rotated electrically. Equipment includes a 40-ton Whiting electric cra with a 15-ton auxiliary crane, cranes also taking hot slag from the conve ters and pouring same into the reverberatories and delivering shells.

The power plant has four 345 h. p. Stirling water-tube boilers, burnin waste gases from the reverberatories, steam being sent therefrom throug a 10" pipe line, under 150-lb. pressure. Machinery includes 2 Connersvil blowers, a Nordberg duplex cross-compound air compressor, with 40x4 air cylinder and 18x36x42" steam cylinders. There are two 300 k. w 480-vo 3-phase 60-cycle generators, direct-connected to two 16x32x36" Nordber cross-compound engines, and an electric turbine pump. Electric power furnished the Blue Bell mine, 18 miles distant, current being transmitted 15,000 volts, stepped down to 440 volts, at the Blue Bell transformer statio

The smelter treated 160,328 tons of domestic and custom ore and co centrates in 1918, producing 18,800,073 lbs. copper; 442,809 oz. silver; 14,17 oz. gold. Smelting cost $3.17 in 1918, a decrease of $1.03 per ton fro 1917. Costs per ton, 1918: mining, $3.76; milling, $1.92; smelting $3.1 Cost per pound of copper 14.68c; average selling price, 24.30c per pound.

Production:

	Tons Mined	Copper Lb.	Silver Oz.	Gold Oz.	Profit
1918.....	173,960	9,472,075	254,583	10,509	$703,65
1917.....	147,256	9,229,113	207,600	8,620	881,81
1916.....	109,452	7,242,347	127,228	4,858	859,01
1915.....	90,531	5,473,740	100,682	3,174	194,94

In Aug., 1919, production was 12,200 tons of ore and 650,000 lb. of coppe

Management is exceptional and working along conservatively sound, ye progressive lines, building for the future.

CONSOLIDATED HOMESTEAD MINES, INC. **ARIZONA**

Subsidiary of U. S. Continental Mines Co., which see.

Mine at Walker, Yavapai county. Mark Bradley, mgr. **Cap.**, 600,00 shares, $1 par.

Property: a mineral claim, patented, carries a vein yielding a com plex sulphide ore containing copper, lead and zinc, with gold and silve Former production is said to be $35,000. During 1918, the U. S. C. M. C spent $27,483 at the Homestead. A 40 or 60-ton mill is planned, and mone is on hand for new shaft equipment and exploration at depth of 250 f

COPPER HILL GROUP **ARIZON**

Taken over by Garford Syndicate, which see. Fully described Vo XIII.

COPPER LODE MINES CO. **ARIZON**

Address: care Industrial Dev. Corp., 608 South Dearborn St., Chicag Ill.

Believed to be idle. Described in Vol. XIII.

COPPER MOUNTAIN MINES CO. **ARIZONA**

Address: Celora M. Stoddard, Phoenix, Ariz.

Is a reorganization of the Stoddard Copper Co.

Officers: Celora M. Stoddard, pres.; Senator Reynolds of N. Y., v. p.; M. A. Pickett, sec.-treas., Phoenix, Arizona. S. C. Chaney, supt.

Inc. 1912, in Arizona. **Cap.,** $5,000,000; shares $5 par.

Property: the old Stoddard mine on Copper Mountain, a mile from the Arizona Binghamton, and near Mayer, Ariz.

Mine reopened, Nov., 1917, gasoline hoist installed; shaft retimbered and sunk to 250′ level. Ore shoot encountered at depth of 100′.

COPPER QUEEN GOLD MINING CO. **ARIZONA**

Address: Stoddard, Ariz.

Officers: Louis Goldman, pres., Los Angeles, Calif.; E. G. Ball, v. p. and mgr.; A. B. Owens, sec.; V. S. Wardlaw, treas.; preceding with J. K. Bywaters, A. Goldman. C. R. Caldwell, J. H. Gooch and A. N. Rogers, directors; Chas. Cramp, supt., Stoddard, Ariz.

Cap., $2,000,000; shares; $1 par.

Property: 25 claims, 23 patented, about 360 acres, and a mill-site on the Agua Fria river, 6 miles east of Humboldt, adjoins the Arizona Binghampton. Claims show great beds of silicified. schist, cut in places by rhyolite dikes.

Development: by tunnels; No. 1, 593′ long with about 2,500′ of workings, including shaft and workings on 300′ level; No. 2, 600′ long, with 2,100′ of workings on adit level, a 500′ inclined shaft and 3,900′ of workings. On the 900′ level there are two orebodies, 7′ to 12′ wide, containing chalcopyrite and tetrahedrite, with some gold and silver. Diamond drilling said to show good results.

Equipment: consists of two 400 cu. ft. electric driven air compressors and 30 h. p. electric hoist. Development work is being done on a substantial scale.

Ore reserves are said to be 50,000 tons of 3% copper ore. A 100-ton mill was ordered in July, 1919.

COPPER VALLEY MNG. CO. **ARIZONA**

Address: Skull Valley, Ariz., or Thos. A. McKennell, of McKennell & Appell, Prescott, Ariz.

Inc. April, 1917, by D. C. McIver and Rich. Lamson. **Cap.,** $1,000,000; shares $1 par.

Property: 10 claims known as the Ehle group in Copper Basin, about 4 miles from Skull Valley, Yavapai county, Ariz., said to show a mineralized schist belt over 100′ wide and carrying some ore of commercial grade.

Development: by 3 shafts 30′, 45′, 60′ deep.

A prospect only. Presumably idle.

DEVELOPMENT COMPANY OF AMERICA **ARIZONA**

Practically defunct. T. G. Norris receiver, Prescott, Ariz.

Company has small interests in several subsidiary concerns, none of them prosperous. Stock considered almost worthless.

DOLPHIN MINE **ARIZONA**

Frank Ritzel, mgr.

Property: near Poland, Yavapai county. Shaft 125′ deep. Gold predominant near surface, changing to silver content at 100′.

A prospect.

DOS ORIS MINES **ARIZONA**

Office: care J. B. Tomlinson, Prescott, Ariz.

Property located 14 miles from Prescott, consisting of the Dos Oris, Buzzard and Raven silver mines, formerly property of R. H. Burmister, reported to have produced about $200,000 in the '80's. Dumps said to contain good value in silver.

EQUATOR MINING & SMELTING CO. **ARIZOI**

Office: 20 Exchange Place, New York, N. Y. **Mine office:** Jero Yavapai county, Ariz.

Officers: Hon. Wm. A. Clark, pres.; Jas. A. MacDonald, v. p.; Ha H. St. Clair, sec.-treas.; preceding with Chas. W. Clark and Jas. H. And son, directors.

Inc. March 19, 1900, in West Virginia. **Cap.,** $500,000; shares $5 p issued, $250,000. Annual meeting, third Monday in February.

Property: the Iron King mine, on Equator hill, adjoining the Cop Chief, 6 miles by wagon road, south of Jerome, shows a lenticular, can shaped body of pyrite ore in schist near a granite porphyry contact. M owns north half of the Copper Chief orebody.

Closed down since 1904.

EUREKA GOLD AND COPPER MINING CO **ARIZOI**

Address: Jerome, Yavapai county, Ariz. Dr. A. J. Murietta, pres.; A. Macpherson, sec.-treas.

Property: 8 claims, 7 miles south of Jerome, near the Iron King mi is opened by 2 tunnels, showing a 30′ vein with an 8′ paystreak carry bornite and chalcopyrite, with occasional visible gold, but has not develo ore in commercal quantities. Mainly idle, for some years, excepting ann assessment work.

FAIRVIEW GOLD & COPPER CO. **ARIZOI**

Address: John Slak, mgr., Turkey, Ariz.

Office: care of H. M. Coffman, South Bend, Ind.

Officers: F. N. Bonine, pres.; Wm. Miller, v. p., 200 Sheidley Bld Kansas City, Mo.; H. M. Kaufman, sec.-treas., with M. T. Knapp, directo

Inc. Sept., 1916, in Arizona. **Cap.,** $1,000,000; shares $1 par; non- sessable; 500,001 outstanding.

Property: 9 claims, 180 acres, in the Peck mining district, Yava county, 1 mile E. of Turkey Creek, and said to lie on Blue Bell conta Claims reported to show an orebody, 200 to 300′ wide, of oxidized ore, stron leached, with gold, silver, and copper. Reported property is to be develop as a copper mine.

Development: plan sinking vertical shaft with drifts and crosscuts 100′ intervals. The mine is equipped with a 35 h. p. gasoline hoist a small compressor.

FERGUSON GROUP (AZTEC GROUP OR LOGOS MINE) **ARIZOI**

Under lease and bond to Argonne Copper Co., see p. 333.

Address: F. E. Andrews, Prescott, Ariz., owner. Property forme under bond and lease to the Logos Mng. Co. and previously to Aztec Ki Mng. Co.

Property: 9 contiguous claims, in the Agua Fria mining district, miles N. E. of Cordes, Yavapai county, Ariz., and 10 miles from May Claims cover an area of Yavapai schists between diorite and gran Copper ore occurs in small quantities at all openings with ore of co mercial grade exposed on the main, or Aztec King, vein.

Development: by many shallow shafts and a 160′ tunnel.

FORD GOLD & SILVER MINING CO. **ARIZOI**

Address: Prescott, Ariz.

Reported having acquired the Promoter group in Crook canyon fr C. E. Warren and B. F. Peters of Prescott.

A tunnel and shaft are said to have developed a 4′ vein of concentr ing gold ore. Company intends to sink shaft deeper, install a Lane mill treat the mine dump.

FORD MINING CO. **ARIZOI**

Probably dead. Described, Vol. XII.

FORTUNE MINING CO. **ARIZOI**

Purchased at mortgage sale by the Boone County Bank.

Property: the Wizard mine and other claims in the Big Bug mi

istrict, Yavapai county. Is a gold mine in which some high-grade copper re occurs.

Development: 1,200′ tunnel on the vein showing 4 to 6′ of ore in a hoot 800′ long; 225′ shaft and crosscuts.

Equipment: includes 10-stamp mill and two 50 h. p. gas engines. There as 10,000 tons of milling ore reported on dumps in 1917; but nothing is nown about company's present standing.

RANCO-AMERICAN COPPER CO. **ARIZONA**

Office: Box 338, Prescott, Ariz.

Officers: F. S. Clark, pres.; Fred Bowler, v. p.; J. E. Russell, sec.-reas. G. W. McGarvey, supt.

Inc. Nov. 15, 1918 in Arizona. **Cap.**, $5,000,000; 10c par; issued 50,000 hares.

Property: 15 claims, 5 patented, 8 miles S. E. of Humbolt, Yavapai ounty. Ore with gold, silver and copper occurs in a steeply dipping 8′ ontact vein between schist and porphyry.

Development: shaft is 250′ deep with 900′ of underground workings aid to block out 300 tons of ore. Operated in 1912 by Yavapai Metals ining & Red. Co. when some ore averaging 2 to 10 oz. gold, 4 oz. silver, % copper was shipped, yielding $8,000.

In Aug., 1919, the old shaft had been retimbered and was to be sunk nother 50′; a wagon road to Mayer was nearly finished; 1,500 tons of 20% ump ore was to be shipped to smelters; a new ore-shoot had been opened; nd a hoist, compressor, and other machinery was being installed. In ovember, a dispatch from Prescott used the words "astonished"; "the Gold-eld gang would send it up into the millions over night:" "the big bunch ver the mountain would float it at half a million in one day, and easily;" he Franco-American is an enigma"; "the property is now financed," all of hich would indicate that something tremendous is in the developing. We ope so.

ARFORD SYNDICATE **ARIZONA**

Mine is at Skull Valley, Prescott, Ariz. G. M. White in charge.

Property: 14 claims, unpatented, 245 acres, in Copper Basin mining istrict, Yavapai county, formerly known as the Copper Hill group. Main haft reported as being sunk to 1,000′ level. Also reported having acquired he "Robinson" group, a zinc, lead, copper property.

Ore: copper bearing, with molybdenite, gold and silver in shoots and reaks in breccia, surrounded by granite, diorite and porphyry. Ore hoots vary from 5′ to 15′. Average assays reported as copper, 3.75%; olybdenite, 4.25%; gold and silver, $1.15. Property has shipped about 00 tons.

Development: in 1916, 1,500′ of development work was reported and 5,000 tons were blocked out. Property has three shafts 45′, 50′ and 0′ deep. Intend building flotation mill and installing new hoisting plant.

ENERAL MINES CO. **ARIZONA**

Main office: Salt Lake City, Utah. **Mine office:** Walker, Ariz. C. N. rown, supt.

Property: the Amulet mine, near Walker. An old mine, previous pro-uction estimated at $100,000. From drifts on 200′ level from new shaft a hipment of 200 oz. silver ore has been reported. The ore is a silver galena ith some gold.

Equipment: includes, hoist, compressor.

OLD BLOSSOM MINING CO. **ARIZONA**

Address: G. M. Spicer, Prescott, Ariz.

Inc. in Arizona.

Property: the old Perry silver mine 9 miles south of Prescott, com-rising 40 acres, patented, Yavapai county, Ariz. Lies immediately west f Mary E. mine. Shows complex silver-gold-lead copper-zinc ore.

Development: by 360′ incline shaft and levels. Water was up to 70′ level.

Equipment: 25 h. p. engine, hoist, new cable, etc.

Being reopened in Oct., 1919.

GOLD KING MINING CO. **ARIZON**

Office: Everett Moffitt, 1030 Wheeling Ave., Muncie, Ind.; George D ner, supt., Crown King, Ariz.

Officers: Everett Moffitt, pres.; Otto Williamson, v. p.; G. A. Brownl sec.-treas.; with W. E. Toohey, Ralph Clark, Harve Leffler, A. G. Mcl and Grover Plumer, directors.

Inc. Jan., 1904, in Arizona. **Cap.,** 1,000,000 shares, $10 par, non- sessable; 475,000 outstanding. Bonds authorized, $100,000; issued, $10,0 In July, 1919, an issue was being offered at $1. Annual meeting seco Monday in January.

Property: 22 claims, 450 acres, in the Peck and Crown King distri in Bradshaw mountains, 22 miles S. E. of Prescott.

The deposit is a contact in slate and porphyry, ore carrying copp silver, and gold, the two former predominating.

Development: 4 tunnels, 600, 800, 1,100 and 1,500 ft. long, have open the mine to depth of 600 ft. Total workings amount to 6,000 ft.

At mid-1919, company was contemplating erection of camp for 50 m 50 h. p. compressor, etc.; and was offering shares at $1, in order to ra $30,000 for further development. Considering its enormous capitalizati company is doing but little work; operating expenses last year were $10,0

GOLD WARRIOR MINING CO. **ARIZON**

Office: Prescott, Ariz.

Officers: O. S. Wakeling, pres.; A. M. McOmie, v. p.; D. C. MacIv sec.-treas.; foregoing, with P. H. Osborne and J. R. Esposito, directors.

Inc. 1916 in Arizona. **Cap.,** $500,000; $1 par; outstanding, 210,000.

Property: 6 unpatented claims in the Hassayampa district, 11 mil from Prescott and about three-fifths mile from the Big Pine mine, at whi mill Warrior ore is to be treated.

Geology: gold-silver contact deposit in blue diorite and quartz-diorit dipping 45°, with N. E.-S. W. course. Pay-shoot is said to be 6′ wide wi metal contents evenly distributed. Ore reported to assay from $14 to $ per ton.

Development: by 100′ tunnel on the vein. C. H. Dunning, cons. eng estimated if conditions hold, the first 1,000′ of level should yield 25,000 to of $10 ore, but whether it did or not we cannot find out.

GOOD HOPE MINING CO. **ARIZON**

Address: John Slak, mgr., Mayer, Ariz.

Property: in the Turkey Creek district, has some merit. A rece prospectus is alleged to have murdered the local geology, and was full exaggerations.

GREAT WESTERN SMELTERS CORPORATION **ARIZON**

Dead. Property and assets transferred December, 1919, to Mayer Sm ters Corporation—q. v.

GRIJALVA NUEVA MINING CO. **ARIZON**

Company started operations in Dec., 1915, and went out of busine in 1917. See Vol. XIII for details.

HALE MINING & MILLING CO. **ARIZON**

Constellation, Yavapai County, Ariz. Felix X. O'Brien, supt. Has go and copper ores in veins. Equipped with gasoline power. Inactive s for yearly representation work.

HALF MOON COPPER CO. **ARIZON**

Officers: F. J. Hobson, pres.; O. B. Kemp, treas.-mgr., Mayer, Ari C. L. Wilson, sec., Prescott, Ariz.

Inc. June 23, 1916, in Arizona. **Cap.,** $1,500,000; $1 par; 750,000 shares treasury. Registrar & Transfer Co., N. Y., transfer agents.

Property: 14 claims, 280 acres in Agua Fria mining district, about 4 miles N. of Mayer, Ariz., shows copper glance in sericite schist, over a zone 50' to 200' wide and traceable a half mile. Property equipped with gasoline hoist and air drills. Development work begun in Aug., 1917. Sinking shaft, 1918. At mid-1919, company was preparing to start work on claims in the Copper Mountain district.

Property reported to be well worthy of exploration.

HANEY COPPER CO. **ARIZONA**

Company owns properties at Ramsgate, 12 miles west of Prescott, with pyritic ore of very low gold-silver-copper values. Reported that 8" of high grade hornsilver ore has recently been encountered.

HAYDEN DEVELOPMENT CO. **ARIZONA**

Operating the Copper Chief mine of the Copper Chief Mining Co., which see.

HILLSIDE DEVELOPMENT CO. **ARIZONA**

Address: care E. D. Gluwas, supt., Hillside, Yavapai county.

Reported shipping 45% zinc ore by motor truck from property near Bagdad, Eureka district.

HUMBOLDT CONSOLIDATED COPPER CO. **ARIZONA**

Formerly Shill Gold Mining Co., and name changed, 1917.

Address: Mesa, Ariz.

Officers: F. J. Davis, pres.; G. W. Silverthorne, sec.-treas.; M. G. Shill, Frank Griffin and W. J. Lempke, directors.

Inc. 1914, in Ariz. **Cap.,** $1,200,000; shares $1 par. Company offered 50,000 shares at 50c in Jan., 1917.

Property: the Mesa Copper Group, one mile south of Humboldt smelter, shows veins in Yavapai schist belt.

Development: two shafts with levels at 100' and 200', said to block out 12500 tons of $12 to $75 ore.

Several requests for information in 1919, have been unanswered.

HUMBOLDT ORE CO. **ARIZONA**

Controlled by Consolidated Arizona Smelting Co.

INTERNATIONAL COPPER & MINING CO. **ARIZONA**

Mine office: Mayer, Ariz.

Officers: John Slak, v. p., sec. and mgr.

Inc. Feb. 1, 1916, in Ariz. **Cap.,** $1,500,000; shares $1 par. Annual meeting Feb. 15th.

Property: 12 patented claims, 200 acres, in Black Canyon mining district, Yavapai county, shows fissure veins in lime-porphyry-schist formation. The main orebody has N. S. strike and dips 10° from vertical. Average assays reported to run 6% copper, $5 gold, $3 silver per ton.

Development: by incline shaft and 3 short tunnels.

Equipment: includes 25 h. p. gasoline hoist and 10x10" Ingersoll compressor. Management plans sinking to 500' depth and crosscutting every 100'.

INTERNAT'L. SYND'TE. OF MINES & SMELTERS **ARIZONA**

Office: Prescott, Ariz.

Officers: Judge E. C. Whitesitt of Kansas City, pres.; Dr. L. P. Morgan, cons. engr.

Property: 100 claims in the Copper Basin mining district, Yavapai county, about 12 miles S. W. of Prescott, including the Arizona Portland 20 claims, Martin Schuber group 26 claims, the Ruth, Brown and Rainy Day groups. The Arizona Portland adjoins the Loma Prieta, and the Phelps Dodge's Commercial mine on the S., and is reported to carry the extension of the Loma Prieta orebodies. The orebody is reported to be from 50' to 250' wide with N. S. strike and easterly dip, with chalcopyrite and slight gold and silver values disseminated through monzonite por-phyry.

Development: by 1,000' of workings, including a 250' incline shaft and tunnels.

Equipment: includes a 2 drill compressor, hoist and steam powe Operating expenses for 1918 were $8,000. Values so far developed are t low grade to be profitably mined, even with a flotation plant, but office hope to open up higher grade ore by further work.

IRON QUEEN MINING & SMELTING CO. **ARIZON**

Address: Wm. T. Read, 15 William St., New York City. Mines ne Mayer, Yavapai County, Ariz.

Directors: F. W. Wood, Wm. T. Read, A. D. Barnhart, I. D. Williams and H. B. Bishop.

Cap., $3,500,000; shares $10 par. Company formed to take over, subje to a mortgage for $130,000, the greater part of the former holdings of t George A. Treadwell Mining Co., sold at tax and foreclosure sales. T Boggs and Hackberry properties are not included, being bought by t Commercial Mining Co., controlled by Phelps, Dodge & Co. The orga izers of the Iron Queen offered stock at 75c a share to stockholders the Treadwell Co.

Property: consists of Iron Queen group near Mayer, the narrow gau railway, 31 claims and interests in 3 others in the Verde mining distri The Iron Queen group was favorably reported upon by M. A. Finne former manager of the Consolidated Arizona Smelting Co. (Humbol smelter), who states that property is leached down to 300′ level, h zinc ore between that and 400′ level and has 6′ pyritic ore carrying 3 copper, 38% iron and 38% sulphur below that and on the 500′ level.

Smelter was bought by the Big Ledge Copper Co. interests and a operating company formed, known as the Great Western Smelters Cor which in turn was unloaded on the Big Ledge Co.

No news since 1917.

JEROME PRESCOTT COPPER CO. **ARIZON**

Address: W. A. Cline, Prescott, Ariz.

Officers: W. A. Cline, pres.; A. J. Matthews, v. p.; F. R. Dyas, sec treas.; above with F. O. Smith and W. E. Saunders, directors.

Inc. in Arizona. **Cap.,** $1,500,000; shares $1 par; 500,000 issued. Re istrar and Transfer agent, New York, registrar and transfer agent. Kastel Co., 20 Broad St., N. Y., fiscal agents.

Property: the Hub, or Sanders group of 33 claims, about 660 acres, se eral miles west of Copper Basin in Skull Valley, 4 miles from the railway and miles from Prescott, Yavapai county, Ariz. Claims cover a schist belt 30′ wid along a monzonite contact, which shows green copper stains; also several quar veins carrying gold values and one containing hornblende with associat chalcopyrite.

An examination by W. H. Weed showed the property worthy of very mode development for gold, but lacking any of the earmarks of a successful copp mine. Promoters distributed garbled copy of above report, with all unfavorab comments and opinions eliminated. Stock was boosted by rigging to $6.75 p share, breaking to 25c. per share, when manipulation ceased.

JUANITA MINING & MILLING CO. **ARIZON**

Company defunct.

Former officers: M. Dwight Jennings, pres.; W. S. Hefflin, v. p D. A. Seaman, sec. and gen. mgr.; E. J. Bennett, treas.; preceding, wit B. F. Peters, Otto Kring and E. Payne Palmer, directors.

Inc. April, 1905, in Arizona. **Cap.,** $1,500,000; shares $1 par; no assessable; issued $1,200,000. Annual meeting, first Tuesday after seco Monday of April.

Property: 16 claims, unpatented, 300 acres, and a 5-acre mill site abo 4 miles from the Senator mine in the Hassayampa district, about 17 mil S. of Prescott. Property said to carry 11 fissure veins in porphyry a schist with 4 under development of 1 to 60′ width, traceable 1,000 to 3,00 carrying copper sulphides assaying 2 to 10% copper, to 100 oz. silv and $1 to $1,700 gold per ton. Apparently the main vein is of a avera width.

Development: by 210′ shaft and several tunnels from 45 to 450′ long, with 3,500′ of workings estimated, 1913, to have blocked out 5,000 tons of ore with 25,000 tons in sight.

Equipment: includes 25 h. p. hoist, 2 stamp mill, 7 tons capacity.

In June, 1917, D. M. Jennings and others of St. Louis, received a deed on the property from the Sheriff.

LAKE SUPERIOR & WESTERN MINING CO. **ARIZONA**

Office: 208 Glencoe Bldg., Duluth, Minn.

Officers: A. Hagberg, pres.; A. Bjorkman, v. p.; A. Borgquist, sec.; A Johnson, treas., with Magnus Olson, John Peterson, A. R. Norman, Ed. Falk and A. Kolstad, directors.

Inc. 1912, in Arizona. **Cap.,** $1,000,000; shares $1 par; $250,000 issued; assessable, subjects to calls from 60c-$1. Authorized bond issue $300,000; $134,000 bonds outstanding. Annual meeting, first Tuesday in February. Is a holding company, owning a ½ interest in the Big Pine Cons. Mng. Co., which see.

Property: the Mascot gold mine and a 100-ton cyanide plant at Crown King. After expenditure of $250,000 on the mine and mill, ore proved to be too low-grade to pay and property was abandoned. In 1915 a consolidation was effected with the Big Pine Cons. Mng. Co., a $500,000 corporation, on the following basis: 200,000 shares of the Big Pine C. M. Co. stock were issued for the Big Pine properties and 200,000 shares and $32,150 in cash paid the Lake Superior & Western Co. for its mill, which was moved to the Big Pine ground. No recent information received, but corporation is now a holding company, whose only asset is apparently its 200,000 shares Big Pine Cons. Mng. stock.

LAWLER; ESTATE OF JOHN **ARIZONA**

Office: care Ed. W. Wells, Prescott, Ariz.

Property: 6 patented claims in the Eureka district, Yavapai county.

Vein is 1.5′ wide, 3,330′ long, developed by tunnel, shaft and 10,000′ of lateral work. Average grade of ore is given as $23 in gold and silver; ore reserves 40,000 tons.

Mill equipped with 5 stamps, Wilfley tables and slimers, capacity about 15 tons.

Now idle. Mr. Wells reports production to date as ⅓ ton gold, 13 tons silver.

LIBERTY COPPER MINES **ARIZONA**

Office: 511 Republic Bldg., Kansas City, Mo. **Mines:** Mayer, Ariz.

Officers: F. Huttig, pres.; C. B. McClusky, v. p.; A. W. Johnson, sec.; A E. Leonard, treas. First 3 with N. S. Shannon, J. E. Alley, directors. R. D. Shore, supt.

Inc. 1917 in Ariz. **Cap.,** $10,000,000; $1 par; outstanding 5,200,000 shares. Annual meeting, July.

Property: 26 patented claims, known as the Jean group near Copper Mountain 4½ miles N. E. of Mayer, traversed by a ledge of mineralized schist, and said to be from 50 to 150′ wide, and to carry gold, silver and copper values.

Development: 3 compartment vertical shaft being sunk in May, 1919, vertical shaft showing iron sulphides from 30′ to 120′ depth.

Reported on by F. J. Hobson, D. G. Kidder, G. R. Fansett, R. W. Hart, C. P. Basye.

An undeveloped prospect with no ore and heavy capitalization.

LINDEN GROUP **ARIZONA**

Address: Wm. Linden, Groom Creek, Yavapai county, Ariz., owned and mgr., at last accounts.

Property: the Cottonwood and Vera groups, 7 claims, 140 acres at Groom Creek, in the Hassayampa district, shows gold-silver-copper-molybdenum ore in quartz contact vein traversing diorite-schist formation.

Development: by 50′ vertical shaft and several tunnels, deepest 300′

Shipments: in 1916, totaled 100 tons from the Cottonwood claim and

averaged 17% copper with some silver and gold. Owner planned installin 50-ton Marathon mill and cyanide unit and driving a 400' tunnel in 1916.

All letters written by us since 1917 returned. Probably idle.

LITTLE EGYPT COPPER MINING CO. ARIZON

Address: Mayer, Ariz.

Wm. A. Davidson, of Prescott, mgr.; A. L. Blumenauer, supt.

Inc. 1918 in Ariz. to take over the copper property of C. A. Vivian (Humboldt and W. O. Belford of Mayer. A grass root tunnel was drive in expectation of taking out sufficient ore to pay for development. Reporte to be in financial difficulties necessitating reorganization.

LITTLE JOHNNIE MINE ARIZON

Owned by Harrington Blauvelt, Prescott, Ariz.

Property: in the Hassayampa district, Yavapai county, shows a fissu vein 3' to 8' wide, carrying gold ore said to run as high as 2 oz. gold, with 1 copper values appearing at depth. Average assays given as $18 gold per to

LOCEY-PABST GOLD MINES CO. ARIZON

Address: Prescott, Ariz., W. J. Casey, mgr., Walker, Ariz.

Reported in 1918 to be prospecting various small properties includin the Union mine at Chaparral and the Mud Hole gold mine at Walker, Yav pai county.

LOGOS MINES CO. ARIZON

Dead. Claims re-located and known as the Ferguson Group, whic see.

LOMA COPPER CO. ARIZON

Company is a reorganization of the Loma Prieta Mines Co., stockholde getting share for share.

Address: Prescott, Ariz.

Officers: Arthur Hendy, pres.; J. I. Gardner, v. p.; R. H. Burmister, sec treas.

Inc. 1918, in Arizona. Annual meeting, 3rd Monday in Sept. **Cap** $2,500,000; shares $1 par.

Property: 28 claims, 500 acres in the Copper Basin mining distric Yavapai Co., Ariz., 12 miles S. of Prescott, adjoining the Commercial min of Phelps Dodge Corporation.

Ore: minerals are primary, chalcopyrite occurring with secondar quartz, and while high-grade bunches of sulphides appear, the deposit wi be mined as a mass of low-grade concentrating ore of disseminated cha acter Samples show an average of about 2% copper, and 36 to 48c silv per ton.

Development: by 414' shaft with drifts and crosscuts at 400' level.

Equipment: includes steam hoist and compressor.

Production: one carload shipped in 1917 assayed 8.6% copper, $1 gol and 1.5 oz. silver per ton.

Is a property, likely to develop a large tonnage of low-grade concer trating ore

LOMA PRIETA MINES CO. ARIZON

See Loma Copper Co.

LOMA VERDE MINE ARIZON

Believed to be idle. Mail returned unclaimed from Humboldt, Marc 1919

Property: 2 miles S. E. of Humboldt, known as the Lone Pine, when was worked as a gold mine, is said to show copper-gold values, in a sma body of concentrating ore Developed by shallow tunnel and shaft.

LOOKOUT COPPER CO. ARIZON

Main office: Prescott, Ariz.

Officers: T. G. Norris, pres.; A. W. Edwards, v. p.; Geo. D. Morri sec.-treas.

Property: the Lookout group, 5 copper claims; Mark Twain group, silver-lead claims; Davs group, 8 gold-silver-copper claims, in the Sla Creek mining district, Yavapai County, Ariz.; Bodie group, 13 silver-lea

claims, in the Hassayampa mining district, Yavapai county, Ariz.

Development: a 100′ shaft was sunk on the Lookout property with short levels at 45, 60 and 100′; 800′ north of the shaft are other workings, consisting of a crosscut to the vein and two drifts north and south with a 60′ winze and raise to the surface from the north drift. At the mouth of the raise a gallows frame was erected and a hoisting plant installed. An excellent wagon road about 3¼ miles long connects the mines with the main road leading to the Davis mines.

On the Mark Twain group very little development work was done, although the mine had been worked in a small way at a profit, before acquired by the Lookout Co. The Mark Twain, Blue Dick, and several other promising properties should be consolidated, insuring, under good management, a profitable mining enterprise.

The Davis group is one of the old mines of the district. From the surface and shallow workings much high-grade ore was shipped in the early days. The principal development work was by tunnels and winzes, all showing good ore; the high-grade ore carries considerable copper, though principal values are in gold and silver.

On the Bodie group of mines a good deal of development work was done on the patented claims. A shaft was sunk some 340′, with levels at 55, 85, 170, 230 and 335′, all said to show ore. The 3-compartment vertical shaft was started at a central point. Work was stopped on all the Lookout properties in 1910.

Surveys were completed for an ore road from the Walker end of the Kirkland tunnel, through the Senator district to Lookout camp. A branch was also surveyed from this line to the Bodie. The road measures 13.6 miles from the tunnel to Lookout and 8 miles to Bodie, with a maximum grade of 4%. It was intended to build a 30″ gauge road with good roadbed and heavy rails, and operate it by steam. Two miles of railroad purchased from the Metals Milling Co. constituted the first 2 miles of the Lookout ore road. This contemplated road would furnish cheap transportation and open a country that should produce large amounts of ore.

Part of the company's property was being operated under lease in 1917, since when no news.

LUCKY STRIKE MINING CO. **ARIZONA**

Office: 415 National Bank of Arizona Bldg., Phoenix, Ariz.

Officers: J. C. Brown, pres.; Arthur Luhrs, v. p.; A. G. Hulett, sec.-treas.

Inc. 1917 in Ariz. **Cap.,** $1,200,000; **$1** par.

Property: 160 acres including the Old Stein property in the Walnut Grove mining district, 9 miles S. E. of Kirkland, said to have an iron vein, wide containing gold, silver and from 1.5% to 17% copper. Developed by 70′ shaft with 170′ of workings. Gold values are about **$1.80** per ton.

LYON COPPER CO. **ARIZONA**

Reorganized as Arizona Merger Gold & Copper Co., which see.

MADIZELLE MINING CO. **ARIZONA**

Address: 413 Fleming Bldg., Phoenix, Ariz.

Officers: G. U. Young, pres.; E. C. Moon, v. p.; G. N. Cunningham, sec.-treas.; above are directors.

Inc. 1905 in Arizona. **Cap.,** $500,000; **$1** par; 3 issued; proposed in Aug. 1917, to sell 30,000 shares.

Property: 25 patented claims, 2½ miles N. of Copper Basin and 6 miles W. of Prescott, said to show a quartz vein with schist hanging and porphyry foot-wall. Ore carries copper as chalcopyrite and bornite, with gold and silver values, and assays from $12 to **$40** per ton, 25,000 tons and 5,000 tons in reserve, respectively.

Development: by tunnels from shafts, 500, 700, 800 and 130′ long, with total of about 5,000′ of workings.

Equipment: includes steam hoist, compressor, pump, steam and gas power, and 5-stamp mill.

MARK TWAIN MINE **ARIZONA**

Mail returned unclaimed, March, 1919, from Prescott, Ariz. J. F. Moore, J. F. Healey, and O. F. Smith are reported to have an option on this old silver mine.

Said to have produced $250,000 from a 16' ledge. Workings opened by 3 tunnels.

MAY MINING CO. **ARIZONA**

Office: Sidney, Ohio. **Mine:** Mayer, Ariz.

Officers: M. L. Heffelman, pres.; J. D. Barnes, sec.; H. C. Heffelman, mgr.

Cap., $200,000; $1 par.

Property consists of 2 patented claims, adjoining the Blue Bell on the North. Copper ore occurs in a fissure vein in schist, claimed to be 2' wide and to be a continuation of the Blue Bell lode. Developed by 200' shaft with 700' of workings. Has been idle of recent years. Appears to be worthy of further exploration and development.

MAYER ORE PURCHASING CO. **ARIZONA**

Address: P. O. Box 134, Mayer, Ariz. H. A. Wagner, mgr.

Cap., $300,000; $1 par; all issued.

Does a general custom sampling business. Also buys ores, operates a custom concentrator, assay-office, ore-testing plant, etc., and is installing a leaching department for oxidized copper ores.

Company leased and remodelled the Gray Eagle mill, where all shipments are consigned.

MAYER SMELTER CORPORATION

Address: Mayer, Ariz. Stock sales office, Industrial Dev. Co., 91 Olive St., St. Louis, Mo.

Officers: Chas. Batre, pres.; Frank J. Hobson, v. p.; Roy C. Walter, treas.; all of Mayer, Ariz.

Inc. 1919, in Arizona. **Cap.,** $5,000,000 common, $1,000,000 8% preferred, 1,250 pfd. and 25,000 common issued. Above subject to 250,000, 10-year 6% first mortgage bonds.

Property: 60 acres at Mayer, Ariz., containing plant, as described hereunder; also lime and silica deposits.

Equipment: 2,000-ton ore-bin, 1,000-ton coke-bin, 250' railroad trestle, one 200-ton blast-furnace complete (blown-in March 12, 1917). Curtis turbo-generator, sample plant and laboratory, machine-shop, pumping plant, houses, etc. Product shipped to U. S. Metals Refining Co.

During July, 1917, a second furnace was blown-in. There has also been installed one 500 h. p. cross-compound Corliss engine, two No. 6 Connersville blowers, two 150 k. w. generator sets, three 250 h. p. marine type boilers, and a Weber concrete stack. A two-stand converter plant was to be ready in 1918. Plant formerly regarded as a big junk heap.

It has been stated that the smelter at Mayer, between March 12 and up to April 21, 1917, ran 33 days. In that time, it handled 2,700 tons of ore, or only 82 tons per day. It was designed to handle 200 tons, and various reports stated that 150 to 200 tons of Big Ledge ore being handled every 24 hours and that a new 500-ton smelter addition was to be installed to handle increased production. Three shutdowns, for six days in all, were reported to be due to lack of ore supply even at 82 tons daily. Of the 2,700 tons smelted, 800 tons are said to have come from outside ores and 1,900 tons from Big Ledge ore. Of Big Ledge ore, the Butternut mine contributed 1,300 tons, and the Henrietta mine 600 tons or less than 20 tons daily from the Henrietta, which was glowingly described in February, 1917, as ready to produce 200 tons daily as soon as the smelter should be ready. As to the smelter production reaching 15 tons of matte per day, the entire matte production from March 12 to April 21 was only about 80 tons, assaying 45% copper and about $60 a ton in gold-silver, equivalent to 30 lbs. yield copper per ton ore and $1.80 in gold-silver. These returns are so ridiculously low that the inference is that not all the matte ha

been drawn from the furnace, but if the returns really represent actual recoveries from average ore, then 26 lbs. copper at 25c a pound and $1.80 in gold-silver, make a total of but $8.30 per ton in all. Stock regarded unfavorably.

See Big Ledge C. Co., owned by same interests.

McKINLEY MINING & DEVELOPMENT CO. **ARIZONA**

Prescott, Ariz. A. M. Gough, pres.; Chas. E. McKinley, gen. mgr.

Inc. 1906 in Arizona. **Cap.**, $1,000,000; $1 par.

Property: 38 claims, 760 acres, in the Copper Basin district, 11 miles south of Prescott. The Dixie group of 6 claims has veins of 5 to 15′ width, carrying copper ore. The Peacock group has a vein of 60′ claimed width, carrying surface ores said to average 3.7% copper, developed by the Peacock shaft, sunk to a depth of 700′.

In 1917, a crosscut at 700′ depth was driven 500′, where a strong flow of water was met with. High-grade ore is said to have been exposed at that point, also on the 400′ level.

Equipment: includes power plant with hoist good for 1,000′ depth. No recent returns.

McMAHAN GROUP **ARIZONA**

Zonia, via Kirkland, Yavapai County, Ariz. Owned by C. H. McMahan and brothers. Reported sold, Jan., 1919.

Property: the Cuprite mine and a group of 8 claims, unpatented, south of Zonia. Ore zone reported as 700′ long, containing 8 shoots, 50 to 75′ long and 3 to 20′ wide, assaying 2 to 9% copper in oxidized zone.

Development: consists of several shallow shafts.

MILDRED GOLD MINING CO. **ARIZONA**

Address: D. B. Genung, supt., Stanton, Ariz.; H. M. Canover, pres. Company has no debts.

Property: 14 unpatented claims near Congress Junction, Yavapai County, Ariz.

Development: 4,000′ of shafts, drifts, etc. Tunnel 1,150′ long has been driven from mill level connecting with main vein and incline shaft at depth of 520′. Retimbering shaft and putting in ore pocket.

Equipment: 2 hoists, 10-stamp mill and water supply 1¼ miles long.

MINGUS MOUNTAIN COPPER CO. LTD. **ARIZONA**

Office: 516 Grant Bldg., Los Angeles, Cal. Mine near Jerome, Yavapai County, Ariz.

Officers: W. W. Thomas, pres.; A. Gleason, v. p.; J. R. Thomas, sec.; above with A. M. McDermott, A. J. McDermott, and E. R. Jeffrey, directors.

Inc. June, 1900, in Arizona. **Cap.**, $3,000,000; shares $1 par; issued $2,400,000.

Property: 5 claims, 100 acres, in the Black Hills district 12 miles south of Jerome, the nearest railroad point, has good surface showings of carbonate ores. Assays from 2,800′ vein traversing property, N. E.-S. W., are reported to show .02 oz. gold, $1.45 silver and 6.39% copper. Orebody claimed to be 45′ in width, with dip of 60° E., but ore has only been found in bunches and streaks.

Development: by 4 shafts, deepest 430′, with several tunnels, giving a total of 4,240′ of workings.

Equipment: includes 50 h. p. steam plant, with 2 hoists, good for 1,000′ each, and several mine buildings. Out of cash and idle some years.

MONROE COPPER MINE **ARIZONA**

Address: John Curran, owner, Walker, Yavapai Co., Ariz. Mine, once owned by the Monroe Cons. Mines Co., long dead, is near the junction of Knapp gulch and Lynx creek, near Prescott. Formerly worked as a gold mine and said to have a 50′ dike carrying copper ore on the 300′ level. Development work consists of various tunnels.

Presumably idle.

MONTE DE COBRE COPPER CO. **ARIZO**

Officers: W. A. Tucker, pres.; John Rose, v. p., of Bisbee; E. M. Wal sec. and J. R. Robertson, treas. of Mayer, Ariz.

Property: The Barbara mine on South Copper mountain, near Ma Ariz., shows chalcopyrite and oxidized copper ore in a vein in schist.

Development: 60′ shaft and adit tunnel, now driving, said to h passed through a 40′ zone of mineralized vein matter.

MONTE CRISTO MINING & MILLING CO. **ARIZO**

Chief owner, Ezra W. Thayer, pres., Phoenix, Ariz.; A. G. Pick sec.; Chas. B. Brann, supt., Wickenburg, Ariz.

Inc. Nov. 23, 1903. **Cap.,** $2,000,000; $1 par.

Property: Monte Cristo silver mine, adjoining the Arizona Copp Belt mine near Constellation, in Black Rock district, Yavapai county. T mine shows very remarkable high-grade native silver ore which in t bottom of the mine is changing to copper ore.

Development: by 1,100′ shaft with over 6,000′ of workings. Compa was developing on 1,000′ level at last accounts, and has opened a lar deposit.

Repeated requests for information concerning property have be ignored by management, but it is understood that stockholders are main personal friends or customers of Mr. Thayer, who stands ready to retu their money at any time. It is a pity to have the property idle.

MONTEZUMA MINING & MILLING CO. **ARIZON**

Address: Crown King, Ariz., but letters returned unclaimed, 1919.

Officers: J. P. Waldron, pres.; Philip Nohe, v. p.; P. Fink, sec.; Waldron, treas., with F. Fink and M. Devaul, directors.

Inc. in Arizona. **Cap.,** $1,000,000; shares $1 par; non-assessable.

Property: 7 claims, 5 patented, 120 acres, in Pine Grove district, miles from Crown King. Shafts and tunnels reported to have open some high-grade ore. Main tunnel 700′ long to be extended.

A 5-stamp mill recently installed.

Reports in Aug., 1919, stated that mine was sold to California a Colorado capitalists.

MOUNTAIN DRIVER & CALAMITY JANE MINES **ARIZON**

Address: Alex Denny, Chaparral, Yavapai county, Ariz., but letters r turned unclaimed in 1919.

Property: two claims, 40 acres, near Henrietta, in Big Bug district, miles from Humboldt smelter. Ore occurs in quartz-porphyry and carri copper and gold.

Development: consists of 150′ shaft. Idle since 1916.

NELSON MINING CO. **ARIZON**

Defunct. Property acquired by Philadelphia Mining Co., which s

NIAGARA COPPER CO. **ARIZON**

Presumably dead, and mine near Bagdad, Ariz., idle. See Copper Han book, Vol. XI.

OCTAVE MINES CO. **ARIZON**

Office: 882 Drexel Bldg., Philadelphia, Pa. **Mine:** Octave, Yava county, Ariz.

Officers: H. C. Gibbs, pres., 60 State St., Boston, Mass.; H. S. Hopp v. p.; D. S. Leas, sec.-treas.; J. Nelson Nevius, mgr., 809 S. Los Robles Av Pasadena, Cal.

Company issued $150,000 2½ year 8% collateral trust notes, da April 15, 1919, due Oct. 15, 1921 for providing additional equipment. No sold at par, but with 100% stock bonus.

Property: 300 acres in the Wickenburg district including the Octa old [illegible] mine with a record of $2,000,000 produced. Shows sa [illegible] the Congress mine, 10 miles to east. The rocks a [illegible] dic and basic dikes, including some of post min

Development: to depth of 2,000′ and for 2,000′ along the vein. To the East the veins were cut off by a fault. During 1915-17, new work found the veins beyond the fault and is said to have opened up an orebody 730′ long on the 800′ level. This ore is exposed on the 600′ level and 9 raises are said to prove it between the levels. The same orebody is exposed for 300′ on the 950′ level, the face of the drift, Oct., 1919, is said to show 4½′ of $26.50 ore. Management claims the mine has positively developed 40,000 tons assaying $13.89, with nearly all working faces in ore, and very important probabilities for further development.

Experimental mill work is said to show a probable recovery of 96%.

OHIO MINES CO. **ARIZONA**

Office: 614 Outlook Bldg., Columbus, Ohio.

Officers: H. W. Whitaker, pres.; L. W. Smith, v. p.; J. F. Rogers, sec.-treas.; preceding officers, R. S. Barbee, Thos. M. Murphy, W. G. Brossman, H. J. Rittenour, T. D. Brown, and W. H. Jones, directors.

Inc. Jan., 1909, in Arizona. Cap., $2,500,000; shares $1 par; in $200,000 deferred and $2,300,000 common stock; issued 1,810,837 shares; $250,000 first mortgage notes, $50,000 issued. Annual meeting, third Monday in January.

Property: 14 claims, partly patented, 400 acres in Yavapai county, with 5-acre mill site, and water-rights on the Agua Fria river, 6 miles from the mine, in the Big Bug district. Property was bought of the Jessie Mines Co., which see in Vol. VIII.

Ore: gold, with small silver values occurring in granite.

Development: by 3 shafts, 659′, 206′ and 200′ deep, with 7,000′ of workings, and the mine is said to have produced upwards of $750,000 in gold, under an ownership previous to that of the Jessie Mines Co. Property under lease to Chaparral Mining Co., which has been doing development work only since Jan., 1916.

No recent information.

OLD VESUVIUS MINE **ARIZONA**

Address: C. H. McMahan and brothers, owners, Kirkland, Yavapai County, Ariz.

Property: the City Group, known as the Old Vesuvius mine, 6 claims, unpatented, 9 miles S. E. of Kirkland. Shows 4 veins at contact of diorite and granite and diorite and quartz diorite. Developed by several shallow incline shafts. Small shipments made in 1916-1917 are reported to have carried from 4-7 oz. gold per ton. Sinking was resumed in shaft on East vein, where high-grade ore is said to have been extracted. No recent information.

ORIZABA MINING CO. **ARIZONA**

Dead. Described in Vol. XIII.

ORO BELLE DEVELOPMENT CO. **ARIZONA**

Address: Crown King, Yavapai county, Ariz.

Presumably inactive. See Vol. XIII.

ORO BELLE & GRAY EAGLE GROUP **ARIZONA**

Address: Mrs. Hattie Barnes, owner, care Theron Davis, 170 Broadway, New York. Mine formerly owned by Tiger Gold Mng. Co.

Property: 10 patented claims, 172 acres, 5 miles S. E. of Crown King, Yavapai County, shows pyrite and chalcopyrite in fissure veins, 2-15′ wide, veins strike N., dip 60° W. Ore is said to assay $20 gold, 2 oz. silver and 5% copper per ton.

Development: by 8 tunnels, longest 1,000′, and a 600′ shaft.

Equipment: includes a 50 h. p. steam hoist, compressor and 20-stamp mill.

Production: 19,010 lb. of copper, 9,937 oz. silver and 4,313 oz. gold 1907; 3,639 oz. silver and 1,823 oz. gold in 1908; 4,802 lb. fine copper, 1,225 oz. silver and 1,226 oz. gold in 1909. Property was idle until Oct., 1916, when leased to Oro Belle Dev. Co. Again idle in 1917. No recent information received.

Mine credited with total production to date of $700,000.

PACIFIC COPPER MINING CO. **ARIZON**

Office: 415 Board of Trade Bldg., Kansas City, Mo. **Mine offi** Crown King, Yavapai County, Ariz. John Kelley, pres.; W. J. Morse, s

Inc. Feb. 1907, in Arizona. **Cap.,** $3,000,000; shares $1 par; no assessable; issued, $2,397,616.

Property: 30 claims, 10 patented, 600 acres, including a mill and smelt site, 4 miles from Harrington and 9 miles from a railway, in the Silv Mountain district of the Bradshaw mountains. Claims show a hornblen phase of Yavapai schist, with an intrusive porphyry dike of 50 to 150′ wid carrying contact deposits of 9′, of 14′ and of 25′ estimated average wid traceable 3,000′, with N.-E. strike. Gossans are much leached, carryi honeycombed hematite and limonite, with occasional copper carbonat

Ores: malachite and azurite, succeeded at 50′ by secondary chalcoci bornite and chalcopyrite. The management estimates ore to range fr 3 to 15% in copper, with good value in silver and gold.

Development: consists of 1,500′ of work, with a 500′ shaft and seve prospect workings.

Equipment: includes a 120 h. p. plant, with an 80 h. p. 3-cycle verti engine, connected to a 4-drill Sullivan air compressor, a 20 k. w. tripl pump, and a 40 h. p. gasoline hoist. Presumably idle, for several years.

PALO VERDE COPPER CO. **ARIZON**

Office: Akron, Ohio. C. H. Howland, Cuyahoga Falls, Ohio, mgr.

Officers: J. P. Loomis, v. p.; I. M. Shively, sec., with Chas. Curr E. E. Quirk and C. H. Howland, directors.

Inc. in Arizona. **Cap.,** $2,000,000; shares $1 par; issued $1,000,000.

Property: 8 claims, is a copper prospect about 60 miles west of Phoen in the Saddleback mountains, between White Tanks and Eagle Tails d tricts, Yavapai county, Ariz.

Mine is opened by shafts of 50, 112 and 210′ depth and a 130′ tunn Surface ores said to contain 2 to 15% copper. Plans to resume work.

PAN-AMERICAN MINING CO. **ARIZON**

Is a close corporation. C. P. Collins, pres., Tulsa, Okla.

Cap., $[illegible]; shares $1 par.

Property: 8 patented claims, near Prescott, Yavapai county, develop by several thousand feet of underground workings. Ore contains go silver, lead values, mostly of milling grade. Mine idle for several years.

PECK CONSOLIDATED SILVER MINES **ARIZON**

Office: Edwards-Snapp Co., 1030 Consumers Bldg., Chicago, Ill.

Officers: C. B. Willey, pres.-treas.; C. A. Snapp, v. p.; M. L. Snapp, se with W. H. Cade, directors. V. C. McAdoo, gen. counsel; A. J. Edward asst. sec. and attorney; F. W. Fisher, asst. sec.; L. G. Kirkland, mgr.

Inc. November 8, 1919, in Arizona. **Cap.,** $2,000,000; $1 par; non-asses [illegible] shares in treasury. Bonds $[illegible] of 8% bonds redeemable in [illegible] of annual net earnings to be set aside for redemption.

Property: the Peck mine, and group of 10 claims, 320 acres, in Pe [illegible] miles south of Prescott, Yavapai county. The mine was disco [illegible] has been shut down, after having produced over three millions [illegible] operations has been intermittent since then. At mi [illegible] was examined by F. W. Fisher, J. J. Mears and W. [illegible]

Geology: [illegible] above sea le [illegible] having a N. W.-S. E. tren [illegible] 100′ wide a [illegible] to the N. W. a [illegible] continuously through [illegible] from 4 to 8′ wide. Four oth [illegible] The principal silver minerals are the chlorid [illegible] and other secondary mineral [illegible]

Development: present working shaft 250′ deep, abandoned by old company after striking rich ore on account of heavy flow of water which pumps could not handle, and by 4 shafts, 490, 387, 150, and 80′ deep, respectively, with over 10,000′ of workings. The Peck shoot has been stoped to 540′ or about 150′ below water-level, and the others considerably above that depth for over a length of 700′. Reserves are estimated by Mr. Fisher to be worth $2,719,360. This does not include ore below water-level, but includes $194,360 on dumps, $225,000 in old stopes and $2,300,000 in place. Mr. Williams made no estimate of ore in place, but gives the dumps and filling above water level as 20,000 tons of 15.7 oz. silver ore. This, at say $1 an ounce, would give a total of $314,000, against $419,360 for this material by Mr. Fisher. Construction of a mill is considered to be warranted.

Treatment of the ore was investigated, cyanidation being the method suggested at a cost of $3.60 per ton. One flow-sheet includes a ball-mill, concentrators, agitators, and filter; while another has Gibson mills, Pierce amalgamators, Hardinge mill, and cyanide plant.

Property seems to be well worth reopening and developing.

PHILADELPHIA MINING CO. **ARIZONA**

Address: Philadelphia, Pa. **Mine address:** Geo. P. Harrington, mgr., Crown King, Yavapai county.

Property: between town of Crown King and mine of that name. Has fissure vein 3′ wide, developed by 2 tunnels, 225′ apart vertically, the upper 1,000′ long, and 300′ incline shaft on vein. Drove a lower tunnel, 3,000′ long, to cut ore zone 700′ below old mine workings exposing 5′ of gold-bearing ore, and developing a large flow of water, that is a desirable asset.

Numerous assays show gold and silver in commercial quantities; also some lead, zinc and copper. Ore was sent to the flotation mill of the Bradshaw Reduction Co. at Crown King, adjoining the Nelson mine. The zinc-content, a detriment in the past, is valuable, forming by flotation a concentrate desired by smelters.

Company recently (1919) acquired the property of the Nelson Mining Co. at Crown King.

Equipment: includes 25 h. p. gasoline hoist and air compressor. Company was employing an average force of 15 men.

POCAHONTAS COPPER QUEEN MINING CO. **ARIZONA**

Office: Pocahontas, Ark. **Mine office:** Mayer, Yavapai county, Ariz.

Officers: W. H. Skinner, pres. and gen. mgr.; T. J. Burns, v. p.; D. A. Chapin, sec.; Benj. A. Brown, treas.; D. M. Rock, eng.

Inc. 1906, as successor of Big Bug Gold & Copper Mining Co. **Cap.,** $1,000,000.

Property: 14 claims, 3 miles S. E. of Mayer, in 2 groups, about 1,000′ apart. The smaller group of 4 patented claims carries gold-copper ore. The Spar group of 10 claims has a vein up to 14′ in width, carrying mainly gold, silver and lead, and the mine is said to have shipped 23 carloads of high-grade ore, under former ownership, that gave sufficient returns to pay the purchase price and the cost of development. The mine has a 200′ two-compartment shaft and a 120′ shaft. A level at this depth was being extended to develop 2½′ of ore, said to assay $40 in gold, silver, lead, cut in the bottom of the shaft, at last accounts. In August, 1919, the erection of a 100-ton ball-mill, table, and flotation plant was decided upon. Property has been worked in a desultory fashion for years, but the ore is of milling grade, carrying silver, gold, copper, and zinc.

POLAND MINING CO. **ARIZONA**

Mine office: Prescott, Ariz. T. G. Norris, pres.; A. W. Edwards, v. p.; George D. Morris, sec.-treas.; L. B. Mulhearn, asst. sec.-treas., 26 Cortlandt St., New York.

Property: 37 claims, about 750 acres, extending through a highly mineralized mountain lying between the Big Bug and Lynx mining districts, Yavapai county, about 35 miles from Prescott by rail, or 15 miles by wagon road. The claims cover a granite mountain intersected by a num-

ber of well-defined, persistent fissure veins, disclosed in a tunnel which g through the mountain a distance of some 8,000'. Two of these veins, t Poland and Accidental, have been extensively developed.

Equipment: air-compressors, drills, cars, and tools, and a thoroug modern 20-stamp mill.

The tunnel will be of considerable value as a transportation tun when a railroad is built from Lynx Creek end, connecting the mines in t Walker district with the Prescott and Eastern Railroad at the Poland e of the tunnel. Was a subsidiary of the Dev. Co. of America, now dead.

PRINCE ALBERT MINING & MILLING CO. ARIZO

Property disposed of. Described in Vol. XIII.

PRUDENTIAL COPPER MINING CO. ARIZO

Office: 322 Federal St., Chicago, Ill. **Mine office:** 9 Bashford Bl Prescott, Ariz. H. H. Linney agt,

Officers: Shea Smith, pres.; F. B. Gibbs, sec.; G. H. Jenkins, v. p.-trea with W. H. Newhall, M. N. Murphy, Mrs. Emma S. Jennings and Mrs. A. Ewing, directors.

Cap., is 500,000 shares, and company is controlled, through the own ship of 422,778 shares, by the Estate of Maj. Shea Smith.

Property: 12 claims, patented.

Idle for years.

QUAKER GOLD MINES CO. ARIZO

Address: care Thos. J. Brodnax, Board of Trade Bldg., Kansas Ci Mo.

Property: 10 claims, patented, the Gold Note and Richinbar mines, miles from railway, in Harper district, Bradshaw Mts., Yavapai coun Ariz., shows quartz vein carrying gold ores, reported to average $8 per t

Development: 5,000' of work, in shafts, levels and tunnels.

Equipment: includes 20-stamp mill, hoist, etc., with electric power. a big low-grade proposition.

RANDOLPH-GEMMILL DEVELOPMENT CO. ARIZO

Addresses: Crown King, Ariz., and Prescott, Ariz.

Officers: M. P. Randolph, pres.; F. S. Viele, v.p.; David B. Gemm engr.

Property: the remodeled Crown King mill, in which 70-80 tons p day of the old tails from the mill are re-treated. These tails are compl carrying 0.3 oz. gold, 4½ oz. silver, 11% zinc, 0.8% copper, 10% iron, a 53% insoluble. They are tabled, and treated by oil flotation, making a 4 1 concentrate. The bulk concentrate is re-treated, making 15 tons zinc a 7 tons iron concentrate from each 100 tons tails. Zinc product carries 43 zinc, 10% iron, 4½% copper, 15 oz. silver and 0.6 oz. gold; the iron prod carries 1½ oz. gold, 10 oz. silver, 2½% copper, 12% zinc, 30% iron a 5% insoluble. These products yield a net profit of about $4 per ton of ta treated after paying $1.50 per ton royalty. No information for several yea

RICHARDS COPPER CO. ARIZO

Out of business. Formerly owned the Black Hills Copper Co. who property was near the Equator mine, Jerome. Property sold in 1917.

RIO TONTO COPPER MINING CO. ARIZO

Mail returned from former address, 137 No. Central Ave., Phoen Arizona.

Inc. Nov., 1917, in Arizona

Property: the Patton Copper mine, 4 miles east of Mayer, said have high-grade ore exposed in several openings. Evidently idle.

ROSALIE COPPER CO. ARIZO

Letters returned from last address, Haddock & Shackelford, 424 Dwig Bldg., Kansas City, Mo. Mine near Mayer, Yavapai county, Ariz. G. Meese, Los Angeles, Cal., pres and gen. mgr.

Inc. in Arizona. **Cap.,** $3,000,000; shares $1 par.

Property: 9 claims, patented, 180 acres, in the Copper Creek district, miles S. E. of Mayer and 18 miles from Cordes siding, the nearest rail poi

The mine has numerous pits and shafts, and a 1,000′ tunnel, developing a 2 to 7′ vein carrying native copper, in the oxidized zone, followed by bornite, chalcopyrite and occasional chalcocite ores, said to assay 4.15 to 7.3% copper, with small gold gold and silver values.

Equipment: includes a 50 h. p. gasoline engine and air compressor.

RUBY SILVER CO. **ARIZONA**

Address: Prescott, Ariz.

Officers: A. C. Gilmore, pres.; R. E. Morrison, v. p.; J. E. Russell, sec.; Lester Ruffner, treas., all of Prescott.

Cap., $500,000; shares $1 par. In 1918 was attempting to dispose of 50,000 shares at 10c per share.

Property: 3 claims in Hassayampa mining district, Yavapai county, said to show 3,000′ of the Hero vein, width of 6′ to 25′, with lead-silver ore. Work on 165′ tunnel was resumed in April, 1919.

SARATOGA MINING CO. **ARIZONA**

Crown King, Yavapai county, Ariz. J. L. Deming, mgr. According to report the company was reorganized in 1915, and in Dec., 1915, completed a 75-ton mill to treat Saratoga ore and also the dump ore of the adjoining Crown King mine, belonging to the Yavapai Consolidated Gold-Silver-Copper Co. No recent returns.

SHELDON MINING CO. **ARIZONA**

Address: care Stukey Bros., Walker, Ariz. John F. Pell, pres., Newark, N. J.; A. R. Ackerman, treas., Walker, Ariz.

Inc. Aug., 1916, in Arizona, as a merger of the Sheldon group, the H. T. Andrews holdings and those of the Empire Mining Co., Metals Mining Co. and the Majors Mining & Milling Co. These holdings include nine very attractive copper-gold properties, several of them pioneer mines of the district. The tract is a few miles south of Prescott.

Idle and change of management was made in 1917, but no later report.

SHILL GOLD MINING CO. **ARIZONA**

Name changed, 1917, to Humboldt Cons. Copper Co., which see.

SILVER BELT CONS. MINING CO. **ARIZONA**

Address: 212 Ideal Bldg., Denver, Colo.; J. B. Dudley, sec.-mgr., Prescott, Ariz.; and Humboldt, Ariz.

Officers: John J. Mahony, pres.; B. Rybon, v. p.; J. B. Dudley, sec.; H. J. Mahony, treas.; with J. G. Harney, John Faubel and R. H. Burmister, directors.

Inc. Aug., 1916, in Arizona. **Cap.,** $250,000; 10c par; 160,000 issued; non-assessable.

Property: 8 claims, 2 patented, 200 acres, in Big Bug mining district, 2 miles from Humboldt, Yavapai county, said to have a contact vein between diorite and Yavapai schist.

Development: by 295′ shaft at S. end of property, with workings exposing a 4′ vein of silver-lead ore on the 114′ and 230′ levels. There is also a 125′ shaft at N. end of property and a third shaft being sunk 1,000′ N. of the 295′ shaft, was 265′ deep in Sept., 1919. On 250′ level there was 20″ of rich silver-lead ore.

Equipment: includes a 50 h. p. oil engine, 15 h. p. hoist, compressor, pump, blower, houses, etc.

Management claims to have 30,000 tons of $11 ore on the dumps, and to have had operating expenses of $30,000 in 1918. A shipment of 37 tons, sent to El Paso in September, yielded $5,000 net.

SILVER CROWN MINING CO. **ARIZONA**

Address: Crown King, Ariz.

Officers: L. V. Swiggert, pres.-treas.-mgr.; T. M. Anderson, v. p.-supt.; F. F. Swiggert, sec.; above are directors.

Inc. July, 1917, in Arizona. **Cap.,** $1,000,000; shares $1 par; 600,000 issued; non-assessable.

Property: 3 unpatented claims, 60 acres, at Crown King, said to show a contact vein between schist and granite, with copper-silver ore.

Development: 150′ upper, and 260′ lower tunnels. Management state operating expenses in 1918 were $3,800. Plans continuing lower tunnel.

SILVER CYCLE MINING CO. **ARIZON**

Address: C. T. Maloney or E. W. Meyers, Prescott, Ariz.

Property: the Davis Dunkirk and Poverty groups on Slate creek, Sen tor district, Yavapai county, acquired late in 1919. Ten mines are include Ores carry silver, gold, and copper.

SQUAW PEAK COPPER MINING CO. **ARIZON**

Address: Edison Thacker, Jerome, Ariz.

Officers: J. J. Cain, pres.; H. E. Thacker, v. p.; Edison Thacker, sec treas., with R. Thacker and A. W. Whitaker, directors.

Inc. in Arizona. **Cap.,** $2,000,000; shares $1 par; 100,000 issued; no assessable.

Property: 21 claims, 420 acres, in Squaw Peak district, 2 miles W. Verde river and 28 miles S. E. of Jerome, Ariz. Examined in November, 191 by W. E. Defty, whose conclusions were not favorable. Claims said to sho copper ore with chalcopyrite and oxide minerals in quartz, occurring in fra ture planes and veinlets in granite, capped to the W. by Cambrian rocks.

Development: 400′ main tunnel and several shorter ones, also a 7 shaft.

Equipment: steam boiler and compressor; inadequate for propose work. No late information.

STODDARD MILLING CO. **ARIZON**

Described in Vol. XIII. Property now owned by Arizona Binghamto Copper Co.

STODDARD MINES CO. **ARIZON**

Succeeded by Arizona Binghamton Copper Co., which see.

STORM CLOUD MINE **ARIZON**

Property near Senator, Hassayampa district, operated by M. J. O'Brie Ltd., of Cobalt, Ontario.

SWASTIKA DEVELOPMENT CO. **ARIZON**

Property: in the Bradshaw mountains, Yavapai county, was leased t Frank W. Giroux, 1915, and under bond and lease to Cons. Ariz. Smelting Co who worked dumps in 1919. Sold in May, 1919, to the Swastika Silver Copper Co., which see.

SWASTIKA SILVER AND COPPER CO. **ARIZON**

Office: Huntington, W. Va. **Mine office:** Mayer, Ariz. **Freight and ex press office:** Peckes Siding, Ariz.

Officers: L. N. Frantz, pres.; Wm. Brown, 1st v. p.; C. E. Balton, 2n v. p.; F. W. Giroux, gen. mgr.-asst. treas.; John Faulkner, sec.-treas.

In May, 1919, company bought the property of the Swastika Development C

Property: the old Black Warrior, Silver Prince, Isis, and Hard scrabble claims, located in the Bradshaw Mountains, Yavapai county, one mi from the railroad. During 1915-1919 the property produced about $100,00 From 1910 to 1915 the Swastika Dev. Co. shipped ore with a value of $116,00 From 1874 to 1910 the Black Warrior and Silver Prince are said to have pr duced about half a million dollars.

Development: by 4 shafts, 70′, 225′, 250′ and 447′ in depth with sever thousand feet of drifting. Company estimates ore reserves of 100,000 to milling ore, assaying 12 to 16 oz. silver per ton. High-grade ore occurs pockets. The Prince vein has three known ore-shoots. On the property a five veins, only two of which have been worked to any extent.

Equipment: [illegible] 12 h. p. gasoline hoist, one 9 h. p., and 6 h. [illegible] has accommodations for 30 men.

[illegible] build a 50-ton cyanide plant and meanwhile a shipping [illegible]

THU[illegible] MINES CO. ARIZON

C[illegible]

Addr[illegible] Ariz.

Prop[illegible] claims, in Thumb Bu

district, 8 miles W. of Prescott.

Development: to depth of 125' by 2 shafts with total workings of 500'. Said to be several good showings on the property; ore contains silver, lead, copper and gold. Plans new equipment and developing in 1920.

TIGER GOLD MINING CO. **ARIZONA**

Formerly owned the Oro Belle & Gray Eagle mine, Crown King, Ariz., which see.

TILLIE STARBUCK MINES CO. **ARIZONA**

Address: A. J. Pickrell, Prescott, Ariz.

Officers: A. J. Pickrell, pres. and treas.; Alan Gardner, v. p.; Richard Lamson, sec.; also directors.

Inc. July 17, 1916, in Arizona. **Cap.,** $125,000; shares $1 par; non-assessable; 100,000 issued.

Cash on hand in June, 1917, $45,242. Operating expenses in 1916 were $4,758.

Property: 12 claims, 1 patented, 242 acres, on Slate creek, 15 miles S. of Prescott, Ariz., said to show a quartz fissure vein in porphyry and granite; 2' to 6' wide, dipping nearly vertical with N.-S. course. Three shoots, each 100' long, have been developed, with ore reported to assay $12 per ton in gold and silver.

Development: by tunnels, 2,000, 800, 150 and 600' long. Workings total 4,000' to depth of 600'. Raises have been driven between tunnels to cut the vein. Has been developing for past 5 years.

A cyanide plant was proposed in 1917, but whether erected is not known.

TIP TOP CONSOLIDATED MINING CO. **ARIZONA**

Address: Prescott, Ariz.

Officers: C. W. Davis, pres.-treas.; A. F. Muter, v. p.; F. L. Haworth, sec., with W. W. Elliott and D. E. Nelson, directors.

Inc. 1916, in Arizona. **Cap.,** $375,000. Company was organized to operate the old Tip Top silver mine about 25 miles south of Prescott, credited with a production of several million dollars, 1875-85, under Haggin, Head and Hearst.

The mine was originally opened to the 800' level; the present management has reopened it to the 200' level. The dumps, stope filling and low-grade ore left in the mine will be worked for silver and for the tungsten, which was formerly passed over. It is reported that there are 120,000 tons in the dumps that will assay 1½% tungstic acid, and over $5.20 per ton silver, largely as chloride.

Mine examined by G. A. Thayer, who estimated ore worth $792,000 to 300' depth and $2,000,000 under water to 800'. No information since 1918.

TUSCUMBIA MINING & MILLING CO. **ARIZONA**

Address: Jas. H. Sullivan, supt., Crown King, Ariz.

Inc. March, 1916, in Arizona. **Cap.,** $1,000,000; shares $1 par.

Property: the Tuscumbia mine, in the Bradshaw Mtn. district, carrying silver ores, said to be like those of Tonopah. A vein opened in May, 1916, is reported to show 3.8% copper and 115 oz. silver per ton in a shoot 50' long and 4' wide.

In March, 1917, ore was coming from 4 adits to a depth of 300'. No later report, probably idle, although in August, 1919, the mine was being sampled by outside capital.

UNITED ARIZONA COPPER MINING & SMELTING CO. **ARIZ.**

Office: P. O. Box 112, Phoenix, Ariz.

Officers: C. H. Dunlap, pres.; R. C. Baker, v. p.-treas.; C. W. Stott, sec., with C. F. Ainsworth, R. G. Brady, F. O. Longcor, E. F. Jones and Chas. H. Clarkson, 66 Broadway, New York, directors.

Inc. March, 1916, in Arizona. **Cap.,** $2,000,000; $1 par; non-assessable; 802,000 issued. Listed as a prospect on New York Curb.

Property: 22 claims, near Mayer, Yavapai county, Ariz.

Development: started June 1, 1916. Shaft is 835' deep and will be sunk to 1,200'. Crosscuts at 40' and 150' said to have cut vein 20' in width. Ore contains copper, gold, and silver.

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WOLF ARIZON
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LF CREEK MINING CO. **ARIZONA**

Officers: Jas. F. Keating, pres., Mayer, Ariz; A. J. McEwen, v. p.; N. Armstrong, sec.; John Rodden, treas., all of Clarksdale, Ariz.

Inc. 1919 in Arizona. **Cap.,** $500,000; par $1.

Property: 7 claims, 140 acres, 8 miles W. of Mayer, said to show gold-r-copper ore. Management states that shipping ore will assay 0.65 oz. gold, 70 oz. silver, and 11-19% copper, but does not give any tonnage.

Development: by tunnel, which was in 300′ Nov. 1, 1919. Property is rospect.

VAPAI CONS. GOLD-SILVER-COPPER CO. **ARIZONA**

Office: Prescott, Ariz. **Mine office:** Crown King, Yavapai county.

Officers: T. G. Norris, pres.; A. W. Edwards, v. p.; G. D. Morris, sec.,-s.; L. B. Mulhearn, asst. sec.-treas.

Lands: 18 claims, partly patented, including the Old Reliable mine, iles from Crown King; the Wildflower group, in Pine Grove district; the er group, in the Bradshaw Mountains, and the Crowned King mines, in the dshaw Mountains. The last named group, 18 claims, bought from B. A. mer, receiver of the old corporation, for $75,000, half in cash and half in res, has been a considerable producer, mainly of gold.

Property: is leased to the Bradshaw Reduction Co., which see.

Development: by several thousand feet of old workings on a con-vein, between porphyry and syenite, carrying slightly auriferous and highly entiferous copper ores, opened by a 170′ shaft.

Equipment: includes steam power, compressors, 10-stamp mill and -ton concentrator. About 20,000 tons of old tailings were sold in 1915 and ated in a flotation plant.

P. MINING CO. **ARIZONA**

Address: N. H. Getchell, mgr., Prescott, Ariz. Operates the Cash prop-r, 14 miles S. of Prescott in the Senator district, Yavapai county.

Dividends paid are said to amount to $15,000.

Development: has continued for several years and is now at 750′. The ton mill and concentrating plant has 5 Wilfley tables and a Monell slimer and last accounts was reported as producing $8,000 gold bullion per month.

JEROME (VERDE) DISTRICT, YAVAPAI COUNTY

IZONA VERDE COPPER MINING CO. **ARIZONA**

Mail returned from the advertised postoffice address: care W. M. Lazenby, O. Box 814, Phoenix, Ariz.

Property: 26 claims, near Clarkdale, a ⅔ interest in 16 claims in the New er district and 41 claims in the Cave Creek district. Company also had a ar option on 1,700,000 shares of stock in the Golden Reef Mining Co. hich see), owning the Golden Reef mine, 35 miles from Phoenix. Offered ck at 50c a share, May, 1917, solely on the prospective value of its holdings, ing itself "a corporation, with the possibilities of another Guggenheim Ex-ration Company," which is interesting, if true.

Presumably dead.

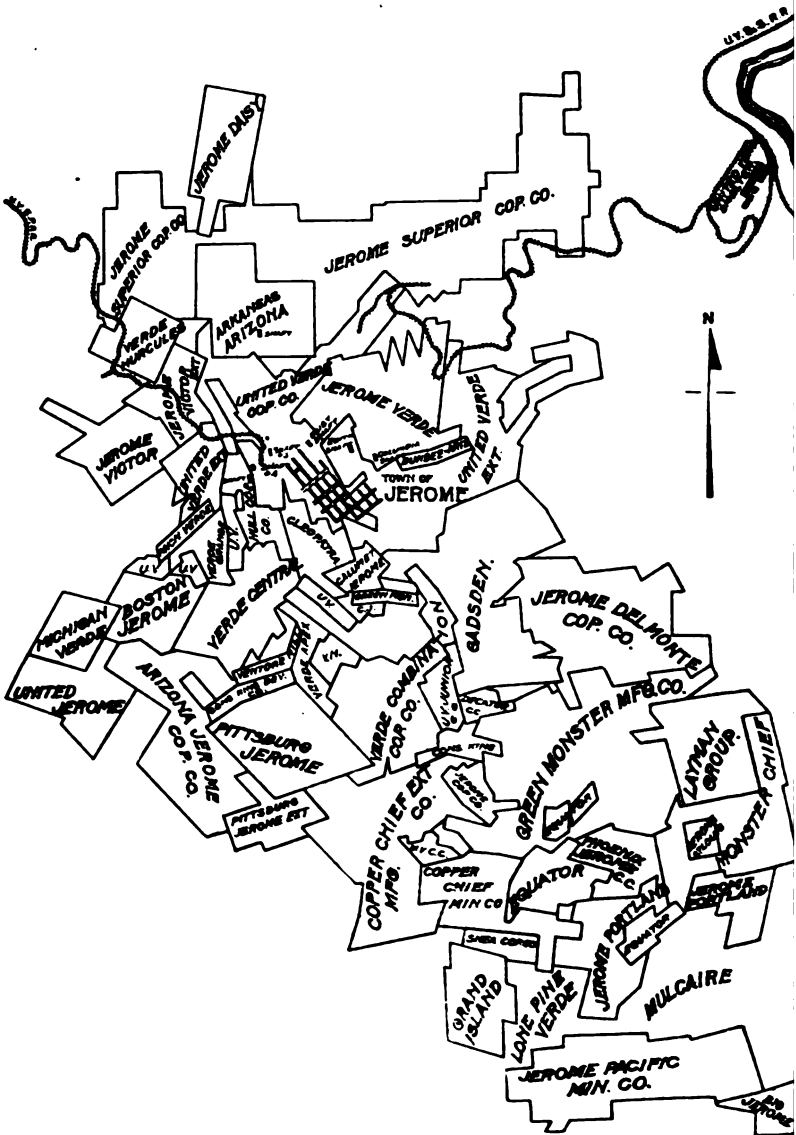
KANSAS & ARIZONA COPPER CO. **ARIZONA**

Office and mine: Jerome, Yavapai county, Ariz.

Officers at last accounts: John F. Boyle, pres.; H. P. Tear, v. p.; J. E. ...s, mgr., Jerome, Ariz.; H. N. Jasper, sec.-treas., Little Rock, Ark., and D. Tickner, directors; W. H. Galligan, supt. Controlled by the Goodrich-...ber Co., 60 Broadway, New York city.

Inc. June 25, 1906, in Arizona. **Cap.,** $1,500,000; increased Jan., 1912, to ...,000, and 1916 to $6,750,000; $1 par. Company refinanced in 1915 and ...ue of $150,000 authorized for further development work; $68,800 issued.

Property: the Royal Irish group, 14 claims, 280 acres in the Verde dis-...show felsite porphyry and diorite cut by olivine basalt dikes run-...h and dipping 60° to the east. Orebodies lie on each side ...porphyry and quartz schist. Orebody said to be 85′ wide



MINING PROPERTIES OF THE JEROME DISTRICT.

here encountered on 1,400′ level and shows chalcopyrite and some bornite. Extent of shoot not yet determined. Company acquired the adjoining claims, 20 acres, of the Mowles Copper Co. in May, 1916.

Development: by 1,650′ shaft with about 6,000′ of workings.

Equipment: includes three 150 h. p. boilers, hoist good for 2,000′, air compressors, machine shop, power house, and a mile of road, connecting with United Verde Copper Co. railroad. Employs 50 men.

The property was shut down indefinitely, August, 1917, after spending $100,000 in a crosscut on the 1,000′ level. It was reported the Goodrich-Lockhart interests were bound by terms of contract to resume operations within 6 months after the close of the war. The pumps are out, but conditions warrant drifting in the pyrite bodies cut in the crosscut, in the hope of getting copper ore.

BIG JEROME COPPER CO — **ARIZONA**

Mail returned unclaimed, March, 1919, from Los Angeles, Calif., and former fiscal Office, Arizona Securities & Trust Co., Phoenix, Ariz.

Officers: L. L. Wallace, pres.; F. M. Dorsey, v. p.; Fred T. Sheppe, sec.; with C. T. Talbert and J. B. Bourne, directors.

Inc. in Arizona. **Cap.**, $2,500,000; 25c par; 5,000,000 shares given in payment for property are pooled, balance said to be treasury shares.

Property: 32 claims, about 640 acres, 1½ miles S. W. of the United Verde Co. and adjoining the Pittsburgh Jerome property and the Copper Shoe group in the southern part of the camp, near the Shea group.

Company's promotion stock was advertised luridly at 10c a share in December, 1916, during the Jerome boom.

No development work of importance has been done on the property. Unfavorably regarded. New York Tribune showed it to be a twin fake of the Ray Arizona of Wilson & Co.

BLUE MONSTER COPPER CO. — **ARIZONA**

Address: Room 817, 7 Water St., Boston, Mass., and Cherry, Ariz.

Officers: L. N. Wombacher, pres.; Thos. Sutcliffe, v. p. and supt.; Jos. H. Morgan, sec., Prescott; P. J. Keohane, treas., with Jos. Lee, directors.

Inc. Dec. 26, 1916, in Arizona. **Cap.**, $2,000,000; shares $1 par. Property acquired for 640,000 shares, which are held in pool until $75,000 has been raised for development work.

Property: 33 claims, unpatented, and a water right on Cherry Creek, in the Verde mining district, Yavapai county, 12 miles S. E. of Jerome, 32 E. of Prescott. The group is said to be located along the great Verde fault, which cross limestones against schist, and in this group is in places covered by conglomerate and lava flows. The crushed zone, 300′ or more wide, is iron stained, and shows green copper stains, and on Blue Jay claim 4′ of 2% ore. W. B. Fisher reports that he believes valuable ore in commercial quantities will be found by development. Experience at the various other Jerome properties shows the faulting to be post mineral and the ore seen in the fault either drag or due to deposition by surface waters. Shaft 280′ deep, peacock ore reported at 100′ depth.

Property favorably reported on by W. C. Thomas and Cyril Wigmore.

BOSTON & JEROME COPPER CO. — **ARIZONA**

Office and mine: Jerome, Ariz.

Directors: include Richard Kingdon, supt. U. V. Extension; J. S. Baker, L. E. Hesler of Prescott, and E. C. Farrel of Clarksdale.

Inc. 1907, in Arizona. **Cap.**, $1,500,000; shares $1 par; increased, May, 1908, to $2,500,000; shares $5; issued $129,090. Listed on San Francisco Exchange.

Property: the Juniper group of 9 claims, 146 acres, 2 miles south of Jerome, north of the Verde King (or Verde Central), and adjoins outlying detached claims of the U. V. Copper Co. There is a limestone cap over much of the property, but copper staining is said to show in some places.

Development: includes 3 tunnels of 400′ aggregate length and 130′ shaft, sunk on a large porphyry and schist reef carrying copper sulphide in small amount in bottom. Property was idle from February, 1908, to 1917. Is a prospect,

that is west of the well-recognized mineral belt of the district, though con
ered to be worthy of exploration. In June, 1919, property idle, company w
out funds and officers had no plans for financing.

CALUMET & JEROME COPPER CO. **ARIZO**

Office and mine: Jerome, Yavapai county, Ariz.

Officers: G. W. Avery, pres. and gen. mgr.; John Rauber, v. p.; Geo.
Avery, sec.-treas.; preceding, with Chas. P. Avery, directors.

Inc. May, 1907, in Arizona. **Cap.,** $1,500,000; shares $1 par: iss
600,000. Money on hand May 1, 1919, $25,000. Listed on Boston Curb;
shares sold at auction in New York, July 23, 1919, at 37 cents each.

Property: 10 claims, patented, 160 acres, one-half mile south of
United Verde mine, and adjoining the Cleopatra. Claims show schist
quartz porphyry in part cut by basalt and covered by basaltic tuff. Rocks
identical with those of adjacent properties. New shaft going down thro
basalt, and cutting schist showing scattered particles of iron and of copper
phides in places. During 1918, acquired a two-third interest in the 101, 102,
103 claims adjoining the United Verde and a one-half interest in the C
claim.

Development: includes a main 13'x15' three compartment shaft r
600' deep, sunk on the N.-S. fault on Remington claim; several tunnels,
1,115'; a new main tunnel, now 2,100' long. At 360' it is reported to have pas
through the fault into mineralized green schist. Headings on the 600' level
said to show "schist impregnated with pyrite and chalcopyrite, and similar r
is cut in a winze sunk from the 600' level." Underground working total 7,0

Diamond-drill holes reaching a depth of about 450' below the 600' level c
tinued in schist and greenstone showing pyrite and chalcopyrite, but failed
reveal ore of commercial grade. Company reports "a drill-hole on the Calu
claim cut body of pyrite and chalcopyrite ore for approximately 200'." C
2,500' of drilling had been done in 1919, to August. November 30, 1919, N
drill hole down 500'. The ore opened on the Gadsden property, 1,000' on
east of the C. & J. tract is regarded as a favorable factor.

Equipment: a 285 h. p. McIntosh-Seymour Diesel engine direct c
nected to a 200 kva., C.-W. generator and exciter with panel board and G
current regulator for 480 volts; a No. 10 Imperial, I.-R. type, 513 cu. ft. c
pressor by a 75 h. p. Westinghouse motor; Lidgerwood double-drum hoist co
ter-balance, driven by a 75 h. p. Westinghouse motor, good for 1,600' depth;
17 Buffalo blower driven by 10 h. p. a. c. motor; No. 5 Leyner drill-sharpe
and oil furnace; 9 I.-R. jackhammer drills; 2 No. 148 Leyner-Ingersoll dril
machines; No. 7 Cameron special sinking pump; 2, 4 stage No. 3 electric sta
pumps, cap. 170 gal. per min. against 540' head, driven by two 50 h. p. a
motors. There are 3 cages, 8 mine cars; 40' head frame; two 5,000 gal. coo
towers; two 5,000 gal. water tanks; two 10,000 gal. crude oil tanks.

The market manipulation of the stock and the misleading and often f
statements given by various newspapers concerning alleged ore-bodies
closed by crosscuts and drifts of the mine in 1917, 1918 and 1919, hurt the g
name of a promising prospect.

CALUMET & VERDE COPPER CO. **ARIZO**

Address: Jerome, Ariz.

Officers: John Rauber, pres.; H. M. Gibbes, sec.; Geo. S. Avery, W
Blue and N. C. McLeod, directors, being Calumet-Jerome interests.

Inc. Nov., 1916, in Ariz. **Cap.,** $1,000,000; shares $1 par.

Had an option on the 101, 102, 103, and Ohio claims, now controlled by
Calumet & Jerome Copper Co., which see.

CLEOPATRA COPPER CO. **ARIZO**

Is controlled by Chas. W. Clark, trustee for himself and associated inter
Jerome, Yavapai county, Ariz.

Officers: R. E. Tally, pres.; F. S. Stephen, v. p.; C. L. Nabers, sec.

Inc. 1901 in Arizona. **Cap.,** $10,000,000; shares $1 par; assessable. 8,6
156 shares issued.

Property: 11 patented claims, about 149 acres, south of the U

Verde mine in the Verde mining district, shows fissure and gash veins carrying ores assaying 1 to 65% copper and 1 to 500 oz. silver per ton, with fair gold value. Has 6 shafts, of 25 to 150′ depth, and 9 tunnels, the Dillon tunnel 3,200′ long, planned to connect with the "1888' shaft.

As company is now practically owned by W. A. Clark (United Verde Copper Co.), no further exploration work will be done from the old workings.

CONS. KING DEV. & COLUMBIA COP. MG. CO. **ARIZONA**

Controlled by Chas. W. Clark, trustee for himself and associated United Verde C. Co. interests.

Office and mine: Jerome, Yavapai county, Ariz.

Officers: R. E. Tally, pres.; S. F. Denison, sec.

Inc. in Arizona. **Cap.,** $6,000,000; shares $1 par.

Property: 11 claims, 154 acres, south of the United Verde mine, showing several bodies of oxidized and sulphide ores, carrying fair values in copper, gold and silver. Mine has a 100′ shaft and a 750′ tunnel, with about one-half mile of workings. Idle since 1913.

COPPER CHIEF MINING CO. **ARIZONA**

Worked under lease and bond by Hayden Development Co., Jerome, Yavapai county, Ariz. W. S. Fulton, pres., Waterbury, Conn. Owned by the Hayden and Midgeon estates, Torrington, Conn., Franklin Brooks, Colorado Springs, Colo., and Arthur Hendey. J. F. Matson, supt.

Property: 21 claims, 11 patented, adjoining Senator Clark's Iron King mine in the Black Hills range, 3½ miles S. E. of Jerome. Two isolated claims cover the water supply and mill-site. The claims are in the belt of metamorphosed igneous rocks and schists forming the southern extension of the United Verde or Jerome schist area. The Copper Chief-Iron King ore-body, which runs across 3 of the claims, is 60 to 95′ wide, and consists of copper-bearing iron oxide carrying gold, silver and a little copper, the total value being from $8 to $13 per ton.

Development work on this deposit shows that it extends downward about 315′ below the outcrop. Material composing this lens is completely oxidized from the surface down to a depth of 226′. The bottom of the lens consists of massive pyrite with about 5′ of enriched ore between the sulphide and the overlying oxidized material. Less than half of the orebody is payable ore in the oxidized zone and about 15% of the lower lying sulphides can be mined at a profit.

Development: by 400′ shaft, 2,225′ of work on the 100′, 160′, 220′ and 280′ levels. The Wonderful shaft is 200′ deep with 250′ of drifts. A crosscut tunnel is being driven to connect with the bottom of the shaft. Mine reported to have a large tonnage of low-grade oxidized ore, which cannot stand transportation to a distance. Future of the property depends upon development of sulphide ore in quantity.

Ore reserves: 58,00 tons of oxidized ore of $12 gold and silver content; 8,240 tons of mixed oxide and sulphide, 1,000 tons of $50 per ton enriched ore and 8,000 tons of other ores running from $15 to $25 per ton.

The Wonderful claim has been developed by a 160′ tunnel and 4 winzes with ore estimated at $25,000.

Equipment: includes 200-ton cyanide mill, erected in 1915, electric power, air compressor and hoist. During 1918, mill treated about 60 tons per day.

Production: from Jan. 1, 1916 to Nov. 1, 1916, was 30,148 tons with total profit of $48,199. Gross value of ore milled was from $8.03 to $13.72 per ton, with a recovery of 66% to 79%. Smelter shipments, September, 1917, amounted to about 320 tons of 3% copper ore per month. No reports of production have been received since.

COPPER-ARIZONA COPPER CO. **ARIZONA**

Address: Phoenix, Ariz.

Officers: Alex. Mackay, pres.; W. C. Foster, v. p.; A. J. Smith, sec.-with L. H. Chalmers and F. S. Stephen, directors.

Inc. in Arizona. **Cap.,** $500,000; $1 par; outstand-

March 21, 1916.

ing 425,000 shares, of which 225,000 belonging to F. S. Stephen and Al Mackay, former owners, were in escrow until September 20, 1917. Equita Trust Co., New York, transfer agent. U. S. Corporation Co., New Yo registrar. Listed on New York Curb as a prospect.

Property: 2 claims, the Greenup and Greenflower, lying betwe United Verde Extension on the east and Jerome Verde on the west, at Jero also a half interest with the United Verde Extension Co. in Jerome Tunnel C consisting of 5 claims and tunnel rights.

Claims show a blanket deposit of 5% conglomerate ore on the surface, 9 long.

Development: main shaft is over 800' deep, sinking was temporar stopped owing to water, but was under way in August, 1919. Property gradua draining by tunnel of United Extension Co., which will soon be connected w the Dundee, providing an outlet for ores. Expecting to resume sinking to 1,200' level, about April, 1919. Total underground workings of 1,500'. Co pany reports about 30,000 tons ore in sight averaging 3% to 5% copper, exp to treat this by new leaching process, also that a contact of schist and quar porphyry passes through the property, which they consider important geologi condition. Contact will be prospected on the 1,200' level. During 1917, repor to have shipped 2,200 tons carbonate ore from near surface.

Equipment: includes 80 h. p. gasoline engine, 500 cu. ft. compressor electric motors, etc. New pumping plant installed, 1917.

In October, 1919 a carload of carbonate ore was being tested by leaching the Humboldt smelter plant.

GADSDEN COPPER CO. **ARIZON**

Office: Bisbee, Arizona. **Mine office:** Jerome, Ariz.

Officers: M. J. Cunningham, pres.; Arthur Houle, v. p.; Fred Sutt sec.; M. Newman, treas., with W. B. Gohring, W. H. Brophy, and L. C. Sh tuck, directors. J. K. Hooper, supt.

Inc. Dec. 2, 1916, in Delaware. **Cap.**, $1,000,000: shares $1 par; 300,0 issued for property. Control is held by the Calumet & Arizona Mining Co., wh has an option on 70% of the stock, agreeing to spend $100,000 on the property, about $10,000 monthly.

For each dollar so expended by the C. & A. Co. it shall receive one sha of the stock of the Gadsden Copper Co. To July 9, 1919, approximately $460,0 had been spent in this development work. Annual meeting, second Wednesd in January. Listed on Boston Curb.

Property: 42 claims, about 650 acres, including the Monster, News Mi ing Co., Walker-Larrimore and Howe groups. Land lies between the Unit Verde Extension and Green Monster properties.

Development: a 4-compartment shaft to 1,200' depth with 4,000' drifting and cross-cutting. Work was retarded by bad ground and mu water, but a depth of 1,230' had been reached by September, 1918. Crosscut 1,300' level driven towards the North and South fault, cut it about 1,800' N. W. in December, 1919, and in their S. W. drift opened up ore runni $[illegible] copper, 3 oz. silver, and $3 g. [illegible]. The rock is a decomposed schist sha [illegible] occasional evidences of chalcopyrite and bornite. A winze is being sunk [illegible] determining its extent.

The site selected for the shaft is in the limestone covered area, north of t great United Verde fault and about ½ mile from the Verde Combination shaft. [illegible] enough [illegible] was no indication whatever, it was calculated by C. & [illegible] engineers to reach underlying geological conditions of promise. Schist w [illegible] at 40' and [illegible] at 70' in depth.

Equipment: [illegible] on the east, includes electric hoist go [illegible] 2,000' [illegible]. Average [illegible] water is 800 gal. per minute.

[illegible] managed by a company-[illegible] [illegible] exploration work. A

GRAND ISLAND MINING CO **ARIZON**

Address [illegible] Chas. Anderson, supt.

Officers [illegible] Gallagher, v. p.; E. Rucke

...; F. P. Jones, treas., with J. S. Eberman, directors.

Inc. 1908 in Arizona. **Cap.**, $1,500,000; $1 par; 1,422,710 shares issued.

Property: 14 claims, in the Jerome copper district, adjoining the Copper Chief and Shea mines on the south. Idle from 1912, until company secured ...erals during the boom of 1916. Claims show a quartz vein 4' wide on surface ...d 8' wide on 200' level, in porphyry-schist and sheared diorite. Ore carries ...pper with gold-silver values; 3 other narrow veins said to outcrop on property.

Development: by 520' shaft with S. W. crosscut on 200' level, in jasper ...d schist. On 500' level expect to cut ledge within 200' from shaft. Small hoist, ...mpressor, etc., installed. Shaft enlarged to 3 compartments.

Considered a fair prospect.

GREAT VERDE EXTENSION COPPER CO. ARIZONA

Address: Shea Bldg., Jerome, Ariz. J. W. Hubbard, supt.

Officers: W. P. Geary, pres.; O. S. Wakeling, v. p. and gen. mgr.; H. H. ...ajor, sec.-treas.

Inc. 1916 in Arizona. **Cap.**, $750,000; shares 25c par.

Property: 9 fractional claims, adjacent and E. of the United Verde ...xtension, at Jerome.

Development: by 3-compartment shaft, down 53', Oct., 1917, in sand ...ne and limestone and reported to show carbonates, chalcopyrite and some ...pper glance.

One of the many speculative promotions formed during the 1917 boom at ...erome. No recent information.

GREEN MONSTER MINING CO. ARIZONA

Address: Jerome, Ariz.

Officers: W. S. Humbert, pres.; Phoenix, Ariz.; David Morgan, v. p. and ...ms. engr., Jerome, Ariz., with T. A. Riordan, Flagstaff; W. W. Lawhon of ...Phoenix, directors; G. G. Fuller, sec.-treas., Jerome; Le Roy Anderson, general ...counsel.

Inc. Dec. 8, 1915, in Arizona. **Cap.**, $750,000; 50c par; 1,200,000 shares ...outstanding.

The financial statement of October 31, 1918 shows cost of properties, $365,-...; buildings, machinery, etc., $60,986; cash, Liberty bonds, etc., $100,990; accts. ...ivable, and supplies, $14,225; development expense, $187,763; taxes paid, ...664; deferred operating expenses paid, $85,014; total, $810,559.

Property: 37 unpatented and 32 patented claims, all but two in one ...roup, situated 3 to 4 miles S. E. of Jerome; the 2 other claims adjoin the ...Cabinet & Jerome and the Verde Combination. The group includes the Cliff ...ine, once the property of the Geo. A. Treadwell Mining Co.; also the Brook-...yre mine. The tract shows several large jasper outcrops, that the Cliff claim ...howing commercial ore at the surface.

Development: during 1918 included 620' of shaft sinking and 2,312' of ...tunnels. In the Gorge tunnel on the Cliff claim the low grade ore-body appeared ...to be bottoming in a quartz porphyry formation. The Dorothy May shaft is ...200' deep, bottom in diorite. On 500' level, the N. W. crosscut cut the Revenue ...vein and encountered quartz-porphyry contact at 600', which here contained ...some chalcocite and chalcopyrite in a highly kaolinized leached zone. On 900' ...level contact 160' from shaft showed slight iron mineralization. The Cliff shaft ...connects with the Gorge tunnel. Drifts started both east and west on a ...mineralized quartz porphyry-diorite contact developed a low grade ore-body ...which 100' below seemed to be bottoming in quartz-porphyry when work was ...discontinued.

Property contains very promising surface outcrops, perhaps the best seen ...in the district, but although the company's operations were supervised by expert ...men in financial, legal and technical lines, its operations have not as yet found ...ore in commercial amount, and in March, 1919, directors decided to suspend ...operations for an indefinite period.

HAYNES COPPER CO. ARIZONA

Succeeded 1916, by Jerome-Victor Extension Copper Co., which see.

HULL COPPER CO. ARIZON

Address: Jerome Yavapai county, Ariz.

Officers: Robt. E. Tally, pres.-gen. mgr.; Geo. Kingdon, v. p.; Le R Anderson, sec.; C. L. Nabers, asst. sec., with Thos. Taylor and John H. Pa directors.

Inc. 1906, in Arizona. **Cap.**, $10,000,000; $1 par; non-assessable; 7,50 000 issued.

The suit filed, 1917, at Prescott, Ariz. v. the Hull Copper Co. and Chas. Clark, trustee, by minority stockholders, for the purpose of forcing the surrend and redistribution of 7,521,727 shares of stock for cancellation; also requiring accounting and a temporary injunction to stop the "levying, seizing or sellin of Hull Copper Co.'s property or assets, was settled by compromise in t Superior Court of Yavapai county, in August, 1918. By the terms of this co promise, Clark is to return to the treasury of the company, 2,500,000 shares stock for cancellation and is to have his title quieted to 5,181,173 shares still r maining in his possession. This gives Clark control of the Hull organizatio The dismissal of the suit between the Hull interests and the United Verde E tension Mining Co., pending in the Supreme Court over the title to the Copp Chief claim is also embodied in the compromise.

Property: 21 claims, partly fractional patented, 249 acres, shows syenit diorite and slate, a continuation of the formation of the United Verde, adjoi ing, reported by company to show 21 ore-bodies, carrying some oxidized or but mainly sulphides, as developed. The "1888" shaft, of 475′ depth, has pr duced a small amount of ore, but not at a profit.

Development: the Hull property and that of the Cleopatra Copp Co. have been developed by a 5,200′ adit driven from Deception gulch, throug Cleopatra ground into the Hull property. A winze has been started on the lo at 5,000′ from the portal.

The Dillon tunnel extends completely around two sides of the United Ver ground. There are many drifts branching out from the tunnel and these usual follow a fracture plane in the rock showing 1 or 2′ of fractured country ro which usually shows pyrite and may be slightly copper-stained. These drif twist and turn in a manner showing lack of system and finally branch out li a tree, each branch following a fracture plane, some of which show 2 or 3″ of co per ore, and some are not even copper-stained. These fracture planes a described as being "leaders" from the big ore-bodies below, and because t country rock contains a small amount of pyrite disseminated through it, the ragged workings were stated to block out low-grade concentrating ore.

On the Silent claim a drift from the tunnel exposed an irregular body excellent chalcopyrite from which 2 shipments were made, the ore assaying 8½ copper. The stope is about 60′ long, in places is 12′ wide and of irregul height. A 160′ raise shows it to branch into 2 seams of 2′ and 3′ wide. An i accessible winze was said to show 13′ of ore, but inasmuch as shipments ha ceased, this seems questionable. Beyond this ore-body the tunnel turns th southwest corner of the United Verde property and follows along its weste boundary to the "1888" shaft. For part of this distance the tunnel follows a le of quartz devoid of copper. Aside from the 1 lens of chalcopyrite mentioned th showing in the tunnel is exceedingly discouraging. The mine has upward of miles of openings, but the manager states that these old workings are not dee enough to develop the extension of the main ore-bodies of the United Verde. N development work of importance done since 1916, nor is any contemplated.

Equipment: includes a 94 h p steam plant and a gasoline engine, wit 2 hoists, one being a steam hoist, installed 1909, at the "1888" shaft. There als is a small air-compressor.

JEROME BISBEE COPPER CO. ARIZON

Formerly Jerome Portland Copper Co.

Office: Jerome, Ariz.

Officers: Geo. Brockshire, pres.; L. H. Beyerle, sec.-treas.

Cap. $75,000 shares, par 50c; outstanding about 800,000 shares issued i exchange for Jerome Portland stock.

Property: in Jerome district, at site of old Equator smelter, near Copper Chief mine.

Development: shaft over 500′ deep, cutting diorite at 515′ with 2,800′ of underground workings. Flow of water fairly heavy.

The management of the former company apparently did everything possible to divert money from the devlopment of the mine into their own pockets. The policy of the present officers appears to be very different, and whatever money is raised will, it is said, be used to develop the property.

JEROME CENTRAL MINING CO. **ARIZONA**

Office: Jerome, Ariz.

Officers: W. M. Malady, pres.; Peter Gordon, v. p. and treas.; Dr. Almer Harding, sec.

Inc. 1918 in Arizona. **Cap.,** $1,000,000; shares $1 par; none issued.

Property: 3 claims, adjoining the Verde Combination, 2 miles from United Verde.

Management waiting to see results of development work at Verde Combination mine, before selling stock to finance the Jerome Central. Surface samples contain copper, gold and silver values.

JEROME CONGER MINING CO. **ARIZONA**

Office: Jerome, Ariz.

Reported company has been organized to acquire the Conger mine. Ore carries gold and copper.

JEROME COPPER MINING CO **ARIZONA**

Address: A. L. Johns, supt., Jerome, Yavapai county, Ariz.

Officers: E. A. Kastner, pres. and treas.; H. Brinkenmeyer, v. p.; G. S. Hoffman, sec., all of Prescott, Ariz.; Homer King, F. M. Burdick, Gus Zorke, B. M. Orde, F. Wellington Hay, Geo. A. Gilbert and H. E. Crawford, directors.

Inc. Nov. 25, 1916, in Arizona. **Cap.,** $2,000,000; shares $1 par.

Property: 5 patented (one fractional) claims, N. and W. of the Green Monster at Jerome, and long known as the Hooker Ewing group.

Development: 1,025′ tunnel to cut a diorite-schist contact exposed in a 90′ shaft at 860′ from portal. About 1,800′ of tunnels, crosscuts, etc., were driven, the results of which are said to have been unsatisfactory.

Option held by the General Development Co. has been abandoned.

JEROME DAISY COPPER CO. **ARIZONA**

Address: Box L., Jerome, Ariz.

Officers: J. F. Mowles, pres.; R. Kingdon, v. p.; A. J. Kisselburgh, sec.; J. J. Cain, treas., with J. F. Hubbard, H. D. McVay and A. G. Dulmage, directors; J. F. Mowles, supt.

Inc. Oct. 5, 1916, in Arizona. **Cap.,** $1,000,000; shares 50c par; 1,129,975 issued, non-assessable.

Property: 22 unpatented claims at Jerome, Ariz., said to show a copper bearing contact vein between quartz, porphyry, schist and diorite with limestone capping.

Development: by 235′ shaft, to be sunk to 500′, followed by lateral work. The present bottom is in sandstone, making 70 gal. water per min. Crosscutting under way on 230′ level in 1917 was said to have exposed a gossan body 17′ wide, on which a winze is sunk.

Equipment: 500 cu. ft. Sullivan compressor, 75 h. p. engine, 25 h. p. hoist, Cameron pump, etc.

A prospect whose shares are offered at 50c in 1919.

JEROME DEL MONTE COPPER CO. **ARIZONA**

Office: Room 1018, 50 Congress St., Boston, Mass. **Mine office:** J. A. Eldridge, supt., Jerome, Ariz.

Officers: F. E. Young, pres.; A. B. Ewing, treas.; above with Thomas S. Woods, E. P. Thompson, Fred Sutter, E. S. Armstrong, Tasker L. Oddie, directors; E. S. Armstrong, managing director.

Inc. in Arizona. **Cap.,** $2,000,000; $1 par; 303,000 issued. Listed on Boston Curb.

Property: 41 claims and fractions, about 700 acres, in the Verde mini district, Yavapai county, Ariz. Property being developed by 3-compartm shaft, down 500′ in September, 1917, and sunk in limestone; much water countered.

Equipment: electrically-driven hoist of 1,500′ capacity, Ingersoll-Ra compressor, 400-gallon Cameron centrifugal pump.

A prospect. Idle since January, 1918.

JEROME GRANDE COPPER CO. **ARIZO**

Address: Jerome, Ariz.

Officers: J. J. Cain, pres.; J. W. Hubbard, v. p.; J. C. Scott, sec.-trea with C. G. Lagstrom and W. Hales, directors.

Inc. July, 1917, in Arizona. **Cap.**, $1,000,000; shares 50c par.

Property: 5 patented claims, 71 acres, located on southern slope Smelter Hill, the United Verde mine being on the opposite slope. Lands forme were owned by Verde Grande Copper Co., which suspended operations in 19 In 1917 bondholders, who were also stockholders in that company, foreclo mortgage and the property was bought in at Sheriff's sale by J. C. Scott, trustee, for the bondholders, who then organized present company.

Development: 838′ shaft, with 560′ crosscut from it. Also two tunn with about 400′ of workings. Claims show diabase, diorite, slate, all schist c with stringers of ore carrying chalcocite, and auriferous chalcopyrite, occurri sprinkled through the schist, but not in commercial quantity. Management off treasury stock to finance the company, planning to extend the crosscut above 4 where ore in commercial quantity is expected. Property is favorably situat but like most of the Jerome properties is a mining gamble.

JEROME NEW YORK COPPER CO. **ARIZO**

Mail returned unclaimed March, 1919, from Jerome, Ariz.

Inc. June, 1917, in Arizona. **Cap.**, $2,000,000; shares $1 par.

Property: 2 claims in the Verde district with reported good surfa indications. Stock offered at 25c, October 20, 1917. Believed to be idle.

JEROME-PACIFIC EXTENSION MINING CO. **ARIZO**

Address: Jerome, Ariz.

Organized in July, 1917, by N. Schutz, J. M. Layman, R. E. Moore and T. Shea of Jerome, with a capital of $750,000, to develop an area S. of the Jero Pacific. A prospect. No recent information; believed to be idle.

JEROME-PACIFIC MINING CO. **ARIZO**

Address: Jerome, Ariz.

Officers: Mrs. C. V. Hopkins, pres.; J. B. Harper, v. p.; foregoing w T. C. Mulcaire, I. M. Sutton, C. W. Small and H. F. Ashurst, directors.

Inc. Sept. 16, 1916, in Arizona. **Cap.**, $750,000; shares 50 par; 750,0 issued; non-assessable.

Property: 36 unpatented claims in Verde district, 5 miles S. E. Jerome, on the E. slopes of the Black Hills.

Geology: replacement bodies in schists, dipping 80° N. and pitchi E.-W. Surface conditions are similar to those at the United Verde and Uni Verde Extension mines, that is, they carry large jasper outcrops, and sh oxidized ore, which assays up to 18% copper, 8 oz. silver, and $6.80 gold per t

Development: by 2 vertical shafts, 35′ and 65′ deep; also 6 tunnels fr 35 to 270′ in length. These are to be sunk and extended. Expenses in 19 totaled $9,000, covering 2½ miles of road and assessment work.

The property warrants development work, which will, it is said, be start when company is financed.

JEROME PORTLAND COPPER CO. **ARIZO**

Reorganized as Jerome Bisbee Copper Co., which see.

The decision rendered in the suit filed by the minority stockholders in 19 against the president of the company, A. B. Frame, stipulated that Frame retu to the treasury 469,000 shares of stock fraudulently obtained by him. T company assets were bought in for debts at receivership sale for $14,000, parties interested in the welfare of the company and an option given to Jerome-Bisbee Copper Co. to purchase the property at the same figure. Acc

g to advices, stock could be exchanged share for share into Jerome-Bisbee ck until July, 1919, upon payment of transfer charge of 3c per share.

EROME-ST. LOUIS COPPER MINING CO. **ARIZONA**

Address: W. P. Burke, pres., Jerome, Ariz.

Officers: A. Brockman, v. p.; J. M. Sullivan, sec.; G. Brookshire, treas.; E. Burke, E. E. McFarland and J. H. Sontag, directors; J. Riley, supt.

Inc. Nov. 13, 1916, in Arizona. **Cap., $750,000;** shares 50c par.

Property: 8 unpatented claims, 3 miles S. of Jerome, between the Green ...ster and the Jerome Portland, crossed by great Verde fault.

Development: shaft-sinking in limestone under way. Encountered ...er at 100' stopping all work until pumps are secured. Has 25 h. p. hoist. About $10,000 said to have been spent to mid-1917. No recent information.

EROME SUPERIOR COPPER CO. **ARIZONA**

Address: Clarkdale, Ariz., or 644 Title Insurance Bldg., Los Angeles, ...ifornia.

Officers: Melville T. Fraser, pres.; Tod Ford, v. p.; G. D. Case, sec.-...s.; Geo. Mitchell, gen. mgr., with C. E. Selby, directors.

Inc. May, 1916, in Arizona. **Cap., $750,000;** 50c par.

Property: 202 unpatented claims in Verde district, 1 mile N. of Jerome ...1 mile N. W. of Clarkdale includes Sutcliffe and Stanridge groups.

Development: shaft 700' deep, Sept. 1, 1919, said to have an encourag-...showing of chalcocite and copper iron sulphides. West drift on 500' level ...ted in leached zone for 300'. Water handled, 40,000 gallons daily.

Equipment: includes 80 h. p. hoist, 6-drill compressor, assay office, etc. The new Verde Tunnel and Smelter R. R. crosses the property for 2½ ...

EROME VERDE COPPER CO. **ARIZONA**

Offices: 60 Broadway, New York; Phoenix, Ariz.; Jerome, Ariz.

Officers: E. O. Holter, pres.; W. R. Barbour, v. p.; I. M. Sutton, sec.-...s., with T. E. Campbell, Heath Steele, Robert Frese and F. V. Henshaw, ...ectors; J. B. Harper, supt.; H. P. Henderson, cons. engr.

Inc. Dec., 1906, in Arizona. **Cap., $5,500,000;** $1 par; non-assessable; ...239,197 issued. Registrar & Transfer Co., New York, transfer agent and ...gistrar. Listed on Boston and New York Curbs. Was organized as successor ...Verde Queen Copper Co., giving old shareholders $2,501,000 in stock, which ...held by the old company in a single certificate, and is practically escrowed; ...000 shares of this were to be distributed on and after July 3, 1916. Annual ...ting, second Monday in November.

In May, 1917, capital was increased from $5,000,000 to $5,500,000, by issuing ...000 shares, which were offered at $1.50 each; 240,000 were sold; total shares ...treasury, 180,783 in November, 1918.

Financial Statement, years ended October 1:

Year	Sale of Shares	Sale of Liberty Bonds	Sale of Ore	Previous Balance	Total Income	Mine Expenses, etc.
918.....	.....	$100,080	$34,569	$181,718	$329,407	$311,041
917.....	$408,735	.....	.....	166,948	588,370	212,168

On October 1, 1918, cash assets amounted to $137,121, and current operating ...s, $17,724. A year later, cash assets were $100,228.

Property: 28 claims, patented, 480 acres, lying E. of the United Verde ...d adjoining the Little Daisy mine of the United Verde Extension, shows ...iron gossan with outcrops of copper ore in limestone capping on the Verde ...Columbia claims.

Development: by 1,060 ft. three-compartment Columbia shaft, with ...000' of workings, mainly on what is termed the 1,100' level, which corresponds ...with the 1,400' level of the U. V. X. These workings expose the typical min-...ralized schists of the ore-bearing formation beneath the limestone and lava ...capping; and in many places oxides, carbonates, and sulphides of copper occur. Average assays were reported by former management, at 8.4% copper. The ...ine is wet, and has electric pumps with 200-gal. capacity, working against 1,100'.

The promising disclosures on the Little Daisy mine of the United Ver Extension, adjoining this property, resulted in an option being given on t Jerome Verde property until June 15, 1915, to the U. V. X.. This option pr vided for the payment of $500 per month and that 100′ of work per mon should be performed. Under the option 935′ of drifting and crosscutting w done on the 800′, 775′ on the 1,200′, and a little work was done on the 1,4 level. Results were unsatisfactory and option was relinquished after an expen ture of $50,000. In April, 1916, an agreement was made with U. V. X. und terms of which said company is to do 150′ of development work per month, to paid for by Jerome Verde on the basis of the company's working costs, plus 15 royalty; the work was being done on the 1,400′ level of Jerome Verde. This the only interest U. V. X. had in Jerome Verde. This second agreement e pired on December 23, 1917.

During the year ended September 30, 1918, new work totalled 6,039′, plus 8,5 of diamond drilling. No ore was shipped. Workings from the Columbia sh on the 1,100′ level were connected with workings from the U. V. X. mine in the Main Top and other claims. A raise connected the 1,100′ and 900′ leve In order to send ore to the Humboldt smelter it must be trammed by mules fr this raise to the Columbia shaft, a distance of 3,500′, hoisted to surface a hauled 5 miles by wagon to rail at Clarkdale. No new ore-body was found, b indications were encouraging. Early in 1919, a crosscut at 800′ depth open some 21% ore, near the U. V. X. boundary. A raise was being put up in Ju to explore this shoot further.

During the year ended September 30, 1919, new work covered 5,388′. September, 1919, it was reported that 5′ of 15% ore was opened on 800′ lev Most of the present work is in the Main Top shear zone at 1,100′.

Equipment: includes electric hoist, good for 1,500′ depth and 1,500 c ft. air-compressors. Current is taken from the Arizona Power Co.

Production: in October, 1917, company became a regular shipper, t ore coming from a small ore-body on the 1,200′ level (U. V. X. side) of t Main Top claim. Up to the end of 1917, 1,596 tons, averaging 8.8% copper, h been sent to the smelter at Humboldt. The last lot carried 9.77% copper. 2 oz. silver, and .06 oz. gold. Further shipments were resumed in October, 19 at the rate of 20 tons daily, the total from then until July, 1919, being 3,5 tons of 8.7% ore. Present monthly shipments are 300 to 400 tons, which ha recently carried 12% copper and several dollars in gold and silver. During ye ended September 30, 1919, the output was $97,713 from 4,709 tons of ore.

Company perseveres in its exploration and diamond-drilling, but finds litt As geologic conditions are similar to those in the U. V. X. shares are a go gamble. The present output is profitable, though small.

JEROME-VICTOR EXTENSION COPPER CO. **ARIZON**

Property sold in October, 1917, to the West United Verde Copper C which see. Shareholders getting four shares for one.

JEROME YEAGER COPPER CO. **ARIZON**

Address: Jerome, Ariz.

Officers: J. W. Hudgeons, pres.; H. Wilson, v. p.; F. Hawkins, se treas.; also directors.

Cap., $1,000,000; 50c par. Of the 2,000,000 shares, 800,000 are poole being given to the owners of the property, subject to complete financing.

Property: 360 acres in Yeager canyon being developed by shafts. On a small crew employed at mine, which is a prospect. In October, 1917, 25c w asked for shares.

MICHIGAN VERDE COPPER CO. **ARIZON**

Address: Jerome and care of Western Copper Syndicate, P. O. B 325, Phoenix, Ariz.

Officers: L. B. Eaton, pres.; A. M. McLellan, v. p. and treas.; E. Bowles, sec.

Inc. 1916 in Arizona. **Cap.,** $2,000,000; 50c par; 800,000 shares held i definitely in pool by Arizona Corporation Commission to enforce its orders.

Property: 29 claims, 535 acres, which according to the company's literature and "ex-geologist" Bethune, contains "outcrops" in a connecting belt of schist and diorite. The property is neither better nor worse than that of the many other Jerome companies who are exploring their tracts.

No development is claimed, but the stock-sellers advertised that the property is owned outright and the money derived from stock sales (offered at 50c June, 1917) would be used for development.

The Michigan Verde was one of the worst of the many very questionable promotions of the boom days in 1916. The manner of its promotion and the character of its sponsors were open scandal in the camp, and when the company let its option and the Arizona Corporation Commission ordered the return of promotion stock and forbade the sale of shares, it was thought that the last had been heard of it. It is apparent that a new and different directorate has been successful in getting by the Commission prohibition, since the Western Copper Syndicate, which has a postoffice box at Phoenix, Ariz., is advertising stock and trading out the same old hackneyed stories about the United Verde mine, and among other misleading statements says, this property end-lines the United Verde Extension property, whose mine workings are 1½ miles away, though an intervening undeveloped group of claims belonging to that company does lie between Michigan Verde and the U. V. mine.

From the known dip and extent of the ore-bodies of the United Verde and its great neighbor, United Verde Extension, it is certain that the Michigan Verde entirely outside of any possible extension of those ore deposits. The geologic report published by the company is a rank example of supposedly technical writing.

Presumably idle: mail returned unclaimed from Phoenix, in March, 1919.

ONSTER CHIEF MINING CO. **ARIZONA**

Office: 27 William St., New York. Mine south of Jerome, Ariz.

Officers: Wm. Barret Ridgely, pres.; A. P. Thompson, cons. engr.; G. Rice, fiscal agent.

Cap., $2,000,000: $1,050,000 issued for property.

Property: 22 claims, 400 acres, adjoining the Green Monster on the southeast and the Jerome-St. Louis on the east. Mine is wholly undeveloped and without camp or equipment.

Is an undeveloped prospect. All available information on the company was from George Graham Rice's house organ. Stock 6c bid, 12c asked at Jerome, October 20, 1917. No present quotations obtainable.

A report by Arthur Perry Thompson, geologist, shows a big vein, called the Green Monster, crossing the Revenue claim of the Green Monster Co., into the Monster Chief group.

Idle at last accounts.

EW MESCAL MINING CO. **ARIZONA**

Address: Jerome, Ariz. Is a reorganization 1914 of the Mescal Mining Co. L. C. Cherry, pres., State Bank Bldg., Little Rock, Ark.

Inc. 1914, in Arizona. **Cap.**, $1,500,000; shares $1 par.

Property: Owen & Allison group, 3 patented claims, a mile south of Jerome in Verde district, showing fissure veins in slate and diorite, one 3' average width, traceable 1,600' and workings show 1-2% copper with trace of gold. Company originally owned 7 claims, but 4 were allowed to lapse and were jumped. The 3 remaining were sold to J. E. Russell of Prescott, who sold them to J. M. Lyman, who in turn transferred them to the Verde Combination Copper Co., and they now comprise part of its Jerome holdings.

Inactive since 1917.

EW UNITED VERDE COPPER CO. **ARIZONA**

Address: 707 Pemberton Bldg., Boston, Mass.

Officers: A. Wiswall, pres., Providence, R. I.; J. T. Hinds, v. p., Prescott; H. H. Patten, sec.-treas., Boston, with W. F. Burns and S. C. Murch, directors.

Inc. in Arizona. **Cap.**, $1,000,000; $1 par, non-assessable.

Property: the Lucky Dime group of 13 claims, 255 acres, and the Lo mine, 7 claims, 140 acres, located 1½ miles from the Lucky Dime group, in so ern part of Cherry Creek mining district, Yavapai county. The properties 11 miles from Jerome.

Development: 216′ shaft on Logan property, said to block out $100, in gold ore. The Lucky Dime group has a 50′ shaft and several test pits, all to show copper or gold and silver values.

Equipment: includes a 10-stamp mill on the Logan property.

Management plans on starting operations after sale of stock has provi sufficient funds. Their excessive optimism is hardly justified by the sm amount of development work.

NEW YORK VERDE COPPER CO. **ARIZO**

Address: Jerome, Ariz., and care W. W. Lewis, Kingman, Ariz. I reorganization of the Victor Copper Co.

Property: at Jerome, consists of 1,100 acres in the Southern Ve district, including 700 acres directly south of and adjacent to the Jerome Pac holdings.

The Kingman property consists of 580 acres in the Maynard district, cover the Copper King vein. Company, at last accounts, drifting at 400′ depth to the vein which is said to show 3 to 4′ of copper ore in places. No recent formation.

PITTSBURGH-JEROME COPPER CO. **ARIZO**

Mine office: Chas. Arata, supt., Jerome, Yavapai County, Ariz.

Officers: Wm. M. McJunkin, pres.; C. A. Cooper, v. p.; E. F. Thom son, sec.; R. L. Smith, cons. engr.

Inc. 1904 in Arizona. **Cap.,** increased, March 9, 1906, to $3,000,000: sha $1 par; all issued. Listed on New York Curb as a prospect.

Property: 21 claims, 387 acres, lying 2 to 3 miles south of Jero nearly N. W. of the Black Hills property, and about midway between the Uni Verde and Equator mines.

Development: by main, or 500′, and the lower or 900′ tunnels and 900′ Pittsburgh shaft, said to show argentiferous and auriferous sulphide of about 4% copper tenor at 358′ depth.

The 500′ or main tunnel, 1,279′ long, connects with the shaft. An east drift this level shows copper carbonate; the west drift is in diorite. Several ve were cut, said to show leached ore averaging 2%; selected sulphide ore carr from 6 to 30% copper, $2.50 gold and 75c silver per ton, leading the manage to hope for increased values below water level.

Equipment: includes a 150 h. p. Fairbanks & Morse hoist, 650 cu. compressor and electric power.

Property closed down in fall of 1918; re-started operations in April, 19 when horizontal diamond-drilling was started on the 500′ level. In Octob 50′ of mineralized schist was cut.

SHEA COPPER CO. **ARIZO**

Officers: D. J. Shea, pres.; E. G. Bush, v. p.; J. M. Goodwin, treas.; G. Engelder, sec. and mgr., together with R. E. Moore, directors.

Inc. 1916 in Arizona. **Cap.,** $750,000; shares 50c par.

Property: 5 patented claims, south of Copper Chief group, carrying or 9 outcrops with gold, silver and copper.

Development: to depth of 325′ by incline shaft following the vein, wi levels at 225 and 325′ and raise between levels, all in $50 to $250 silver o A 120′ crosscut on 325′ level, cuts parallel vein with 2′ stringer of ore th assays 14% copper and 417 oz. silver. Total development 1,035′, all in o

UNITED JEROME COPPER CO. **ARIZO**

One of the companies that employed full-page advertisements during t boom at Jerome, trying to sell shares. Cannot locate promoters and letters s to company are returned by postoffice.

UNITED VERDE CONSOLIDATED CO. **ARI**

Address: Clarkdale, Ariz.

Officers: R. W. Wingfield, pres.; Paul McIntosh, v. p.; E. C. Farrell, r.; D. L. Robinson, treas.; E. M. Barron, mgr.

Ins. Oct., 1916, in Arizona. **Cap.**, $7,500,000; shares $5 par; 471,758 sued.

Statement of August 25, 1917, showed receipts amounting to $67,008 from le of shares; and expenditures, $59,781. The latter includes 1st payment on allard property, $10,000; drawn by promoters (Balentine, Farrell and McIntosh), 611; advertising, $17,898; commissions, $854; development of Maturin prop-rty, $3,259; road building, $650; telegraph and phone, $1,311; and sundries, 863. There was a balance of $7,226 unaccounted for. Due on the Ballard aims, $60,000, and outstanding indebtedness is $12,850. From these figures it is ident that only $4,000 was spent on the property, or less than 7% of total ex-nses; while over $37,000 went in advertising, commissions, etc., exclusive of romoter's commission.

Property: the Ballard claims, at one time belonging to the United erde, Jr., Co. and Mahurin claims, 2% and 15 miles S. of Jerome, Ariz.

Development: drilling was to be done to 2,000′ early in 1917. Three nnels driven by previous owners, 15 years ago, are said to have exposed good pper ore. No recent information.

NITED VERDE COPPER CO. **ARIZONA**

Office: 20 Exchange Place, New York. **Mine office:** Jerome, Yavapai unty, Ariz. **Smelter office:** Clarkdale, Ariz.

Officers: Wm. A. Clark, pres.; Jas. A. Macdonald, v. p.; J. H. Ander-n, sec.; H. H. St. Clair, treas.; Chas. W. Clark, gen. mgr.; officers are the rectors; Robt. E. Tally, asst. gen. mgr.; H. DeWitt Smith, supt. of mines; hos. Taylor, smelter supt.; Charles Kuzell, asst. smelter supt; J. B. Johnson, hief engr.; C. M. Hoffman, supt. of machinery; Dave Hopkins, purch. agt.; . L. Reese, chief chem.-assayer.

Inc. 1883, in New York and reorganized Sept. 2, 1899, in West Virginia. gain reorganized in Delaware, May 9, 1917. **Cap.**, 300,000 shares of no ar value; fully issued and fully paid. Is practically a close corporation, having shareholders, and is controlled, through stock ownership, by W. A. Clark. ive hundred shares were sold at auction, March, 1910, for $70 per share.

Gross sales of copper, silver and gold were $5,368,672 in 1909, $5,605,488 in 10, $4,736,834 in 1911, $5,899,457 in 1912, $6,171,116 in 1913, $5,186,999 in 1914, 519,419 in 1915, $17,185,881 in 1916, $15,276,954 in 1917; $19,275,567 in 1918.

Company's investments at end of 1918 were valued at $10,518,912, compared ith $12,339,503 in 1917. Cash on hand and in bank totaled $2,743,256 January 1919, compared with $1,958,528 the year before, and $523,028 December 21, 1919.

Dividends: were begun, 1892, by old company on the basis of 25c per hare monthly. Recent dividends have been: $2,005,000 in 1905, $2,700,000 in 06, $2,700,000 in 1907, $2,025,000 in 1908, $2,700,000 in 1909, $2,700,000 in 1910, 250,000 in 1911, $1,800,000 in 1912, $1,575,000 in 1913, $1,125,000 in 1914, $1,800,-0 in 1915, $4,050,000 in 1916, $5,175,000 in 1917, $5,550,000 in 1918, $1,800,000 1919.

Property: 13 claims, patented, 230 acres with sundry adjoining prop-rty, including the North Venture and South Venture claims, which have pro-uced a little high-grade ore, in the Verde district of the Black Hills range, at average elevation of 5,500′ above sea level, and about 2,100′ above the valley the Verde river.

Company also owns the Copper Giant mine, Wm. Neagle, supt., near Hack-erry—acquired in 1913. It is developed by 750′ shaft, with various levels which ow siliceous ore carrying 2-7% copper with small gold-silver values. A con-entrating plant will be erected if further development warrants it.

Geology: the property shows granular porphyritic igneous rocks, slate d schist, the ore deposit being connected with intrusions of acidic porphyry in itic rocks; the rocks are sheared and schistose, the overlying limestone having genetic connection with the ore deposit.

The mine is opened on a single large deposit of sulphide ore, in a sheared one, about 600′ in extreme width and 1,900′ length, proven to depth of 1,500′.

The ore-body consists of more or less irregular masses, in a much broken disturbed area, the ore-shoot having a dip of 72° and containing a 70′ quartz that carries about 1% copper and from 0.25 to 0.75 oz. gold per ton, this qu being used for converter linings. The gossan outcrop, carrying auriferous argentiferous oxidized ores extends to a depths of about 160′. The zone of ondary enrichment carries very little chalcocite, with some covellite, and o secondary copper ores, all highly argentiferous. The primary zone carries ma pyrite and chalcopyrite, with a little bornite. No ore assortment is attemp and no concentration is made, everything from the mine going to the furna the average of ore from all openings formerly being about 6.5% copper and 1 32% sulphur, with considerable gold and silver values in the oxidized zone.

Development: to a depth of 2,300′, but production is mainly from 6th and lower levels. The older portions of the mine are worked pillar-and- and timbered with square sets, filled with waste, worked-out stopes being fi with culls and barren rock blasted from the mountain side above the mine run into abandoned stopes. The oxidized zone is being mined by open-cut the milling system. In the newer workings, and parts of the old mine where ground will permit, bottom slicing and a modification of the shrinkage systen used.

No. 5 shaft was being concreted from the 1,950′ to the 2,500′ level in Sept ber, 1919.

The ore is easily oxidizable, owing to its high sulphur tenor, and is th fore liable to spontaneous combustion, while, owing to the more or less shatte condition of the orebody, it is difficult to prevent entirely the access of air, v little of which will keep a sulphur fire burning incessantly. The fire on the level has been burning since 1897, and the mine is on fire in various places, fr No. 9 level to surface, fire in stopes not worked being walled off by cement bu heads. Mining until early in 1917 has been in progress for several years in fire zone under the Plenum system, introduced by J. J. Shaw. By this meth air under pressure is blown against the face of the stopes by electric fans. large volume of cold air has a cooling effect on the burning ore, reducing t peratures, and extinguishing the fire in the immediate vicinity of the work face, at the same time driving back the deadly fumes into the shattered r mass and permitting extraction of the ore. The fire, while dangerous and ann ing, does not destroy the copper, all of which will be recovered eventually, mining or leaching.

The mine has one of the most perfect systems of mechanical ventilat known to copper mining. It was developed through the necessity of fire cont and cooling off of the heated parts of the mine, together with a plentiful sup of fresh air to the working faces.

Equipment: the compressed air plant on surface includes a 2-st compressor, 28 and 52 and 26 and 44½x48″ and 3 smaller units, includin machines driven by 600 h. p. and 300 h. p. motors, also a compressor dri by a 275 h. p. motor. No. 3 hoisting shaft has a first-motion hoist, good 2,000′. No. 5 shaft has an Allis-Chalmers mechanical double-drum hoist, w electrical equipment, speed of 1,900′ per minute, and good for 3,000′ dep 7-ton skips operated in balance are used. This installation is on the 1,000′ le which is the collar of No. 5 shaft. Haulage equipment underground inclu nine 4-ton, four 6-ton, and three 7-ton locomotives.

Smelter: the old smelter, built on the hanging-wall side of the m and too close to the orebody, had considerable trouble from caving ground was closed down and dismantled.

The new 3,000-ton smelter designed by Repath and McGregor has b operating since June, 1915. It is one of the most modern in the world, consi of a crushing and sampling plant, calcining plant, blast-furnace, converter, reverberatory departments, and a power house, together with coke and o storage yards and bins with a total capacity of 26,000 tons. Buildings built of steel and concrete.

The crushing and sampling plant has an Allis-Chalmers 30x18″ jaw-crush driven by a 50 h. p. motor; product passes up a long incline belt convey capacity 2,400 tons daily, to top of sampling mill. This mill has three 20x

jaw crushers, three sets of Allis-Chalmers crushing rolls, 54x24", 36x12" and 36x12"; two 4x14' Gates trommels and four Snyder samplers with final sample of 1 to 250. Crusher product goes over conveyor belts to storage bins for fines for the calcining plant.

As described by T. C. Roberts in the "Engineering and Mining Journal," July 21, 1917, the Hopewell crushing plant was built at the mouth of the 1,000' tunnel. It includes storage bins, No. 9 Gates crusher, shuttle conveyor, 42" steel bucket elevator, shaking grizzles, and 36" belt conveyor, from which the ore goes to the blast furnace bins. Undersize goes to two compound revolving screens 60 and 80" diam., 18 and 15' long, with ¾ and ⅜" holes. First reject, ½", is crushed by 2 sets of 54x24" Anaconda rolls set to ¾"; the second reject, minus ¾" in crushed by two 24x54" rolls set to ⅜"; the third reject, minus ⅜", is taken to storage bins. Product from all rolls in re-screened and re-crushed as desired, the screens and rolls being in closed circuit.

The calcining plant has twelve 21½' Wedge furnaces, each with a daily capacity of 96 tons. The 7 hearths, 6 roasting and 1 drying, are lined with concrete. The plant is built so that it can be enlarged when required. Cooling blast is furnished by 1 or 2 No. 6 Sirocco, 3-oz. blowers, each having a capacity of 25,000 cu. ft. of free air per minute, driven by a 30 h. p. motor. Fumes pass to the dust chamber building, sides of brick and steel, roof of 24-gauge copper equipped with baffle plates, and then to the 400' stack. Calcines, as well as dust, are drawn into 15-ton cars, drawn by 10-ton electric locomotives. A second lot of 12 roasters is being erected.

The reverberatory plant has four 19x100' furnaces, placed at one end of the furnace building. Calcines, with oxidized ores, are fed to these furnaces. Slag is drawn off into Treadwell motor-tilted pots, drawn by an 18-ton electric locomotive, of which there are three. Three more reverberatories have been added. All reverberatories are fired by powdered coal, a storage plant of 14,000 tons capacity (12,000 tons can be stored in water), and pulverizing plant capable of reducing 500 tons daily through 200-mesh having been completed in 1919.

A Cottrell precipitating plant is to be added to the flue system.

The blast-furnace plant has four 48x320" blast furnaces, designed by Hepath and McGregor. Feed consists of mattes from the reverberatories, rich oxidized and sulphide ores, with some calcite. Gases go to a second dust chamber, similar to the other, but with steel plate sides, before going to the 400' stack. Ore and flux for the furnaces is brought by 4 to 6 ton side-discharge cars. Reverberatory matte is poured hot.

The converter plant has four stands with five 12' shells of the Great Falls type, supplied by Allis-Chalmers Mfg. Co. Converters are basic, lined with Harbison-Walker magnesite. Tilting is done by 50 h. p. direct-current motors. Copper is poured into two copper casting machines, each operated by a 20 h. p. direct-current motor. There is a 75-ton reheating furnace in connection with these. Slag is drawn into Treadwell pots and charged hot into the reverberatories together with rich blast furnace slag.

The power plant will generate only part of the electric current used, remainder being purchased from the Arizona Power Co. Current is received at 6,000 volts and stepped down to 2,200 volts. Waste heat from the reverberatories is utilized for 6 Stirling Type M boilers, 713 h. p. each, 2 to each furnace. Three Parker type water tube boilers, using fuel oil, are held in reserve. A pumping station, equipped with 2 pumps, on the Verde river supplies the water. The cooling system of the furnaces, compressors, and the condensing system of the steam units are taken care of by a central cooling plant and pumping station. There are 3 condensers, 2 Weiss and an Allis-Chalmers, and 5 Allis-Chalmers centrifugal pumps, driven by motors.

There are 4 blowing engines, supplying the converters; a Southwork-Rateau-Smoot turbo-blower, capacity 24,000 cu. ft. free air per minute at 16 lbs. pressure, 5,500 r. p. m.; a Nordberg, Southwork and an Allis-Chalmers, with capacities of 21,000, 21,000 and 15,000 cu. ft. respectively. A Nordberg 2-stage compressor furnishes air up to 100 lbs. pressure, capacity 3,000 cu. ft. per minute. Air for the furnaces is supplied at 2½ lbs. pressure by 5 Roots blowers, two of 400 cu. ft., two of 300 cu. ft., and one of 224 cu. ft. Blowers are motor driven. A 16x32x36"

Allis-Chalmers tandem-compound engine operates one of the 400 cu. ft. bl
3-cylinder Diesel engine operates one of the 300 cu. ft. blowers.

The electric generating units include 2 Parsons type steam turb
generators; one is a 500-kva. Westinghouse unit, the other a 1,500-k
made by Allis-Chalmers Mfg. Co., the former delivering current at 4
the latter at 2,300 volts. Two Westinghouse synchronous 1,200 k. w
generator sets take alternating current at 2,200 volts and deliver direct
at 250 volts for the electric locomotives, converter motors, cranes, etc
are three 300 k. w., three 200 k. w. and three 50 k. w. transformers, al
30 k. w. transformers.

The United Verde & Pacific railway, controlled by the company
miles of narrow-gauge line, traversing a very difficult country, connec
mine and works with the Santa Fé, Phoenix & Prescott railroad at
Junction. A standard-gauge railway, built 1912, by the Atchison, T
Santa Fé R. R. Co., connects the new smelter at Clarkdale with its mai
Cedar Glade. For transportation between the mine and smelter another
the Verde Tunnel & Smelter R. R. Co., has been built: it is operated as
rate organization.

Production:

Year	Lbs. Copper	Oz. Silver	Oz. Gold	Year	Lbs. Copper	Oz. Silver
1904...	29,275,503	668,842	23,754	1912...	31,565,539	484,222
1905...	32,683,951	486,041	15,915	1913...	35,334,694	641,074
1906...	38,827,265	428,317	12,913	1914...	32,448,170	646,572
1907...	33,015,457	356,938	11,733	1915...	45,127,832	902,880
1908...	36,183,089	494,574	20,334	1916...	58,299,573	1,030,850
1909...	36,694,063	495,480	17,022	1917...	71,753,111	1,222,607
1910...	38,663,880	563,133	19,267	1918...	77,560,204	1,298,414
1911...	33,167,987	461,145	15,239	1919...	42,927,666	665,328

Mine was shut down account labor troubles, Feb. 15 to May 15, 191
Company sold only 3,397,370 lb. copper at 18.45 cts. a pound in 1919.

In early years the United Verde made copper for 5c. or less a p
one deducts gold and silver values from the cost. The reported cost pe
of finished copper, after deducting gold and silver values, was 9.17c. p
1904; 9.27c. per lb. in 1905; 8.69c. in 1906, and 10.54c. in 1907. Under
circumstances the cost may be figured as 9 to 10c. per lb. The Unite
mine has been lied about more industriously than almost any other min
world, especially in the literature sent out by new copper mining compan
stock for sale. The United Verde has erroneously been pointed ou
example of blind luck, but the mine was taken by Senator Clark, when g
considered worked out, and it was developed, by cash and brains, into
nificent copper mine, the credit being due to the keen mining sense and
acumen of Senator Clark and not to chance. The mine is one of
copper mines of the world, with many years of large and profitable pr
ahead.

To accommodate its employees the company constructed a model tow
Clarkdale, at a cost of $1,000,000. It includes upper and lower sectio
school house, restaurant, rooming house, business area, and residence,
plied with electric light, water, sewers, and telephones.

UNITED VERDE EXTENSION MINING CO. AR

Office: 233 Broadway, New York. **Mine office:** Jerome, Yavapai
Arizona.

Officers: James S. Douglas, pres; George E. Tener, v. p; L
Wheeler, v. p., Chas. P. Sands, sec.-treas.; with Paul Armitage, R.
mond, George Kingdon, gen. mgr.; Archibald Douglas and And
Pickrel, directors; Barry Hogarty, smelter supt.

Inc. 1902, in Maine, as a reconstruction of the United Verde Ex
Gold, Silver & Copper Mng. Co. **Cap.** $3,000,000; shares $10 par. R
ized in Delaware, **cap.** $4,000,000; shares $10 par; and again reor
1912, and cap. reduced to $750,000; shares 50c par; issued $525,000.
reorganization, approximately 360,000 shares were set aside for ex

n a share for share basis for old shares outstanding; about 40,000 shares ere issued in liquidation of debts; 150,000 shares were issued to Jas. S. louglas for services; 50,000 shares were sold to Mr. Douglas for $25,000 ash; 400,000 shares were optioned to Mr. Douglas and his associates with he right to purchase all or a part of this block at par value at any time rior to June 15, 1915, and 500,000 shares were reserved for treasury purposes. Federal Trust Co., Boston, registrar; State Street Trust Co., Boston, transfer agt. Shares are listed on the Boston Curb, traded on New York Curb. Annual meeting, 3rd Tuesday in February.

Comparative Balance Sheet shows:

	ASSETS								
	Mining Claims	Equip. & Smelter	Inv'nt & Land Acq'd	Accts. Rec. & Inv.	Cash & Lib. Bonds	Due—Ore & Bul. Sold	O. & B. in Transit	Total
19	$40,004,915	$5,538,016	$1,840,613	$963,893	$8,939,192	$90,604	$4,424,100	.....
18	40,354,914	$.126,285	1,836,859	1,089,514	5,224,646	852,445	3,477,407	57,962,070
17	40,351,598	2,033,015	1,806,921	362,992	7,515,023	1,167,847	2,668,698	55,466,093

	LIABILITIES					
	Capital Stock	Accounts Payable	Reserves—Depletion Deprec., etc.	Developed Orebody	Surplus Account	Total
19	$25,000	$2,010,996	$9,945,880	$38,425,000	$5,904,067	$57,410,303
18	525,000	2,942,843	7,567,863	38,425,000	8,501,724	57,962,070
17	525,000	477,806	4,019,257	40,000,000	10,444,529	55,466,093

Comparative Statement of Operations:

	1918	1917	1916
Gross income	$14,919,072	$14,583,649	$9,949,919
Other income	237,644	171,466	31,154
Total income	15,156,716	14,755,114	9,931,073
Expenses, taxes., depreciation, etc	11,825,662	6,498,997	3,042,872
Net earnings	3,331,054	8,256,117	6,938,101
Dividends	1,575,000	1,680,000	1,050,000
Surplus	1,756,054	6,576,117	5,888,101

Report of Aug. 1, 1919, showed: cash on hand July 1, 1919, $1,078,388; Liberty Bonds, $3,350,000; copper in transit and in hands of selling agent, the greater part of which was unsold, 17,594,000 lbs. On Nov. 1, these figures were, respectively, $677,363, $3,350,000 and 20,150,000 lbs; also bills payable, $250,000. On account of light sales of metal, company borrowed money against the surplus held in U. S. Bonds in order to pay the dividend of November 1, 1919.

Dividends: $1 in 1916; $2.85 in 1917; $4.50 in 1918; $2.35 in 1919 and 50c in February 1, 1920. The total is $11.25, equal to $11,392,500.

Property: 1,200 acres, known as the Little Daisy group, a two-thirds interest in the adjoining Florencia claim, and an option on 19 claims, 300 acres adjacent to the company's property on the S. and S.-E.: $130,000 was paid for this tract.

The Jerome Verde option was relinquished June 15, 1915, as the 2,127′ of development work from the Daisy shaft failed to disclose ore of commercial importance.

In November, 1919, the Haynes claims were acquired from the West United Verde Copper Co. Several small deposits have been opened, the deepest workings being 1,200′. The price was $250,000, and some West United shareholders tried to secure an injunction against the sale, considering the price too low.

History: original development was by an 800′ vertical shaft, the Edith on the Little Daisy claim, about 1,700′ from the main shaft of the United Verde mine, with collar 450′ lower. This shaft, after passing through 50′ of iron stains, encountered copper carbonates, continuing for depth of about 150′, succeeded by conglomerate, and from a depth of 425′ to 578′ passed through schist carrying copper sulphides and manganese. These old workings total about 5,000′ but develop only a little ore of about 2% copper, 1 oz. silver and $3 gold, on the 800′ level. A 130′ winze below this level was

bottomed in decomposed schist, showing considerable copper.

The early exploration work of the company was unsuccessf option was taken in 1913 on the Jerome Verde group, and a new Edith, was started 1,500′ farther east, sunk to a depth of 1,200′. tension's development of the Verde ground was disappointing company's own ground a large body of very rich chalcocite or countered on the 1,200′ level, Dec., 1914. This orebody was deve worked during 1915, and the shaft was sunk to the 1,400′ level. Fe drift on this level cut the downward extension of the bonanza oreb on the 1,200′ level. On the 1,400′ level the orebody was fully op had an area of 60,000 sq. ft. on that level. Between the 1,400′ levels the shoot was proved by raises. Oxide ore was encou above the 1,300′ level, so no considerable quantity of ore is expec that point. Jan. 1, 1920, reserves above 1,400′ level were 571,400 tons o

Conservative estimates gave 1,000,000 tons of 16% ore betw levels. A winze was sunk 200′ below the 1,400′ level, passing thr of 15% ore and 46′ of low-grade ore. At 160′ an intrusion was c 200′ there was chalcopyrite again.

The ore thus far developed lies on the northerly downthrown big fault, with a drop of 650′ or thereabouts, as shown by the strata on each side of it.

Development: the new 3-compartment Audrey shaft has beer the 1,700′ level and concreted; this permits of drifting on the 1,0 and 1,700′ levels. The face of the crosscut to the orebody on level was 450′ from shaft in Nov., 1919, and crosscuts had been 1,600 and 1,700′. There are 2 other shafts, the Little Daisy, used ventilation, and the Edith, used for supplies; in addition there ar to surface, one used for ventilation, the other for waste. Driving t haulage adit was completed in April, 1919; this connects with the the 1,300′ level, enabling all ore to be shipped direct from the mi smelter and eliminating the use of the aerial tram. Ore-trains, c of electric locos and 30-ton cars, started operating in this tunnel 1919. Overhead square-set stoping is used for very heavy grou 50%, and the Mitchell stoping method wherever weight of gro permit, about 50%.

In 1918 new work amounted to 10,919′. No prospecting work and no new orebody developed. Now that the Audrey shaft has b pleted prospecting and development will be resumed. Ore rese given.

Danger from fire has been minimized—the Edith shaft has a system, the Audrey shaft has been concreted, and the Little Daisy naturally wet. The Mitchell stoping method leaves barriers of was will serve as fire-breaks in that part of the Bonanza orebody wh system is used.

A suction fan, capacity 40,000 cu. ft. per minute, is located at th the Little Daisy shaft, and another, capacity 135,000 cu. ft. per min be placed at the top of the air-raise. With this equipment and the tion of the necessary underground work the mine will be one of ventilated in the southwest.

Smelter: designed by A. G. McGregor and staff, Warren, Ariz., scribed by F. E. Nichols in "E. & M. J." of Oct. 19, 1918. Started in July, 1918. The plant includes one 48"x26'-8" blast-furnace, two reverberatories; six 21' 6" 6-hearth Wedge roasters, and three 12" co of the Great Falls type. Mine ore goes to steel receiving bins, 1, capacity, and by belt conveyors to crushing and sampling plant; f the coarse material goes to the coarse bedding 5,300-ton bin, the fine to the fine bedding 5,000-ton bin. The coarse ore goes by convey blast furnace building to bins to charge cars. Blast furnace has capacity of 600 tons of ore. Slag is handled by 225 cu. ft. electrica cars, drawn by 24-ton electric locomotives. The fines go by belt

o the roasting plant, after calcining they are taken in 15-ton cars to the verberatories, each with a daily capacity of 500 to 600 tons. Reverratories are coal-dust fired, the first time this has been tried in Arizona. he coal-crushing and pulverizing equipment consists of a 24" Jeffrey ngle-roll crusher, a Fuller-Lehigh indirect fired rotating drier, and a batry of four 42" F-L ball pulverizing mills. The converting plant has a 40-n electric traveling crane.

Reverberatory waste heat is used in generating steam in 3 Stirling aste-heat boilers, 713 rated h. p. each; in addition there are 2 Stirling irect-fired boilers, 439 rated h. p. each, fired with pulverized coal.

The power plant contains two 2,200-volt turbo-generators; two 200 kw. otor-generator sets for direct current for the plant; two units, each conisting of a Roots 400 cu. ft. blower, direct, connected to a tandem comound Allis-Chalmers engine, for blast furnace air; two Allis-Chalmers 000 cu. ft. blowing engines for the converter air. Water is obtained from ells on the site at 100' depth.

Production:

Year	Ore tons	Copper %	Gold oz.	Silver oz.	Cost per ton of ore	Net cost per lb., cents	Selling price per lb., cents
919.....	96,546	15.5	....	....	.....	9.8	17,136
918.....	133,535	20.35	.024	4.18	.....	....	.....
917.....	115,064	27.5	.014	2.89	$32.88	5.8c	27.033c
916.....	80,159	22.7	.032	1.60	29.91	6.6	24.145

	Lbs. Copper	Oz. Gold	Oz. Silver
919.....	28,860,615	3,169	272,855
918.....	55,491,077	3,046	503,739
917.....	63,242,784	1,656	332,536
916.....	36,402,972	2,570	128,467

On hand January 1, 1920, 27,220,393 lb. copper, compared with 19,206,934 nuary 1, 1919.

Labor troubles caused a complete shut-down of the property in Feb., 919, operations were resumed June, and the company is again the lowest ost copper producer in the United States. Although the grade of ore now eing smelted is lower, large profits should continue with the operation of s own smelter.

NITED VERDE JR., CO. **ARIZONA**

Property, the Ballard group, reverted to owners. See Ballard group nd United Verde Cons. Co.

ENTURE HILL MINING CO., THE **ARIZONA**

Address: Richard Lamson, sec.-treas., Prescott, Ariz. **Mine address:** . T. Jolly, v. p., Jerome, Ariz. Ed. Shumate, pres.

Inc. 1900, in Arizona. **Cap.,** 3,000,000 shares; $1 par. In Sept., 1917, 25,000 was borrowed, for development, on 10% notes, secured by mortgage.

Property: 6 patented claims, 110 acres, 2 miles S. of Jerome, Yavapai ounty, Ariz., near the Verde Combination and others. Examined by W. . Weed in 1916. Mine was idle for years, but was reopened in July, 1916, nd closed down in October, 1917.

Geology: claims shows a complex of altered Yavapai schist, quartz orphyry and diorite, cut by fractures and fissure veins. Two veins show me scattered ore in shaft and tunnel, samples assaying 6.96% copper, 6.5 . silver and $4 gold per ton; ore in commercial amount had not yet been isclosed in October, 1917.

Development: by a joint shaft on the Verde Apex line, 265' deep, hich connects with the 575' Socrates tunnel. The 2-compartment shaft as been in ore almost since the start, the schist showing pyrite and halcopyrite.

Equipment: includes 60 h. p. Foos gas engine, 25 h. p. hoist, Sullivan ompressor, bunk and boarding houses, etc.

Was regarded as a good prospect.

VERDE APEX COPPER MINING CO. AR

Address: J. H. Robinson, sec., Prescott, and E. L. Bartholome Jerome, Ariz.

Cap., $3,000,000; shares $1 par; 750,000 in treasury; 450,000 1,800,000 in pool.

Property: 8 claims, 85 acres, in central part of the Verde distr mile from Jerome, and some distance S. of the open cut of the Verde mine. The claims are well located. As underground work ited, the prospective value of the ground is largely a matter of deduction and estimate, based on finding both oxide and sulphide the tunnels, and with full knowledge of the 3 producers in the dist

Development: three veins are exposed in tunnels. The Blac is 6′ wide, carrying good ore; the Socrates is narrow, but has prom No. 3 vein in the upper tunnel shows oxide ore of commercial valu the Venture Hill Mining Co., which see, a joint shaft is being sunk boundary of the two properties. This was 260′ deep, Oct., 1917; report. Was a promising venture.

VERDE CENTRAL MINES, INC. AR

Address: C. T. Joslin, sec., Prescott, Ariz.

Officers: W. F. Staunton, pres.; C. T. Joslin, sec.-treas., wit Hope, C. C. Miller, Jr., and L. Spence, directors.

Inc. Aug. 16, 1916, in Arizona. **Cap.,** $2,500,000; shares $1 pa assessable; 500,000 issued.

Property: 20 patented claims, 308 acres, at Jerome, Ariz., in th of the Verde district. Claims considered well located, and merit ment of the known veins and prospecting along shear planes and the limestone cap. Contains extension of the Venture vein, o owned by U. V. Extension.

Development: by 3 old prospect tunnels, probably 1,000′ long, Venture vein, and a 200′ shaft sunk on the northern part of the p In 1918 the old workings were retimbered in preparation for futu Tunnels show ore. Is regarded favorably.

VERDE COMBINATION COPPER CO. AR

Address: David Morgan, v. p.-mgr., Box O, Jerome, Ariz.

Officers: J. L. Dyer, pres.; J. C. Callaghan, sec.; Jas. F. Primm with J. M. Layman, J. S. Eberman and W. N. Richards, directors. Kennedy, asst. sec.-treas.

Inc. in Arizona. **Cap.,** $1,000,000; 50c par; non-assessable; issued. Union Bank & Trust Co., El Paso, Texas, transfer agent. meeting in December.

Balance sheet, Oct. 31, 1918, showed that $229,027 had been s development, and in addition, $47,526 on equipment, etc. Total assets, Dec. 1, 1918, were $174,994.

Property: 33 claims, 550 acres, 15 patented, in Verde distri Company's engineers consider it is on the main fissure of the dist surficially to possess all the favorable attributes for ore deposition

Development: recent development is all at the north end of th erty, by new shaft 1,300′ deep, which connects with extensive wor the Mescal tunnel. This tunnel shows the great Verde fault, the and post mineral fault that traverses the Jerome district for 2 also discloses 2′ of 5% copper ore, in a fissure vein, on which b development save a raise has been done; also two promising cont tween diorite with stringers of copper. The old workings at th end of the tract include 640′ and 500′ shafts, showing diorite with of copper; and a 75′ tunnel opening a 3′ quartz vein.

In year ending Oct. 31, 1918, development work totaled 5 which 3,270′ was on the 700′ level and 1,769′ on the 1,100′ level. mercial ore was opened up but indications on the 1,100′ level are sa promising; that numerous stringers of rich chalcopyrite were e ported in April, 1919, that the vein had been cut on the 1,300′ leve

as 6' to 8' wide, had no commercial ore, but contained numerous stringers chalcopyrite.

ERDE GRANDE COPPER CO. **ARIZONA**

Reorganized in July, 1917, as the Jerome Grande Copper Co., which e. Described in Vol. XII.

ERDE HUB COPPER CO. **ARIZONA**

Address: 715 Millikin Bldg., Decatur, Ill. W. S. Owens, supt., Jerome, rizona.

Officers: Wm. C. Field, pres.; F. P. Wells, v. p.; E. Linxweiler, treas.; muel Morthland, sec.; with C. W. Devore, C. C. McFann and N. M. llies, directors.

Inc. Nov., 1916. **Cap.,** $1,000,000; 50c par. A reorganization of the De-tur Copper M. Co.

Property: known as the Decatur, 1 mile S. of Jerome, Ariz.

Development: by 284' shaft. Diamond drilling, in charge of Samuel orthland, was started in Sept., 1917, but later was stopped on account of t war; drilling done is said to have been encouraging. Plans resuming ork.

ERDE INSPIRATION MINING CO. **ARIZONA**

Mail returned, 1919, from Prescott.

Officers: E. H. Meek, pres.; A. L. Hammond, sec., Prescott, Ariz.; with Lynch, J. H. James and S. S. Allen, directors

Inc. Jan., 1917, in Arizona. **Cap.,** $1,000,000; $1 par; 125,000 shares went owners and promoters, 125,000 for outstanding obligations, with 750,000 treasury and offered to the public.

Company was organized to take over the Hillside Mining Co., 9 claims, acres, 1½ miles from Cherry P. O. and 12 miles S. of Jerome, said to ow gold ore $7 to $17 per ton with 20,000 tons ore blocked out Jan., 8. Developed by several shafts; equipped with a 20-stamp mill which mpany planned on enlarging. No report since 1918.

ERDE MONSTER COPPER CO. **ARIZONA**

Officers: T. F. Shea, pres., Jerome, Ariz.; C. M. Pedley, v. p., and A. McLellan, sec.-treas.

Inc. in Arizona. **Cap.,** $2,000,000; shares 25c par; non-assessable.

Property: 600 acres, 8 miles N. of Jerome, Ariz. About the end of 1916 containing 4% copper was found near the surface. Not operating.

ERDE QUEEN COPPER CO. **ARIZONA**

Reported in Smythe's Obsolete American Securities, Vol. XI, 1911, ew Jersey charter void 1906, for non-payment of taxes."

At a stockholders' meeting held in Jersey City, N. J., May 6, 1916, dis-ution of the company was approved. It was decided to make a distribu-n of part of its assets, consisting of 1,000,000 shares of Jerome Verde pper Co.'s stock; holders of Verde Queen stock to receive in part idation 200 shares Jerome Verde stock for each share of Verde Queen ck.

Property of the company was taken over in 1906 by the Jerome Verde pper Co.

ERDE SQUAW COPPER MINING CO. **ARIZONA**

Address: T. H. Gray, sec., Box 682, Jerome, Ariz.

Officers: J. B. MacDonald, pres.; D. W. Barter, v. p.; T. H. Gray, sec. gen. mgr.; C. F. Benjamin, treas.; with C. C. and G. Reid, directors.

Inc. Jan. 8, 1917, in Arizona. **Cap.,** $1,500,000; shares $1 par; non-as-ble; 915,000 issued. Annual meeting, second Monday in January.

Property: 15 claims, 275 acres, in Verde Valley, 4½ miles S. of Camp rde, 25 miles S. E. of Jerome, Yavapai county, Ariz. Examined in 1917 William Winkelman.

Development: prospected for 17 years by D. W. Barter, and 3 to 40% has been exposed in numerous places. The Barter tunnel now in 1,000' said to have cut a 30' vein at depth of 500'; this vein is reported to have he bornite and also 8' of lower grade sulphide assaying 1% to 7% cop-

per. A 2-compartment shaft has been sunk on the Boulder c
h. p. hoist and a compressor added. Underground work here t
Is a meritorious mining venture.

VICTOR COPPER CO.

Reorganized as New York Verde Copper Co., which see.

Address: W. W. Lewis, Kingman, Ariz.

WEST UNITED VERDE COPPER CO.

Mine office: Jerome, Ariz.

Officers: C. B. Stranahan, pres.; Arthur Terry, sec.-treas.; with Wm. T. James, directors; John H. Banks, cons. engr., 61 New York City.

Cap., $5,000,000; shares $1 par; 3,375,000 issued.

In Oct., 1917, company absorbed the Jerome-Verde Extensi Co. on the basis of 2,250,000 West United shares in exchange Jerome-Victor shares.

The Jerome-Victor Extension C. Co. was a reorganizati Haynes C. Co., which in turn had succeeded the Jerome Mines L

Property: 8 patented claims, 160 acres, adjoining the Uni on the N. W., shows lenticular orebodies in dioritic schist, repo 3'-19' wide and traceable for 2,000'.

Development: includes 1,200' shaft, with 2,000' drift and cro on 700' level and 160' on the 1,200' level; also a 350' prospect 248' tunnel. Excessive flow of water encountered in drill-h deep, said to have forced former management to pull the pumps down the property in 1914.

The mine had been unwatered to 1,200' in June, 1917, when strike resulted in suspension of work, allowing the shaft to fill

Equipment: includes electric hoist, 10-drill Ingersoll-Rand c a 150 k. w. generator and 12 buildings.

Mine under water at present time—1919. Company is over- and hardly worth further attention. In November, the United tension Company offered $250,000 for the property, and it was b fered when certain shareholders thought that the price was to thereupon started injunction proceedings against the sale.

YUBA COPPER CO.

Operated, 1918, a group of claims near the United Verde.

YUMA COUNTY.

ALAMO GOLD MINING CO.

Office: Rol. King, 304 Wilcox Bldg., Los Angeles, Cal.

Officers: B. A. Kipp, pres.; Calvert Wilson, v. p.; Rol. Kin mng. director; with F. R. Stewart, directors. J. V. Allison, s officers.

Inc. Aug., 1917. **Cap.** 1,000,000; $1 par; 700,000 issued. Al

Property: 6 claims in Alamo Springs district, Yuma county ment by 310' incline shaft. In July, 1918, cross-cutting was un the hanging wall. The footwall carries gold throughout. Eq cludes 12 h. p. hoist.

ALVIN DEVELOPMENT CO.

Office: Houghton, Mich. Controlled by Tank Pass Consol ing Co., Salome, Yuma county, Ariz. Idle except for annual work. Described Vol. X.

AMERICAN EAGLE CO.

E. C. Lane, mgr., Parker, Ariz.

Property: in the Cienega district, Yuma county, reported several shipments of copper ore to smelter averaging 30%.

GUS COPPER & GOLD MINING CO. **ARIZONA**
Addres: Planet, Ariz.
Officers: A. B. Jones, pres.; D. M. Jones, v. p.; A. B. Hardwick, sec.; t C. Lane, mgr.
Inc. in Arizona. **Cap.**, $2,000,000; $1 par; 500,000 shares in treasury.
Property: 46 claims, 920 acres, adjoining the Planet mine at Planet, a county, slightly developed and said to show several well-defined s, carrying gold-copper ore, which will assay from $5-$20 gold and copper per ton. Good ore reported from 120' level in new shaft.

ZONA BUTLER MINES CO. **ARIZONA**
Address: F. D. Friend, San Francisco, Cal., or Bouse, Ariz.
Officers: F. D. Friend, pres.; M. L. Strong, v. p.; E. E. Hendee, treas.; H. Jackson, engr.
Property: 700 acres near Bouse, Yuma county, including claims worked 60. There are 18 shafts from 30' to 300' deep, exposing ore with gold, r, copper, and lead values.
Equipment: includes oil engine and compressor.

ZONA EMPIRE COPPER MINES CO. **ARIZONA**
Mine office: Parker, Yuma county, Ariz
Officers: W. A. Moses, pres.; Gen. E. Bouton, v. p.; L. H. Knowlte, Newton Evans, treas.; with F. X. Pfaffinger, directors; Jas. H. Watgen. mgr.
Inc. Aug., 1909. **Cap.**, $5,000,000; $5 par.
Property: bought of Carnation Mining Co., comprises 41 contiguous 820 acres, about ten miles north of Parker and three miles Eagle Landing, on the Colorado River. Company also has 160 acres ich lands on the Colorado River, including Eagle Landing, held for ller site. Geological conditions are markedly similar to those at the and Clara mines.
Development: by about 6,000' of workings, deepest 300', showing a mount of copper carbonate, with sulphide zone not yet reached. On level of the Carnation shaft is an orebody said to assay 5% copper gold per ton, carrying a 10' paystreak estimated to average 10% and $6 gold per ton.
rface showing is interesting, but development work was disappointShallow excavations show irregular areas, often 50' wide, well stained pper carbonate; much of it could be shipped. This green carbonate s been carefully piled and makes beautiful patches of color on the scenery. Development usually reveals a sheared zone, copper- but only a few feet wide. Throughout this region there are ocally encountered pockets of rich gold ore with the copper. These be lenses interbedded in the schist, and while one or two important es have been found in the region, no mines of importance have veloped. Mines were reported taken over by a Los Angeles syndi- shipments made to Hayden smelter, Feb., 1917.
ers returned unclaimed from Prescott, June, 1919.

NA ENTERPRISE MINING CO. **ARIZONA**
dress: Dan McGlone, supt., Bouse, Ariz.
perty: 12 miles south of Bouse, Yuma county Sinking shaft to this prospect.

NA McGINNIS COPPER CO. **ARIZONA**
d returned unclaimed, March, 1919, from Parker, Ariz.
cers: B. L. Vaughn, pres.-gen. mgr., San Diego, Cal.; E. C. Fleet, E. Boydston, supt., at last accounts.
1916, in California. **Cap.**, $1,000,000; $1 par.
perty: 13 claims, adjoining the holdings of the Empire Copper Co., miles N. W. of Parker, Yuma county, developed by 200' shaft and el. Ore occurs as a contact deposit in limestone and quartz schist, N. 65° E., with 30-70° dip. The orebody is reported to be 50' d 200' long, opened to depth of 20' on surface, with 2' shoot of

shipping ore containing cuprite, malachite and chrysocolla, an run 10% copper and $8 gold.

Equipment: includes 35 h. p. oil engine, compressor and 1 tram. Several carload shipments made in 1917. Management pla ing shaft and driving tunnel to get below the surface ore.

ARIZONA PORPHYRY COPPER CO.

Organized to acquire and work a property in the Swansea distri miles N. E. of Bouse, Yuma county. As a result of unfavorable re engineers the property was not purchased and all subscriptions for st

ARIZONA REVENUE COPPER CO.

Officers: at last accounts, David F. Johnson, pres., Phoenix, L. Williams, v. p.; Oscar M. Spence, sec.-treas., Parker, Ariz., with A and Paul C. Thorne, directors. H. A. Morse, supt.

Inc. Dec., 1916, in Arizona. **Cap.,** $2,500,000; 50c par, of whi shares were given the owners for the claims and 200,000 shares off public, March, 1917, at 15c.

Property: 72 claims, about 1,400 acres, in Cienega distr county, includes the Echo, Milton, Cecil, El Moline, Revenue an groups.

Development: about 3,000' of workings, at a cost of $40,0 shaft on the Echo group is said to show ore running better than The Revenue group is developed by 2 incline shafts, 285' and 150' consists of hematite containing oxidized copper minerals, and o replacement of limestone lenses in schistose rocks. Surface showing ising and warrant further development at depth. Geology of the described in U. S. G. Bull. 451.

Ore reserves: about 400 tons of high-grade ore on the dum erty formerly owned by E. E. Osborne. No recent returns.

ARIZONA STANDARD COPPER CO.

Address: J. T. Carrigan, mgr., Parker, Ariz.

Officers: T. Spellacy, pres.; O. M. Spence, sec.-treas.; with ardt and J. P. Sweeney, directors.

Inc. 1917. **Cap.,** $5,000,000.

Property: 21 claims, 420 acres, 14 miles E. of Parker, and ab from Midway, on the Swansea railroad. Claims reported to show s cations of a disseminated copper deposit, which is interesting if true.

Development: by 3,000' of underground workings. Reporte ing at depth by means of churn drills.

ARIZOTA MINING CO.

Seth Bullock, pres., Deadwood, S. D.

Property: 59 claims in the Harcuvar mountains, 11 mile Wenden. Ore is said to contain copper and gold. Shaft 125' deep.

BILLIE MACK MINING CO.

Claims now owned by Illinois Arizona Copper Co., which see.

BLACK GIANT MINES CO.

Operating the Black Giant and Little Giant Mines.

Main office: Mobile, Ala. **Mine office:** Wenden, Ariz.

Officers: A. Meaher, pres., Mobile Ala.; Dick Wick Hall, v. Ariz.; C. R. Hall, sec.-treas.; G. S. Leatherbury, A. Meaher, Pat. J Hubbart and Tom Stevens, directors, all of Mobile, Ala. S. B. Ser

Inc. April 3, 1917, in Arizona. **Cap.,** $1,500,000; $1 par; 1,3 standing. Annual meeting, first Monday in January. Transfer off Alabama.

Property: 8 claims, 160 acres, located in the Harcuvar mount 10 miles N. of Wenden, in Cunningham Pass. In 1918, work was an incline shaft, down 240' and sinking on ore. Ore opened up level. Orebody reported to be from 25-100' long, nearly vertical, N. W.-S. E. It is in a fissure vein with iron gossan, with coppe values; 11 carloads of ore are said to have been shipped.

Equipment: 25 h. p. gasoline hoist and 4-drill compressor. Work began in 1916.

BLACK REEF COPPER CO. **ARIZONA**

Office: 17 W. Adams St., Phoenix, Ariz. **Mine address:** Wenden, Ariz.

Officers: H. E. Willhalm, pres.-mgr.; F. H. Larsen, v. p.; T. M. Burroughs, sec.-treas.

Cap., $250,000; 25c par; 650,000 shares in treasury.

Property: 8 claims, 160 acres, on the south side of Cunningham Pass, Harcuvar mountains, 8 miles north of Wenden. Claims adjoin property of the Desert M. & D. Co.

Development: 400′ working shaft. The 170′ level runs 45′ west and 280′ east on the vein, which, though leached, shows some shipping ore. The vein is practically vertical and the shaft is bottomed in ore. Mine yields 1,000 gals. of water per day.

Ore: carries chalcopyrite and bornite associated with limonite and siderite. An ore shoot on the 300′ level is said to show $3-$40 gold, 3-35% copper and high iron values. Vein is 2′-3′ wide with swell to 6′ at 100′ in depth.

Equipment: includes 25 h. p. steam hoist, 50 h. p. gasoline engine and compressor.

In 1917 company offered the public 100,000 shares at 25c. for a development fund.

It was reported that the company was fully financed Sept., 1917, and the Arizona Corporation Commission has requested the officers to explain sale of stock after expiration of selling permit of July 1; 1917.

BLUE BELL MINING & REDUCTION CO. **ARIZONA**

Mine P. O.: Swansea, Yuma county, Ariz. W. P. Martin, pres.; E. T. Miner, v. p.-supt.; K. E. Newcomb, sec.

Property: 23 claims, about 5 miles from Swansea, just across the Bill Williams Fork River from the Swansea pumping plant.

Development: 200′ two-compartment shaft and several hundred feet of tunnels, showing ore carrying up to 10% copper, with fair gold and silver values. No recent returns.

BOWYER GOLD & COPPER CO. **ARIZONA**

Office: Quartzite, Ariz. **Mine office:** Bouse, Yuma county, Ariz. Jos. Bowyer, pres.-treas.; E. N. Jenkins, sec., with E. E. Northrop and E. B. White, directors.

Inc. July 15, 1909, in Arizona. **Cap.,** $5,000,000; $5 par. Annual meeting, first Monday after first Tuesday in July.

Property: 7 claims, known as the Bowyer group, also 160 acres miscellaneous lands, in the Plomosa district, on the western slope of the Dome Rock Mountains, about 20 miles west of Bouse. Property has 3 contact deposits, between schist hanging and limestone foot, showing 50 to 200′ gossan outcrops and carrying malachite and chalcocite, estimated to average 2 to 10% copper and $1 to $10 gold per ton.

Development: by 50′ shaft near the hanging wall, all in ore crrying from 3 to 15% copper and a small amount of gold and silver. Sinking 300′ inclined shaft in Sept., 1919. Hoist and air drills installed.

Company reports being out of debt and having funds on hand to pay all expenses.

BULLARD MINE **ARIZONA**

Address: John C. Bullard, Aguila, Ariz.

Reported bonded to B. C. Wilson, W. Douglas and E. Bemdurant of Wickenburg.

Property: 36 claims located 10 miles north of Aguila, in Cunningham Pass, Harcuvar mountains, Yuma county. Shaft 225′ deep and 400′ adit tunnel. Lessers shipped 4 cars of ore during 1918. Reported to have 300,000 tons ore in the mine averaging 4% copper and $5 gold per ton.

CLARA CONS. GOLD & COPPER MNG. CO. **ARIZONA**

Declared bankrupt, Jan. 27, 1912. Reorganized as the Swansea Consolidated Gold & Copper Mining Co., receiving 1,500,000 shares of the total of 4,000,000

shares for the transfer of the property with its indebtedness and lia suit was filed against the Clara Consolidated in Oct., 1912, by Georg former president, for $75,000, and by Mary Mitchell for ejectment fr mining claims valued at $25,000 and the recovery of $200 a month rental

Property leased in 1917, for 10 years, to the Swansea Lease, Inc.,

COBRITA MINES CO. A

Address: Salome, Ariz.

Inc. 1916. In Jan., 1918, bond and lease was given to the Cobr Co., which see.

Property: 14 claims, 295 acres, with vein developed by 390′ t 200′ vertical, two-compartment shaft with 40′ crosscut at 100′ and 30 at 200′ level.

A level driven from winze, at 100′ below tunnel is on vein a several oreshoots. Mine has yielded car load shipments of 20% c containing $7 to $15 gold per ton. Sixty thousand dollars spent on of property. This was a promotion of "Dick Wick Hall," which ca small investors.

COBRITA VERDE COPPER CO. A

Mine address: Salome, Ariz.

Address: G. J. Kahn, pres., 1707 Leighton Ave., Los Angeles J. W. Whittington, 51 E. 42nd St., New York City.

Officers: Judge W. M. McCrea, v. p.; J. W. Whittington, se with C. A. Wilson, P. E. Parentean, directors. Parentean & Co., bro York, fiscal agents.

Inc. Nov. 13, 1916, in Utah. **Cap.**, $2,500,000; $1 par; incre from $1,000,000; 1,400,000 issued; 500,000 pooled. In January, 1918, took lease and bond on property of Cobrita Mines Co., described b relinquished Leatherby bond and lease on Vindicator and Little Gran

Property: 5 claims, Easy Money, Mochette and Mache, No about 100 acres, in Harcuvar mountains, 9 miles N. of Salome, Yuma the Santa Fé R. R. Claims lie in basin on the Butler Valley (or n of range; elevation 2,200′ to 4,000′, between Tank and Cunningha Rocks are diabase schist, and greenish prophyritic andesite and on t claims gneiss cut by rhyolite dikes, and "iron stained dacite."

Black reefs of "diorite" 40′ to 50′ across, occur and are cut b veins. Ore occurs in quartz veins and in iron veins, both carrying oxides and sulphides, with glance in places.

Development: 100′ shaft begun in Dec., 1916, on strong 5′ vei at surface with 8% ore; also cut veins at 30′, 58′ and 81′ in shaft. plans sinking 500′ shaft. Main vein said to be 3½′ to 5′ wide with o ments have run 8% to 18% copper and $8 to $12 gold per ton.

CONTINENTAL COPPER & GOLD MINING CO. A

Out of existence. Described in Vol. XIII.

COPPER CHIEF MINES CO. A

Offices: C. A. Post, 20 W. 34th St., New York. Mine at Yuma county, Ariz.

Officers: Richard Darling, pres.-treas.-mgr., Quartzite, Ariz.; Da[illegible] Jr., v. p.; R. A. Darling, sec.

Inc. 1910, in Arizona. **Cap.**, $5,000,000; $1 par; outstanding,

Property: 28 claims patented, 560 acres, 20 miles S. W. of Bou schist and greenstone with a contact deposit dipping at 35° and conta per and gold ore; ore assays 1.5% to 20% copper. Gold runs from $1 ton.

Development: 80′ 2-compartment shaft, which h through greenstone into a replacement body of copper ore in limesto is down to water level, and crosscutting is proceeding. A pump is to b

Examined by L. A. Denham, who reported that the remarkably good outcrops on all the claims of this company would probably be un high grade copper ore.

Equipment: includes a 25 h. p. gasoline hoist, a small compressor, 50 p. engine, triplex pump, 20 k. w. generator, 20 h. p. motor, auto-trucks, and mplete camp site.

No recent news available.

RITIC MINE **ARIZONA**

Joseph Nolachek, lessee, Wenden, Ariz. Geo. B. Layton, New York, owner. Property located in Cunningham Pass, Yuma county, developed to depth of 0'.

Ore contains gold, silver and copper. Has been operated by leasers during ent years who have made regular shipments assaying from $15 to $75 gold, to 25% copper, with a few ounces of silver. Calaverite, a telluride of gold orted from 400' level. Equipped with 15 h. p. hoist.

Production said to total about $700,000.

UPRITE INVESTMENT CO. **ARIZONA**

Address: Wenden, Ariz.

Property: the Wilkinson mine, 9 miles north of Wenden, Yuma county, joins the Little Giant on the S. W. Developed by shallow tunnels and a ' shaft. At 50' depth, report vein 18" wide. Shipments in 1918 said to have better than $50 gold and 10 to 20% copper.

ESERT MINING & DEVELOPMENT CO. **ARIZONA**

Robt. W. Hollis, mgr.-cons. engr. **Cap.,** 500,000 shares; $1 par. tricken from New York Curb, April, 1918. A prospect.

Property: 16 claims in Cunningham Pass, 9 miles N. of Wenden, and 7 claims at Wenden, total 540 acres.

Development: by 2 shafts, 200' and 325' deep on the Copper Hill claim, id to show a large body of disseminated ore.

UTCHMAN MINE **ARIZONA**

Owners: Tom Bouse and Mr. McMahon, Bouse, Yuma county.

Property: 5 miles west of Bouse, operated in 1918.

XCELSIOR GOLD & COPPER CO. **ARIZONA**

Address: Gus Mudersbach, pres., Bouse, Yuma county, Ariz.

Inc. Aug. 1, 1902, in Arizona. **Cap.,** $2,000,000; $1 par; stock owned by o Flagstaff men and the president. Is the successor of the Record Mines Co.

Property: the Mudersbach mine, with 34 claims, 8 miles S. of Bouse, on e main road to Quartzite, in the foothills of the Palomas mountains. The perty covers the strike of a mineralized contact metamorphic zone showing asan of specular hematite, underlaid by oxidized ores to shallow depth, suc- eded by copper sulphides, an average sampling said to have given 4.5% copper.

Geology: ore occurs as bornite, chalcopyrite, pyrite and hematite in a rnet-epidote gangue; it is an irregular bunchy replacement, a few inches to few feet thick, of limestone resting on schist and altered by quartz monzonite.

Development: by the 150' Excelsior shaft, with drifts at 50', 100' and ', and the 200' Mammoth shaft, with 600' of drifts and crosscuts.

Equipment: includes two 15 h. p. gasoline hoists, a gas engine and air mpressor.

Production: 48 tons of 12% ore shipped in 1916, and a carload of 4.25% pper ore with 50% iron and another of 6% ore. Work in 1917 consisted of level at 50' depth of No. 2 shaft; sulphide ore was cut in the 200' level of e No. 1 shaft. No recent news is available.

ORTUNA MINES CORPORATION **ARIZONA**

Presumably idle.

Office: 31 State St., Boston, Mass., and F. G. Hobbs, sec.-treas.; aron Bldg., San Francisco, Calif.

Officers: F. E. Boland, pres.; Frank G. Hobbs, Thos. Pascoe, J. E. anders, directors; T. C. Woodworth, cons. engr.; W. H. Enderton, supt.; B. Keever, mgr.

Inc. 1913, in California. **Cap.,** $500,000; $1 par; 423,960 issued. Listed Boston Curb. Federal Trust Co., Boston, depositary.

Property: the Fortuna mine, 7 patented, 11 unpatented claims, 358.7 res, 15 miles S. of Blaisdell station on the S. P. R. R., and 22 miles S. E.

of Yuma, Ariz. Claims are at base of W. slope of the Gila range. Th mine is said to have been worked by Chas. D. Lane of San Francisco, with a gross production of $2,887,075 gold and to have paid $1,180,0 dends. The ore-shoot was lost in 1901, a fault from 800′ to 1,200′ le off the ore, and $500,000 was spent in vain to recover ore beyond Present company started work May, 1913, and was reported to have spe and to have recovered the vein on the 800′ level.

The Fortuna is a quartz vein in schist, near gneiss and grani It runs E. W., dips 50° S. and has an average thickness of 4″, said out to 30′ in lenses. The outcrop shows iron and copper oxides, but free milling.

Development: by an old 1,500′ working shaft whose levels utilized by present company. Crosscutting is reported to have foun shoot, 5′ wide, on the 800′ level. A new shaft, 400′ E. of old workin to show a 2′ vein of $40 ore. Company claims 1,000,000 tons of pr which is regarded as too optimistic.

Mill has twenty 1,400-lb. stamps and receives water from a 4-mil

Mine has a good record and company has several eminent st but promotion record has been disappointing.

No recent information is available.

GLORY HOLE BONANZA MINES CO. A

Address: Salome, Yuma county, Ariz.

Officers and Directors: Dick Wick Hall, pres.-mgr.; E. S. Jo H. W. White, treas.; E. G. Jesson, sec.

Inc. Feb. 5, 1916, in Arizona. **Cap.,** $150,000; 10c par; 1,25 standing.

Property: 12 claims, seven 8 miles N. W. and five 10 miles N.

Geology: quartz vein, with 60° dip, N. W.-S. E. strike, in an schist, shows small high-grade and large low-grade shoots of gold ore copper.

Development: by 4 tunnels aggregating 825′ in length. Wo 175′ depth total 1,500′. Work commenced in 1916. Only exploration since high-grade pockety streaks were extracted.

Equipment: Fairbanks-Morse engine, 4-drill compressor, mach

Is an aftermath of the spectacular discovery of specimen gold o few years ago. Advertising was decidedly lurid in local Arizona pa

GOLDEN STAR MINES CO. A

Office: 32 Broadway, New York. **Mine:** Polaris, via Mohaw county.

Officers: D. M. Hyman, pres.; J. L. Tilton, sec.; H. B. Barn with C. E. Bamberger, E. M. Rogers, E. L. Grover, H. M. Robinson,

Inc. Dec., 1908, in Maine. **Cap.,** $2,000,000; $5 par; 400,000 issu pire Trust Co., registrar.

Property: undeveloped gold claims at Polaris, 50 miles N. of Two men reported working in 1919.

GOLDZONA-SCOTCHMAN MINING CO. A

Address: Bouse, Yuma county, Ariz.

Inc. by R. King, W. C. Miller, B. A. Kipp and others, of Los

Property: 600 acres, on which $100,000 has been spent.

Equipment: gasoline hoist, compressor, drills, buildings. Prob

GREATER AJO COPPER CO. A

Miami, Ariz. **Officers:** G. F. Senner, pres.; A. E. Soderman, Considine, sec.-treas., with A. B. Saling, R. L. Payne, E. Becher and B. directors.

Cap., $5,000,000.

Property: 68 claims, at Palomas, Yuma county, Ariz.

The prospectus—if it can be called such—of this company is mentions nearly everything, the property receiving small space. On predicts the Greater Ajo to be "The biggest mine in the State of Ari

Reported sold to a New York syndicate in Feb., 1918. No report recent date.

HARQUA HALA RIDGE M. & M. CO. **ARIZONA**

Controlled by Ranier Mines Corporation through ownership of 90% of stock.

Offices: 27 School St., Boston, Mass. **Mine office:** Wenden, Ariz.

Officers: Angus McEachren, pres.; Chas. S. Hill, v. p.; M. A. Blood, sec.-treas., with Percy James and D. L. Aspinwall, directors. W. T. Gnash, mgr.

Inc. Feb. 28, 1917, in Arizona. **Cap.,** $3,000,000; $1 par; 1,800,000 outstanding. Annual meeting first Wednesday in February.

Property: 30 claims, in the Harqua Hala mountains, Elsworth mining district, Yuma county, about 7 miles S. of Wenden, said to show a contact deposit between quartzite and porphyry, 100′ wide and traceable for 1,200′ in length, containing copper, gold and silver.

Examined by W. J. Stoke in April, 1919. The Gold King group of 43 claims has, it is said "geological conditions such that they form the most favorable indications for a large mine. . . . You have, in my opinion, the greatest gold showing in the southwest." There is also a copper vein that has had little work done on it. A tunnel, to give a depth of 1,200′ is suggested.

Development: by tunnels and shafts, with a total of 1,200′ of workings.

The company offered to prospective investors "to crush and pan gold ore, taken from the property, before your eyes," at their Boston office.

HI HENRY MINING CLAIMS **ARIZONA**

Address: H. W. Fabrenbrick, Polaris, via Mohawk, Yuma Co., Ariz.

Property: 23 claims including fractions in the Polaris district, 1.5 miles N. W. of King of Arizona mine, about 50 miles N. of Mohawk, Yuma county. A report states that the quartz-porphyry ledge is 28′ wide with andesite and dacite walls, striking E.-W., and dipping 45° N., traceable for 1,000′ on surface. Ore said to carry gold with a little silver, varying from $2 to $25.

Development: by 50′ shaft with 53′ crosscut also a 293′ crosscut tunnel. Elevation of mine is about 3,500′.

ILLINOIS ARIZONA COPPER CO. **ARIZONA**

In 1917 acquired holdings of the Billie Mack Mining Co.

Office: 19 South La Salle St., Chicago, Ill. **Mine office:** Parker, Ariz.

Officers: Robt. Tarrant, pres.; H. M. Higinbotham, v. p.; Wm. H. Dowe, sec., with C. Horix, F. W. Peck, Jr., R. Pringle, D. N. Condit, W. H. Burrage, W. C. Little, directors. Ed. G. Kynoch, treas.; United States Corporation Co., N. Y., transfer agent and registrar. R. W. Michael, supt.

Inc. 1917, in Arizona. **Cap.,** $2,000,000; $1 par; 971,378 outstanding.

Property: 26 unpatented claims, 8 miles S. of Parker, including the Billie Mack, Lion, Butte, Jack Rabbit and Malapais groups.

Geology: claims cover an area of pre-Cambrian schist, with limestone whose beds dip steeply N. W. Intrusions of quartz-monzonite, and diabase are said to form dikes or stocks from 100′ to 1,500′ wide, mineralized with iron and showing copper stains, which, it is hoped, indicate copper ore below. The ore found thus far occurs in veins in the limestone and consists mainly of malachite, chrysocolla, and specularite with free gold in porous quartz. As a rule the ore though often very rich, occurs in short bunches.

Development: by 200′ shaft with levels at 100′, 150′, and 200′ and by numerous short tunnels and shafts, totaling over 4,000′.

Production: returns from 489 tons shipped were 8% copper, 1.1 oz. gold per ton. Total production to date estimated at $125,000.

Equipment: includes small hoist, air-compressor, gasoline engine, air drills, etc.

Reported on by H. E. Olund, J. B. Rossman and Y. S. Young.

INLAND COPPER CO. **ARIZONA**

Idle. Letters to 1017 Commerce Bldg., Kansas City, Mo., and to the mine at Planet, Yuma Co., Ariz., unanswered. L. E. Corbin, pres.; A. W. Bork, v. p.; A. D. Dodson, sec.-treas., at last accounts.

Inc. in Arizona. **Cap.,** $5,000,000; $1 par.

Property: 40 claims, including 2 groups of about 15 claims each, in the

Bill Williams range, near the Bill Williams Fork river, with a mill-site site and water rights. The mine has 2 tunnels, and a 2-compartm equipped with an 18 h. p. gasoline hoist. Company advertised for cop presumably to show its stockholders, since it had no reduction plant of Is not regarded favorably.

JEROME-WENDEN COPPER CO. AR

Address: A. J. Humbert, Wenden, Yuma county, Ariz.

Is a reorganization of the Nuevo Mundo Mining Co., and althoug Jerome tacked on to its name, the company is doing its mining work there. Vein said to be up to 5' wide, carrying copper, developed by tunnels. A prospect.

JUNIATA GOLD & COPPER CO. AR

Office: 315 South Broadway, Los Angeles, Cal. **Mine address:** Yuma Co., Ariz.

Officers: P. W. Powers, pres.; E. S. Field, v. p.; Dalton S. Pa sec.-treas.; H. B. Ailman, supt.

Inc. October 29, 1907, in Arizona. **Cap.,** $1,000,000; $1 par.

Property: 10 claims, 200 acres, lying between the Gray Eagle a nation mines, in the Seneca district about 9 miles N. E. of Parker, o side of the Colorado river. Claims show gray micaceous schists wit bedded limestone. The schists dip about 45° and are cut by shear which copper ores occur.

Development: by 200' shaft with 2 prospect shafts. Property is pect. No returns secured.

LA BELLE MINING CO. AR

Address: Vicksburg, Yuma Co., Ariz.

Officers: A. W. Hompre, pres.; E. B. Moore, v. p.; L. S. Judd, s mgr.; James Bayne, treas.

Inc. Aug. 3, 1909, in Arizona. **Cap.,** $100,000; $10 par; issued. Company is a close corporation, entire stock issue being owned by offic

Property was abandoned as development proved it of no valu machinery and improvements sold, and company probably defunct.

LEADVILLE ARIZONA MINES CO. ARI

Office: Wenden, Ariz.

Officers: J. H. Finnegan, pres.; R. O. Worley, v. p.; A. F. Ki sec.; J. M. Campbell, treas.

Cap., $150,000; 10c par.

Property: 5 claims on the south side of the Harqua Hala mou

LITTLE GIANT MINE ARI

Operated by the Black Giant Mines Co., which see.

MAMMON GOLD & COPPER CO. ARI

Address: W. M. Boyce, mgr., Parker, Yuma Co., Ariz.

Officers: F. S. Osborne, pres.; J. M. Patterson, v. p.; F. M. Hal Geo. F. Farrell, treas.

Property: 32 claims in Osnega district, 12 miles E. of Parker. several carloads of oxidized copper ore were mined. Property passed t owners' hands until present owners acquired it.

Geology: ground largely covered with basalt. Schists show in fissures and on lower slopes. The copper and accompanying hematite o lies, not big enough fissures, also in a persistent bedded or blanket appearance contemporaneous with the overlying gneiss. The bedded vein has b source of the ore mined, and must be relied upon as the main source Where ore occurs in the crevices it occurs in small quantities.

Development: [illegible] consists of 3 short t connected by crosscuts. No. 3 workings. No. 2 is not promising; shows the continuation of the orebed. shaft was down 175 feet in 1907, from which crosscuts have opene copper ore. [illegible] reaching a depth [illegible] ore was 8" of which 25 per cent matter carrying 0.25

copper, and the remainder was in gneiss. The hole was continued in that rock to 300' when hot weather stopped operations. Company proposed drilling to 500' late in 1919.

Production: about 500 tons, shipped at various times in past 5 years, ore averaging well in copper.

Is a property worthy of careful exploration by churn-drilling.

MAVIS MINE **ARIZONA**

Address: F. G. Heath, National Bank Bldg., Long Beach, Cal.

Property: 5 patented claims in the Cienega district, 10 miles N. of Parker, Yuma county, adjoining the Empire Arizona Cons. Co.

Development slight. A 25' shaft furnished 14 tons of ore running 19 to 20% copper, and $15 to $18 gold.

MOHICAN COPPER CO. **ARIZONA**

Office: 304 Wilcox Bldg., Los Angeles, Cal. **Mine office:** J. V. Allison, mgr., Bouse, Ariz.

Officers: W. G. Miller, pres.; B. A. Kipp, v. p.; Rol. King, sec., with G. M. Swindell and Christ Walter, directors.

Inc. March 25, 1914, in Ariz. **Cap.**, $2,000,000; $1 par; 1,200,000 issued. Transfer office: Security Transfer & Registry Co., New York. Listed on New York and Boston Curbs. Balance sheet of March 31, 1918, showed that from March 26, 1914, to March 31, 1918, development cost $86,514, and $14,673 was expended for equipment. There was $480 cash on hand, and $3,500 notes payable.

Property: 31 claims, 9 patented, 5 miles W. of Bouse, in Plomosa district, Yuma county, said to show copper sulphide ore, with some gold.

Development: by 512' shaft with others 35, 60 and 110' deep, and total workings of 2,683'. At depth of 300', 500' from shaft, a 50' vein was cut. It was leached, but contained lenses and streaks of high-grade copper ore. On No. 1 level, and in a winze below No. 2 there is ore.

Equipment: includes hoist and compressor. Mill and K. & K. flotation plant proposed in 1919, tests having been made at the mine. Examined by J. W. Finch, W. A. Farish, and T. A. Keegle.

MONTANA-ARIZONA COPPER CO. **ARIZONA**

Address: W. D. Greenough, mgr. (Greenough Bros.), Spokane, Wash.

Property: 26 claims, 520 acres, 30 miles north of Wenden, Yuma county, said to show 5 veins, on vein carrying gold.

Development: 300' two-compartment shaft and a considerable number of trenches.

Equipment: includes 60 h. p. gasoline hoist.

MUDERSBACH MINE **ARIZONA**

See Excelsior Gold & Copper Co.

NAVAJO MINES CORPORATION OF ARIZONA **ARIZONA**

Office: Vicksburg, Yuma Co., Ariz.

Officers: E. P. Heald, pres.; William Vincent, 1st v. p.; O. B. Lefurgey, 2d v. p.; C. Y. DeLay, sec.-treas-gen. mgr., with H. M. Anthony, O. P. Posey and Eugene Schutz, directors.

Inc. in Arizona. **Cap.**, $3,000,000; $1 par; 1,800,000 issued. National Security Co., New York, transfer agents.

Property: the Desert mines, comprising the Golden Mound and Gold Eagle quartz claims, and Safe Deposit placer, all patented, 51½ acres, 2½ miles from Vicksburg on the railroad.

Geology: rocks are pre-Cambrian schists, with overlying quartzite, cut by diorite dikes. There are reported to be 3 quartz veins 1 to 10' wide, also a mound 400' across, 140' high at center. Ore contains gold, with small lead and copper contents and average assay is given as $8 per ton. Quartz in small mill is said to carry 4.3% copper and $17.15 gold and silver per ton.

Development: veins traced 800' by pits, tunnels, open cuts and a 275' tunnel with 2 crosscuts, 90' and 40' long'. Ore reserves were estimated by J. R. Boggs at 100,000 tons. W. Forstner estimates orebody 400' long by 140' high to contain 13,500 tons of $20 ore and 1,500 tons of $50 ore.

Equipment: includes concrete reservoir, buildings for 50 Prospectus truly said: "This is not a stock for everyone." Development opinion, too meagre to warrant the estimates given of either quantity and mining and milling cost of $2 per ton will be hard to attain o scale. Reported June, 1917, there were 5 carloads of ore ready for but no record of smelter returns has been received by us.

NEW LA PAZ GOLD MINING CO. A

Office: 930 Merchants' National Bank Bldg., Los Angeles, Ca

Officers: O. L. Grimsley, pres.-gen. mgr.; G. A. Scroggs, v. Geo. Renwick, sec., with J. E. Ransford and G. A. Reichard, directors.

Inc. May 2, 1910, in Arizona. **Cap.,** $1,500,000; $1 par; 933,2 Operating expenses first 5 months of 1917 were $15,850.

Property: 14 claims, 1,606 acres, in La Paz or Weaver distri county, said to show a deposit of gold-bearing gravel 6 to 40′ deep decomposed granite and porphyry. There are reported to be 5,300,0 of gravel, averaging $2.15 per yard. Operations to be by hydrauli which a 1,750,000 gal. storage dam and 12″ pipe-line from Colorado planned.

Property reported on by A. J. Condee, E. Shurley Wilson, A. B. E. A. Rasor.

NEW PLANET COPPER MINING CO. A

Office: 61 Broadway, New York.

Officers: Alex. Rae, pres.; Geo. S. Barton, v. p.; Herman C treas., with Julius H. Susmann, S. S. Rosenstamm, Geo. Crompton Lloyd, directors.

Inc. July 13, 1909, in Delaware. **Cap.,** $4,000,000; $5 par; issue shares. Is a reconstruction of the Planet Copper Mining Co., stock was retired by exchange for 240,000 shares of New Planet stock. Loan & Trust Co., New York, registrar. Annual meeting, third W in June.

Property: the Planet mine, with 31 patented, 10 unpatented, a tion claims, 800 acres, in the Harcuvar district, on the southern bank Williams Fork River, 21½ miles from Bouse on the Santa Fé c about 6 miles from Swansea.

Geology: copper occurs mainly as oxidized ore, though nu ticles of sulphides mixed with specular hematite are seen in the dee ings. The orebodies are replacements in limestone, the ore bed de the Planet shaft lying on the contact between this rock and underlyi This deposit is 3 to 20′ thick and dips 15° south. Much high-grad been shipped from other parts of the property in past years; it was crusts, or shells, about impure hematite in limestone, especially near amphibolic rock now altered to black gneiss. A deep-seated mass of the not improbable source of mineralization, although later igneous shown in a volcanic plug not far distant and in the basalt flows which surrounding country. The geology is very fully discussed in U. S. 451, p. 47, written by Howland Bancroft.

The ore deposits show a heavy iron gossan, mainly of hematite, of workable grade, and it has been estimated that the property sh 500,000 tons of 60% iron ore. The main orebody developed in the Pl is about 300′ in width, has a thickness of 4′ 3″, and an average copper 5.9%, according to a report by A. H. Kellar.

Development: aside from open cut and tunnels, is mainly at t shaft, an incline sunk on the ore bed at an average angle of 15° to 733′. There are drifts, crosscuts, etc., amounting to 2,500′. A ve shaft connects with these workings and gives ventilation.

The old workings include 8 tunnels, longest 225′, and 12 vertica shafts, of 25 to 325′ depth. About $150,000 was expended under th ment of the General Development Co. in sinking the vertical shaft a down a number of churn-drill holes, 3 holes showing low-grade su below the old workings.

The Planet mine is probably the oldest copper mine in Arizona. It was opened in 1864, worked in a small way until 1874, and reopened in 1884, when a 36" circular blast furnace was erected. The property was taken over, 1902, by the predecessor of the present company. The mine produced, 1864-74, upwards of $500,000 worth of high-grade ore, ranging from 15 to 40% in copper, which was presumably shipped down the Colorado river to Guaymas, and thence to Swansea, for reduction.

Equipment: includes a 75 h. p. gasoline plant, with two hoists and a 5-drill air compressor. Buildings include a carpenter shop, smithy, 2 shaft houses and 3 dwellings.

Property considered as still unproven, churn-drilling being too limited to determine existence, or non-existence, of large orebodies, and the greater part of the area is unexplored.

Property was under lease to the Northwestern Leasing & Development Co. from October, 1915, to September, 1917, when the lease was surrendered. Since then no operations have been carried on at the property. The lessees, during their operations, shipped ore and paid royalty to the New Planet Co., which enabled it to pay off its debts and company now has about $87,000 in its treasury, $80,000 of which is in U. S. Liberty Bonds and U. S. Certificates.

NORTHWESTERN LEASING & DEVELOPMENT CO. **ARIZONA**

Company had a lease on the New Planet copper mine (which see).

Described in Vol. XIII.

ORO COBRA MINING CO. **ARIZONA**

Address: Mrs. Thos. Wilkinson, pres. and gen. mgr., 715 High St., Burlington, Iowa. Mine near Wenden, Yuma county, Ariz.

Inc. Oct., 1901, in Arizona. **Cap.,** $1,500,000: $1 par; fully issued. Annual meeting, second Tuesday in February.

Property: 14 claims, 280 acres, in the Tank Pass section of the Harcuvar mountains, Ellsworth district, 12 miles west of Wenden, Yuma county. The claims show diorite, schist, granite and porphyry, with several fissure veins, from a few inches to 20' in estimated average width, carrying oxidized ores near surface, said to assay 12 to 15% copper, and $1.50 to $80 per ton in combined silver and gold values, with chalcopyrite, at shallow depth. Mine is opened by shafts of 250', 150' and 40', and a tunnel of 110' with 700' of workings. Only assessment work done in recent years.

RANIER DEVELOPMENT CO. **ARIZONA**

See Ranier Mines Corporation.

Office: 216-27 School St., Boston, Mass.

Officers: and Directors: S. J. Gnash, pres.; W. W. Gnash, v. p.; W. A. Dean, sec.-treas.; S. J. Gnash, mgr.; W. T. Gnash, supt., Wenden, Arizona.

Inc. July 1, 1914, in Arizona. **Cap.,** $3,000,000; $1 par; 1,878,496 shares outstanding, of which 1,777,238 shares are pooled. Metropolitan Trust Co., Boston, transfer agent. Annual meeting, February 15th.

Property: 44 claims, including the Big Four, about 860 acres, in Ellsworth mining district, 10 miles N. of Wenden, Yuma county. Ore occurs in fissure veins carrying gold-silver-copper-iron. The main vein is reported exposed at surface for 80-250' in width. Country rock is granite-schist, shale, porphyry and limestone. Two small shipments averaged $59 per ton.

Development: totals 2,000' of workings, including several shafts, deepest 226' vertical and a 130' tunnel. A 2-compartment shaft was down 175' in Nov., 1919, being sunk 500'. The vein was considered to be 600' wide. The shaft was in low-grade copper-gold ore. A contract was let to deepen the deepest shaft in the Big Four, where good ore has been mined.

Equipment: 20 h. p. gas. hoist, 60 h. p. oil engine, compressor, drills, pump, tramway, and several houses. Twelve men are employed. Mine is connected by wagon road with Wenden.

RANIER MINES CORPORATION **ARIZONA**

Address: 216-27 School St., Boston, Mass.

Officers: John W. Wilson, pres.; A. R. Nickerson, v. p.; W. A. Dean, sec.-treas., with Angus MacEachern and Ralph L. Gustin, directors. S. J. Gnash, mgr.; W. T. Gnash, supt.; J. H. Shockley, cons. engr.

Inc. Oct., 1917, in Arizona. **Cap.**, $5,000,000; $1 par; ou 2,502,815 shares. Listed on Boston Curb. Transfer office, Metropoli Co., Boston. Registrar, Equitable Trust Co., Boston. Annual meetin Tuesday in January.

Company is a holding company owning 98% of stock of Ranier (which see), and 90% of stock of Harqua Hala Ridge M. & M. Co. near Wenden, Yuma county.) Operating expenses for 1918, were $7,5

In a 45-page prospectus, the president of the company says, "Th ration's vast holdings of 1,630 acres, comprising 84 mining claims in heart of the copper-gold producing district, with 2,500 outcroppings ore, and 250 veins already exposed—one of them 290′ in width at warrant the prediction that Ranier will soon rank as one of the bi richest copper-gold mines in the State of Arizona."

The company, in a year's operations has sunk a shaft less than hoped to have it down 300′ by the end of 1919. It was 175′ deep November. There are about 10 men working on the property, and fiscal agents scattered over the country. The original promoters ar have received 2,000,000 shares. To date, about 600,000 shares have by the company, realizing $300,000, and company claims $7,500 to $1 on hand. Stock sells on the Boston Curb for over $1 per share, the of the company are reported offering them at 60c. per share, but th cates sold by them are not saleable on the Curb for 2 years from date

RED CLOUD CONS. MINES CO. A

Property: 40 miles N. of Yuma has a 500′ shaft developing s ore. A 300-ton mill started operating in 1918, equipped with crusher, and 3 dry-concentrating tables. Claimed the ore developed was su run the mill 5 years.

RED METAL COPPER CO. A

Address: Parker, Ariz.

Officers: Dr. A. H. Littlefield, pres.; Lee Pritt, v. p.; Fred M. F John Pritt, treas.-supt., with J. F. Raney, directors.

Property: 12 miles N. E. of Parker, adjoins the Western Ariz per Co. holdings on the S., and is said to show a contact deposit of with an iron gossan carrying gold and copper.

Development: by 225′ shaft. Company offers stock at 25c per 1917, to procure funds for further development. In 1919, still trying property.

RUBY GOLD AND COPPER CO. A

Property near Parker, Ariz. Apparently acquired by the Bil Mining Co., and later by the Illinois Arizona Copper Co., which see.

SHAMROCK MINING CO. A

Address: Bernard McEntee, gen. mgr., via Vicksburg, Yuma C

Property: in the Plomosa district. Ore as mined is said to copper and 20 oz. silver per ton. Shipments amount to $12,000 to dat

SWANSEA CONS. GOLD & COPPER MINING CO. A

Reorganization of the Clara Cons. Gold & Copper Mining Co.

O. M. Souden, trustee, c/o U. S. Nat'l Bank, Los Angeles, Calif to Judge W. J. Thomas of Los Angeles, early in 1915; operated, 191 Thomas Estate. **Inc.** 1912. **Cap.**, $4,000,000; par $1.

In May, 1917, Swansea Lease, Inc., which see, secured a 10-year the mine, calling for a 1,000′ shaft, 50% royalty on ore, to be not under in 10 years. Shipments were 30 cars per week in Sept., 1917.

Trustee's report for 4 months ended Feb. 23, 1917, showed a net cas of $47,311, plus $22,335 carried forward, making $69,646. There were 452 cars of ore, worth $252,466.

In May, 1917, company was discharged from bankruptcy, and ha on hand. There is still a bonded debt of $1,000,000. Company has shares outstanding.

Property: reported as 132 claims, 3,300 acres, about 10 mil Planet, includes the Signal mine, erroneously called the Clara, and t and Clara groups, at Swansea, Yuma county, Ariz.

Geology: the Signal orebody is a replacement deposit formed in a limestone bed 15 to 100′ thick, associated with overlying shales and amphibolitic schist and resting on granite gneiss, all of pre-Cambrian age. The outcrop is an irregular replacement, 30′ wide, of copper-stained hematite, dipping at 52° N. This orebody extends 150′ downward in the mine, is 20 to 30′ wide, 90′ long, and contains boulders of unreplaced limestone. The orebody is encased in soft chloritic schist derived from amphibolite and appears to rest on a strong fault plane that separates the granite gneiss from the sedimentary series. Two parallel, smaller, but similar orebodies occur in the hanging wall of the deposit. The ore consists of soft, red hematite with manganese-oxide and chlorite, holding grains and nodules of chalcopyrite and pyrite. The ore as a whole averages perhaps 2.5% copper, though 4% ore is obtained for smelting by rough sorting. See U. S. G. S. Bull. 451, pp. 59-67.

Development: by 2 main shafts with extensive underground workings along the main fault or lode, and by stopes on 3 orebodies. The mine has 4 vertical and 2 inclined shafts. No. 1 shaft, 400′ deep, vertical, has a 15 h. p. gasoline hoist, raising ore with a bucket. No. 2 shaft, 325′ deep, is an incline, and has a 50 h. p. Western gasoline hoist, operating a 2-ton skip. No. 3 shaft, also inclined, is 200′ deep. No. 4 shaft, the largest and deepest, 3 compartments, is 500′ deep, with a hoist. No. 5 shaft, 373′ deep, has a 75 h. p. steam hoist, and No. 6 shaft, 250′ deep, has a 25 h. p. steam hoist.

Equipment: the power plant has two 250 h. p. boilers, a 300 k. w. d. c. motor, and a 150 k. w. belt-driven motor operating pumps at the Bill Williams Fork river, supplying water to the mine and works through 3″ and 6″ pipe-lines. A reverberatory furnace was partly completed when the mine closed down in 1913. The smelter has a water-jacket blast-furnace of 750 tons rated daily capacity, a 15,000 cu. ft. air compressor, and a blower direct-connected to a compound engine. Buildings include a machine-shop, sawmill and other structures. Slags are handled by a Jeffrey electric locomotive. The smelter building is of structural steel. The converter department has 2 stands and 9 shells, rotated electrically, with a 40-ton electric crane, having 2 auxiliary hoists, and a silica mill, with electric motor, for linings.

A new flotation mill was completed by the Swansea Lease, Inc, Sept., 1919, in charge of L. F. Barber.

The mines and works are connected with the Santa Fé, Prescott & Phoenix Railway by a 21-mile line, known as the Arizona & Swansea Railroad, operated, but not owned (controlled by George Mitchell of Los Angeles) by the company.

The company is an example of enthusiasm run wild, coupled with reckless stock selling and the foolish construction of surface works before the development of enough ore to keep them busy.

SWANSEA LEASE, INC. **ARIZONA**

Chas. W. Clark, pres., San Mateo, Calif.; J. Ross Clark, v. p.; C. O. Whittemore, sec.; F. E. Shaw, treas.

In 1917 obtained a 10-year lease on property of Swansea Cons. G. & C. Mng. Co., Swansea, Ariz., and in 1918 erected a 200-ton concentrator, and sank a 500′ working shaft. Property closed down in April, 1919, to wait for better copper market conditions. Production figures not available. Employing 30 miners in July, 1919. Larger and richer orebodies than formerly mined are said to have been revealed by drilling. A flotation plant was ready to work by Sept., 1919.

TANK PASS CONSOLIDATED MINING CO. **ARIZONA**

Address: A. Tennyson Pryor, pres.-gen. mgr., 933 Dime Bank Bldg., Detroit, Mich. Ward Smith, v. p.

Inc. Nov., 1909. **Cap.,** $3,000,000; $10 par. Company controls the Alvin Development Co. through stock ownership, and took over the property of the Cobralla Copper Co., March, 1910.

Property: known as the Ultimatum or Cobralla group, adjoins the Alvin, near Tank Pass in the Harcuvar mountains, Ellsworth mining district, about 10 miles from Wenden. The mine carries about 4,500′ of the strike of various fractures in a contact zone following granite intrusive in quartzite, phibolite and limestone, the ores carrying bornite and chalcopyrite, and

estimated to average 3 to 5% copper, 5 to 6 oz. silver and $1 to $8 gol
with occasional paystreaks and masses of high-grade ore.

Development: by the 150′ Carbonate Hill shaft and a 200′ tunn

Equipment: includes gasoline hoist. Is a prospect of merit.
ably idle.

UNITED MINES COMPANY OF ARIZONA A

Address: care L. M. Hart, 120 Broadway, New York City.

Officers: J. C. Denton, pres., Superior, Ariz.; George Christie,
H. Stewart, treas.; E. A. Goodrich, sec., with H. E. Woods and A.
directors.

Inc. May, 1916, in Arizona. **Cap.,** $1,750,000; $1 par; 900,000 in
Listed on New York Curb. On Dec. 10, 1919, at public auction, 1,0
were sold at $75 the lot.

Property: 30 claims, 600 acres near Bouse, including former ho
Little Butte Cons. Mines Co., the Arizona Pride and Bullion groups.

Mine shut down 1916, as funds for development were nearly
before reaching the point where engineers expected to find the orebody

Geology: the holdings are in an extensive district of pre-C
schists, quartzites and limestones, cut by intrusive granites and othe
rocks, and covered by recent volcanic flows. The ore deposits of the
though varied in nature, carry gold, silver or copper ores. The typic
ores of the region contain specular red hematite, and the deposits w
Planet, Mineral Hill and the Clara are largely replacements of limest

The **Little Butte** claims cover an area of sedimentary rocks ru
W. and dipping at 50°, including a 1,500′ belt of brown limestone in par
by an old rhyolite breccia. These rocks are faulted against a coarse
the fault being mineralized, though nearby, the limestone caps and c
granite. The vein outcrop shows an interlacing network of quartz
stringers forming a wide lode. The underground workings show
lenticular bunches of oxidized ore on and above the 120′ level, and clo
granite hanging-wall, with 75′ or so of altered andesite (rhyolite) bet
lode and the limestone. Shipments of 388 tons yielded $8,040, or $
ton. The lode is in part leached below these residual masses of ore, an
development was stopped at 388′ below which the richer ore prob
The association of chlorite, specularite and quartz indicates that the m
tion will extend downward to very considerable depth, and the ore
chalcopyrite.

Development: by a 700′ incline shaft with 1,000′ of levels at d
75, 150, 210 and 310′. Water was encountered at 200′, but the lowest
oxidation has not yet been reached. The 150′ level shows ore bunches
along the drift. The 210′ level shows mainly leached vein matter w
small bunches of copper ore, but the leached material is said to averag
for 200′ along the drift. Similar conditions obtain at 300′.

The **Arizona Pride Group** claims cover part of the granite area
gold-bearing quartz veins occur. Development includes 50′ and 60′ sha
showing ore.

The **Bullion Group** covers a sedimentary area, cut by intru
dikes and dacite, with veins following the intrusive contacts. A 2
on one vein has not yet reached water level, the filling being leached.

Production: under former owners the Little Butte mine shipme
valued $3,840. By contract the ore averaging $7.60 per ton gold, 9.4% cop
iron and 32% silica.

In June, 1917, property was examined by Henry C. Carr, who co
the gold-bearing veins of secondary consideration without a treatme
copper ore which could be handled in commercial quantities at greater
predicted at 78%.

The property has extensive possibilities which are said to warra
fully planned development.

VICTOR & BELLE CROWN MINING CO. AR

Address: Weldon, Yuma Co., Arizona.

Officers: J. E. Matteson, pres.; F. C. Piper, v. p.; J. H. Matteson, sec.-treas.; Geo. M. White, mgr., at last accounts.

Property: 10 claims, 180 acres, in the Harcuvar mountains, 8 miles N. of Salome, the nearest rail point, said to have a vein of 5 to 7′ width, with a 30 to 36″ paystreak, giving assays of 15 to 20% copper and $15 to $20 gold per ton.

Development: includes shafts of 80′, 35′ and 450′, and tunnels of 755′, 165′ and 230′, aggregating about 1,200′ of workings. In 1918, was driving a tunnel to intersect the veins at 600′ depth.

VINDICATOR MINING CO. **ARIZONA**

Address: care Otis E. Young, Phoenix, Ariz.

Property: located in Cunningham Pass district, Yuma county, said to show copper-gold ore. Developed by shaft.

WENDEN COPPER CO. **ARIZONA**

Address: I. H. Barkdoll, pres., Phoenix, Ariz.

Property: 3 miles N. of Cunningham Pass, Yuma county. Reported in 1918 that a 18″ vein of copper glance had been opened and several carloads of ore shipped. Property operated under lease.

WENDENDALE GOLD MIINING CO. **ARIZONA**

Property: near Wenden, in the Cunningham Pass district, is developed by a shaft, showing ore that gave returns of 13% copper and $12 gold per ton, from a test smelter shipment. Shipping ore was mined by lessees in 1916. No later report.

YUMA CONSOLIDATED MINING CO. **ARIZONA**

Address: F. W. Dunn, mgr., Quartzite, Ariz.

Property: placer ground in Quartzite district, Yuma county. Late in 1916 a dry treatment plant, including a Lidgerwood shovel, grizzly, Quenner crusher and Stebbins dry concentrators of 2,000 yards daily capacity was erected at a cost of $65,000. Shortage of water is the reason for this type of plant. As much as 97% of the gold said to be extracted. Gravel containing $2, $6.65 and $12 per yard reported available. In May, 1919, reported using a steam-shovel for ore extraction, and that 150 men were employed.

YUMA WARRIOR MINING CO. **ARIZONA**

Office: 41 Bank of Arizona Bldg., Prescott, Ariz.

Officers: H. W. Stevens, pres.; E. J. F. Horne, v. p.; C. T. Joslin, sec.-treas., with W. A. Drake, R. W. Hunt, O. W. Johnson and H. K. Chapin, directors. John B. Martin, supt.

Inc. in Arizona. **Cap.,** $3,500,000; $1 par; about one-half is outstanding.

Property: 365 acres in the Ellsworth district, 6½ miles from Salome, Yuma county, known as the Harqua Hala-Bonanza and Golden Eagle groups. Originally located in 1888, the mine is reported to have yielded gold worth $4,000,000 above the 200′ level. Examined by L. W. Getchell.

Geology: ore shoots occur in shear-zones in schists with intercalated limestone, extending down into the basal granite. Basic dikes are found and many veinlets of quartz and calcite occur. Geology is described in U. S. G. S. Bull. 451, 1911, p. 106.

Development: by incline shaft to 365′ vertical depth. On 5 levels free milling ore is said to have been opened; on No. 7 south, sulphide ore assaying $44 gold, 7.4 oz. silver, and 5.28% copper; and in a winze below No. 8, $16.54 gold, 7.85 oz. silver, and 6.15% copper ore, all above water level. At 350′ or 400′ lower, estimated water level, a considerable body of copper sulphide is expected. A new 3-compartment shaft may be sunk.

Equipment: complete mining plant, ⅞ mile aerial tram from Golden Eagle mine to Bonanza, 40-stamp mill, shops, and buildings. To treat the sulphide ore it was proposed to add tube-mills, concentrators and flotation plant, with capacity of 200 tons daily.

Production: is irregular; since Feb., 1917, the mill yielded gold worth $25,000.

Reported new orebodies may be valuable, but company should not bank on past production, which was gold from free-milling ore.

No later news, and mine presumably idle.

WARDWELL & OSBORNE COPPER MINES CO. ARI

Dead. Property lost by failure to do assessment work, and subse relocated and now held by Mammon Copper Co., which see. Described XII.

WESTERN ARIZONA COPPER C.O. ARI

Mail returned, 1918, from former address, Miami, Ariz.

Officers: N. D. Brayton, pres.; J. P. Downey, v. p.; C. D. Duncar F. E. Gassaway, treas.; G. R. Stewart, gen. mgr.; H. M. Foster, atty.

Property: 11 miles from Parker, on the Arizona side of the Co river. In April, 1917, two cars of ore averaged 12% copper and $4 gold p

ARKANSAS

The zinc-lead region of northern Arkansas is in Boone, Baxter, M Newton and Searcy counties. Carbonate and silicate ores are the pr products, though drilling has exposed sphalerite, but galena has not ye found in large quantities. Open-cut mining is the general rule. Ore-d follows Joplin, Missouri, practice.*

Production statistics are given by the State Bureau of Mines. M the mines were idle during 1918, though several new mills were erected in and Marion counties. Yearly production, in short tons, is as follows:

	Zinc concentrates				Lead concentr	
Year	Sphalerite	Value	Carbonates	Value	Tons	Va
1919....	24	.....	141	.....	56	..
1918....	310	$16,430	2,156	$68,333	155	$1
1917....	916	57,824	17,053	650,585	474	4
1916....	1,670	112,726	16,609	940,224	339	2
1915....	606	41,341	7,925	408,079	79	
1914....	743	19,406	1,143	25,187	52	
1913....	594	16,916	680	15,050	23	

The output of the State for 1917 and 1918 is as follows:

	1917	1918
Crude ore, tons....	203,600	37,000
Zinc, per cent.....	3.70	2.86
Lead, per cent.....	0.19	0.32

	1917
Concentrates:	
Sphalerite, per cent..	58.40
Carbonates, per cent.	40.50
Galena, per cent....	80.50

The total value in 1919 was $8,340.

The manganese region is tributary to Batesville.

The mines are arranged alphabetically.

AMERICAN BAUXITE CO. ARKAN

Office: 111 Harrison Bldg., Philadelphia, Pa. **Mine address:** Ba Saline county, Ark.; Harmon Lewis, v. p.; J. R. Gibbons, mgr.

Operated as a close corporation.

Property: the largest producer of bauxite (oxide of alumina) i State. The output is sold mostly to the Aluminum Ore Co. of East St. L Employees number from 400 to 1,200, varying with demand for product. bauxite occurs as blanket formation in clay and is mined by open-cut met The ore, which is of high grade, is crushed to 1½ in. size and dried, read market. The mine is described by Tom Shiras in the "Eng. & Mng. Journa June 21, 1919.

AMERICAN STAR ANTIMONY CORPORATION ARKAN

Office and mine: Gilham, Ark.

Officers: Gordon Battele, pres.; C. M. Fenton, v. p.-sec.-treas., Harry S. Miller and G. B. Fenton, directors.

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*The field was described in the "Engineering and Mining Journal" of A 26, 1911, by Otto Ruhl, and on February 16, 1918, by Tom Shiras.

Inc. Dec. 10, 1916, in Missouri. **Cap.**, $24,000; $100 par; all issued. Conqueror Trust Co., Joplin, Mo., registrar and transfer agents. Annual meeting, second Monday in December.

Property: 3 groups, 440 acres, near Gilham, Sevier county, and a smelter in the town of Sevier. **Ore:** stibnite occurs in fissure veins, 6" to 3' wide and said to give average assays of 30% antimony, 33% sulphur, 6% silica, 3% iron, and 24% alumina.

Development: by 3 shafts, deepest 175'.

Equipment: includes 3 compressors, hoist and steam power. Management reported ore reserves of 2,000 tons in 1917. Developing.

ARKANSAS MINING & MERCANTILE CO. **ARKANSAS**

Address: F. A. Handlen, mgr., Fort Smith, Ark.

Property: zinc-lead mine between Boone and Marion counties. A 200-ton mill was to be built in 1919.

ARKANSAS-OKLAHOMA MINING CO. **ARKANSAS**

Address: Luther Evans, Batesville, Ark.

Property: a lease on a manganese deposit on Cave Creek, the ore being cleaned by a log-washer.

ARKANSAS ZINC & SMELTING CORPORATION **ARKANSAS**

Address: Robert L. Greene, gen. mgr., Van Buren, Ark. N. Y. address: 42 Broadway.

Smelter: one mile east of Van Buren, between St. L., I. M. & S. R. R. and St. L. and San F. R. R. Plant includes ore storage bins of 4,000 tons capacity, weighing apparatus, 2 Ropp type kilns of 20 to 25 ton daily capacity, crusher and mixing house, sampler, 4 blocks of 800 retorts each, pottery, electric power plant, and necessary buildings.

The ore and concentrate supply for this plant comes from northern Arkansas-Oklahoma mines.

B. & A. MINING CO. **ARKANSAS**

Address: J. W. Hammond, Okmulgee, Okla. C. L. Larson, mgr.; J. J. Sanford, mine supt.; E. W. Ellis, mill supt.

Directors: J. W. Hammond, O. F. Dickenson, W. M. Hodsdon, F. P. Snider, Villiard Martin, Charles Popkin, W. J. Seekatz, N. Lambertson, and Milo Brown.

Property: the old Davis mine, 15 miles N. of deQueen and 6 miles N. W. of Gilham, Sevier county. Claims were acquired in 1918, and $150,000 has been spent on development and machinery. The ore-zone is up to 40' wide, and carries sphalerite, chalcopyrite, and galena. The first named mineral follows the footwall, while the others are disseminated. A 170' shaft has been sunk. Mill employs rolls, jigs, and tables.

BIG HURRICANE MINE **ARKANSAS**

Address: J. C. Shepherd, Pindall, Searcy county, Ark.

Property: 480 acres, near Pindall, on the M. & N. A. R. R. The mine is in an ore-bearing fault running N. 82° W. Carbonates have been the principal output, but sphalerite has been found under them.

Development: by large open-cut 60' deep, exposing a thin ore-bearing zone included in the fault. Ore is removed by cars drawn up an incline track.

Equipment: 3 mills of 125, 200 and 100-ton capacity, respectively. In No. 1, ore is crushed to ½" mesh, and jigged. Tailing passes to No. 2, where a Hardinge mill grinds it to 1½ mm. size, concentration being on tables. No. 3 has 4 tables, which handle pulp from No. 2 mill without finer grinding. Losses of metallic zinc were reduced by the three plants from 5% to 3% and later to 1½%. Tailing piles contain 50,000 tons of 3 to 5% material. Production in 1918 was from 90 to 100 tons of concentrates per week. These contain 40% metal, and make grade B spelter. The mills recover 12½% as carbonate concentrates.

BLUE PIG MINING CO. **ARKANSAS**

Address: A. Besse, supt., Batesville, Ark., but letters returned in March, 1919.

Property: a manganese mine, on which a log-washer and other ery was to be erected at last accounts.

BOO-GRA-LOO MINING CO. (THE) ARK

Address: Pawhuska, Okla.

Officers: W. E. Graham, pres.-mgr.; H. M. Loomer, sec.; R. B. treas., also directors.

Inc. Jan. 26, 1918, in Oklahoma. **Cap.**, $10,000; $1 par; all issue nual meeting, January 25. Gross earnings in 1918 were $1,500, and $2,815.

Property: lease on 390 acres of patented land, at Zinc, Boone Ark. Ore-body is a chamber deposit of calamine in limestone.

Development: by 300′ tunnel. **Equipment:** includes a 50-ton mil concentrators. No production at present, as development is under way.

BROOKS HILL MINE ARK

Address: Walter Dennison, Cushman, Izard county, Ark. Mi maganese deposit worked by steam-shovel.

CENTRAL STATES LEAD & ZINC CO. ARK

Address: A. N. Stanfield, Flippin, Ark.; or Oklahoma City, Ok

Property: the Monkey Hill zinc mine in Marion county. A mill was erected in 1918.

CHARLEY BOY MINING CO. ARK

Address: Chas. Gilstrop, Tulsa, Okla.

Officers: A. K. Richards, pres.; W. T. Hines, v. p.; Chas. Gilstr treas.

Property: a lease on land in the Zinc district, Boone county.

CONFEDERATE MINE ARK

Address: W. E. Everhart, supt., Harrison, Ark.

Property: a zinc-lead mine in Newton county, said to have been in 1860. A 300-ton mill, the largest in the State, was erected late in 1917, is brought 9,300′ in a 6″ pipe-line. Concentrates consist of 66% zinc and 33% lead.

CONSOLIDATED ZINC MINES CO. ARK

Address: N. W. Palmer, supt., Zinc, Ark.

Property: the Howard, Churchill, and Wallace zinc mines. A mill was to be built at last report.

CONTINENTAL ZINC CO. ARK

Address: Bear Hill mine, Georges Creek, Marion county, Ark.

One of the few mines in the northern Arkansas field developed b and drifts. Main shaft is 157′ deep, and sphalerite is mined from dri and 133′ depth.

COWAN-BANNERS DEVELOPMENT CO. ARK

A 200-ton mill and mining plant was to be erected in 1919.

CUSHMAN MANGANESE CO. ARK

Address: Batesville, Ark.

Company has a manganese mine, and in July, 1919, was one of the mines of this character in operation.

DEEP MINING CO. ARK

Address: W. E. Layton, Rush, Ark.

Property was optioned late in 1917, and Moore Bros. of Stone, A to drill the deep ground on Cowan barren, between Rush and Yellvill lean zinc ore was cut at 175′ in 1918.

DENVER MINING & MILLING CO. ARK

Letters returned unclaimed in March, 1919, from Yellville, Ark.

Property: a zinc-lead mine in northern Arkansas, said to $300,000 worth of ore. A new mill was started in August, 1917.

DIXIE GIRL MINING CO. ARK

Offices: 600 Wheat Bldg., Fort Worth, Texas; and Buffalo, A

Officers: O. H. Haley, pres.; J. W. Haley, v. p.; H. Lederm treas., with A. C. Barnhart and J. H. Hand, directors. L. E. Myles, mg Jobes, cons. eng.

Inc. 1917, in Arkansas. **Cap.**, $300,000; $1 par; 50,000 issued.
Property: 160 acres of patented land 5 miles S. W. of Buffalo, and 5 miles N. E. of Rush.
Development: by tunnels and open-cuts. Ore is zinc carbonate. New machinery was to be erected early in 1918.

DIXIE QUEEN MINING CO. **ARKANSAS**
Property: the Can Spring mine, on Warner creek, near Buffalo, Marion county.

EDITH MINE **ARKANSAS**
Address: Charles Le Vasseur, Rush, Ark.
Property: acquired in Jan., 1919, by J. de Costa and associates of Kansas City, Mo. Ore is a carbonate of zinc, and is hauled to Yellville. A mill is in operation.

EUREKA MANGANESE CO. **ARKANSAS**
Address: Cushman, Ark.
Property: covers deposit of manganese disseminated in clay. A washing and jigging plant were to be built in 1918.

EVERTON MINING & DEVELOPMENT CO. **ARKANSAS**
Address: Everton, Ark.
Property: manganese deposit in Pugh Hollow, Lafferty Creek district, Boone county. Ore said to carry from 25 to 29% Mn. Concentration raises this grade to above 34%. A test mill was employed prior to erection of a larger plant late in 1918.

FORT SMITH SPELTER CO. **ARKANSAS**
Address: C. W. Martin, pres.; Fort Smith, Ark.
Works: zinc smelter with 2,560 retorts at Fort Smith and rolling mills for sheet zinc at Greencastle, Indiana. Ore is purchased from mines in Arkansas and the Tri-State region.
Through the sale, in July, 1919, of his interests in the American Zinc Products Co., D. W. Kerr, former president, transferred control of the above works, to the Valley Iron Co. of Youngstown, Ohio. New York office: 50 Church St., with M. L. Filley as Eastern sales manager.

FOX DEN MINING CO. **ARKANSAS**
Property: the Dry Bone zinc mine and mill, near Buffalo.

GLORIA MINING CO. **ARKANSAS**
Office: Zinc, Ark. Geo. C. Miller, mgr.-supt. Not incorporated. Reported gross earnings, 1918, $30,000, costs, $20,000.
Dividends: $10,000.
Property: 31 acres, 1 mile N. of Zinc, carries a blanket deposit of zinc ore in limestone, worked by 560' tunnel.
Equipment: oil engine, 600' tramway, 50-ton concentrator, consisting of jigs and tables. Concentrate shipped in 1918 averaged 44% zinc and valued at $30,000.

HARRISON MINING & MILLING CO. **ARKANSAS**
Lease sold to Krueger-Mills Mining Co., which see.

INDEPENDENCE MINING CO. **ARKANSAS**
Address: Batesville, Ark.
Company has a manganese mine, and in July, 1919, was one of the only two operators at work.

J. & C. MINING CO. **ARKANSAS**
Address: C. H. Holman, supt., Buffalo, Ark.
In 1918, company was reported developing a body of zinc carbonate ore and erecting a 75-ton mill.

KRUEGER-MILLS MINING CO. **ARKANSAS**
Address: W. O. Krueger, Harrison, and E. H. Mills, Springfield, Mo.
Property: lease acquired from Harrison M. & M. Co., Harrison, Ark. Some ore was developed, and a 75-ton mill operated in 1918, but was burned down in that year.

LENK PAT MINING CO. **ARKANSAS**
Former address: care P. C. Quinn, 530 Main St., Joplin, Mo., but letter returned unclaimed in 1919.

Property: at Rogers, Ark., where a mill was to have been built

LIBERTY LEAD & ZINC CO. ARKA

Address: Yellville, Ark.

Officers: C. G. Rogers, pres.; G. W. Caldwell, v. p.; R. R. Ston treas.

Inc. June 17, 1971, in Arizona. **Cap.,** $100,000; $1 par.

Gross earnings in 1918 were $2,000, and expenses, $3,000.

Property: 220 acres in Marion county, 3 miles S. E. of Yellvill tains a blanket deposit in flint rock and sand. Ore carries zinc only. D ment by 200′ tunnel.

Equipment: geared hoist, 850 cu. ft. compressor, 75 h. p. oil engi 150-ton mill, including 2 jigs.

Production: in 1917, 100 tons of ore; in 1918, 50 tons of concent

MAGNOLIA LEAD & ZINC CO. ARKA

Address: J. H. Haddock, pres., Oklahoma City, Okla.; or G. C. Zinc, Ark.

Property: 4,000 acres in Marion county, contains chamber depo zinc carbonate in limestone and flint.

Development: by 200′ tunnel, to depth of 200′.

Equipment: steam power, 600 cu. ft. compressor, 300′ tramwa 150-ton mill employing jigs.

The ore assays 12% and the concentrates 42% zinc. The finished costs $15 per ton.

MATTIE MAY MINING CO. ARKA

Address: E. Zimmerman, supt., Rush, Ark.

A 150-ton mill to concentrate the developed zinc carbonate ore wa pleted in 1919.

McCURRY MINING & MILLING CO. ARKA

Address: W. A. McCurry, Zinc, Ark.

Property: the Coker Hollow, and Rhodes-Manchester, the H Dodd City; and the Keys Gap and Canton mines, near Ponca City. The contains zinc silicate, the latter blende and galena. At Zinc the compan 100-ton custom mill.

MORNING STAR MINING CO. ARKA

Property in the Rush district, yielded 160 tons of zinc ore in Octob

NORTH STAR MINING CO. ARKA

Address: F. C. Heywood, Yellville, Ark.

Property: the North Star and Lone Star mines in northern Ar drilled in spring of 1918; the two mines were consolidated in November was erected with aerial tram, and in April, 1919, the daily output was 5 high-grade zinc carbonate.

OKLAHOMA-KANSAS MINING CO. ARKA

Address: Ross Blake, mgr., Batesville, Ark.

Officers: O. M. Bilharz, pres.; W. H. Gartung, sec.-treas.

Property: 585 acres in Independence county. Containing mar ore in clay, which is worked by a steam-shovel. A 300-ton mill makes Mn. product.

ONWATTA MINING CO. ARKA

Address: C. G. Rogers, supt., Yellville, Ark.

Officers: C. G. Rogers, pres.; G. W. Caldwell, v. p.; R. R. Ston treas.

Property: 40 acres in Marion county, 9 miles N. of Yellville, contains lead ore with calamine, smithsonite, with cadmium content occu fissures or fault breccias in limestone. The zinc ore averages better th metal.

Development: by 150 and 300′ tunnels. Workings total 1,000′, ing out 2,000 tons of ore.

Equipment: 35 h. p. oil engine, 140 cu. ft. compressor, and 50-to employing jigs.

Production: 1,000 tons of ore up to 1918.

OZARK MINING & MILLING CO. **ARKANSAS**

Address: E. E. Scofield, mgr., Rush, Ark.

Company built a 100-ton mill to concentrate lead and zinc ores, but in May, 1919, plant was reported to be dressing manganese ore from the Batesville district.

SHEPHERD MINING CO., J. C. **ARKANSAS**

Property: a zinc mine in Rush district, taken over by Tulsa, Oklahoma people, in February, 1918. In October, 1917, the mine yielded 350 tons of zinc ore.

TEMPLE MINING CO. **ARKANSAS**

Address: A. Ludlow, supt., Buffalo, Ark.

A new mill was reported producing zinc carbonate concentrate in May, 1918.

YELLOW ROSE MINING CO. **ARKANSAS**

Address: Rush, Ark.

Cap., $3,000,000.

Property: the Yellow Rose, White Eagle and Big Find zinc mines in the Rush district, Marion county; said to be one of the best properties in northern Arkansas.

Development: by shaft and tunnel. A 200-ton mill is operating.

CALIFORNIA

As the mining districts of the State are widely scattered along the Sierra crest, the mining companies and mines are described alphabetically, instead of by towns or counties.

The gold output of California still constitutes the most important and valuable metallic product of the State. The total value of the output in 1918 was $17,000,000, or $3,000,000 less than in 1917. The copper, lead, silver, and zinc ores mined in 1918 aggregated $15,000,000 in value, and $5,800,000 in 1919. For 1919, gold alone has increased, the other metals showing a decline in production.

ABBOTT QUICKSILVER CO. **CALIFORNIA**

Has lease on property of the Alpha Quicksilver Co., which see.

AFTERTHOUGHT COPPER CO. **CALIFORNIA**

Office: 1321 Pierce Bldg., St. Louis, Mo. **Mine office:** Ingot, Shasta county, Calif.

Officers: Geo. L. Porter, pres.; J. Taylor Stratton, v. p.; C. A. Crowl, sec.-treas., with S. F. Lumm, C. Cambern, C. P. Keller, F. P. Maid and John T. Milliken, directors. Robt. Milliken, mine supt.: A. H. Heller, gen. supt.

Inc. Jan., 1909, in Arizona. Cap., 1,600,000 shares, $10 par; 1,544,898 shares issued. Is successor of Great Western Gold Co. A 20-year first mortgage 6% gold coupon bond issue of $800,000 authorized: $350,000 issued, Sept., 1917.

Property: 19 patented claims, 380 acres, with mill and smelter sites and timber lands giving total holdings of 1,760 acres. Lands include the Afterthought, Liberty, Last Chance, Section 15 and Bull groups, mines more or less developed being Afterthought, Copper Hill and Copper Grand. Lands are on the east side belt, which extends from Ingot to DeLamar, and is entirely distinct from the copper belt on the west side of the Sacramento river. Lands are porphyry, slates and shales, carrying contact deposits with sulphide ores, there being 5 known ore-bodies, of which 2 are under development, 1 being reported by company to be 160'x500'x35' in size.

Company also has 160 acres located 12 miles N. of Redding, in the Flat Creek mining district, adjoining Mountain Copper Co. property.

The Afterthought mine, in the Furnaceville district, 20 miles E. of Redding, has a main shaft 900' deep, with 7 tunnels, main tunnel being about 2,500' long, with a total of 10,000' of workings. Development on the 700' level shows an entirely new ore-body, averaging 4½% copper, 3% zinc, 6 oz. silver, and 60c gold per ton. This was also cut on 9th level. Sampling of the mine and assays of 2,000 tons of ore milled during past year, show the ore to average 3.6% copper, 18% zinc, 6 oz. silver and 60c gold per ton. Ore is almost exclusively chalcopyrite and sphalerite.

Equipment: includes blast-furnaces, electric power, a 115 h. p plant at the mine, with 20 h. p. and 30 h. p. hoists and a 5-drill air-com also a flotation plant that is treating 300 tons daily. To separate the z copper, the flotation product is put in a Wedge type furnace, lightly ro 400 to 500° heat, and retreated in flotation cells.

A 14-mile standard-gauge railway, known as the California, Shasta ern Railway, connects Anderson, on the Southern Pacific Railway wi Vista. The ore is hauled 12 miles by truck from the mine to Bella Vista.

The smelter: 1 mile north of Cow creek and 1½ miles north of t is connected therewith by a 30" tramline. The smelter, blown-in M 1905 has water-jacket blast furnaces of 42"-96", rated at 75 tons, and rated at 250 tons daily capacity. A new reverberatory furnace, 19'x into operation in July, 1919. Employs 100 men when running full time.

The mine was closed on account of treatment troubles on Nove 1917. Operations were resumed in March, 1918, suspended in July to an electrolytic zinc plant, and a reverberatory furnace for treating con centrates, and again resumed in April, 1919.

The company has done considerable experimenting with its comp which has been very difficult to treat satisfactorily. The Horwood pro apparently solve the difficulty. This is described on page 151, Min. & Sci. August 2, 1919.

Ore is crushed to 2" diameter, ground to 48-mesh, then subjected to which produces a collective concentrate and a final tailing. The conce thickened, filtered, dried and roasted lightly. After cooling, it is ag jected to flotation producing a froth called zinc concentrate, and a tail is copper-iron concentrate. Ratio of concentration is about 2 to 1, gi tons of collective concentrate daily: this concentrate when treated gives copper concentrate to 90 tons zinc concentrate. Janney flotation mach used.

ALCADE MINING CO. CALIF

Lloyd Root, supt., Grass Valley, Calif.

By October, 1919, company had unwatered the old 400' Kenosha miles W. of Grass Valley, Nevada county, preparatory to working mine include continuing shaft to 1,000' level, as mine has produced a good ore in the past. New company is composed chiefly of eastern men. Is tion of Geo. W. Root.

ALLISON MINING CO. CALIF

Address: Melones, Calaveras county, Cal.

Inc. 1917, by A. W. Cappes and John T. Murphy, at San Franci Frank B. Pattee of Oakdale.

Property: quartz claims on Carson creek, adjoins the Jones, sides and ends; west of the Melones mine, vein shown on bodies of $ and some high grade ore.

Two 5' Huntington mills were to be installed in 1918, but whether th no information is available.

ALLISON RANCH MINE CALIF

Owned by Grass Valley Cons. G. M. Co., which see.

ALPHA QUICKSILVER COMPANY CALIF

Main and Mine Office: Wilbur Springs, Colusa county, Cal.

Officers: R. A. Bogges, pres.; E. R. Dodge, sec.; W. H. Rabli Directors: R. A. Bogges, E. R. Dodge, T. K. Stewart, W. E. Pruett.

Inc. March 21, 1917, in Nevada.

Cap., $250,000—7% preferred and $500,000 common; $5 par; non able; all issued.

Property: 555 acres, near Wilbur Springs, Colusa county, Cal. to Abbott Quicksilver Co.

Development: 250' shaft and 4,000' of underground workings. said to contain 15 lbs. mercury per ton and to occur in a 15' serpentine shale; course N. W.-S. E. dip 22° from perpendicular. Ore at bottom said to be good. New shaft is 115' deep.

50 h. p. steam hoist, compressor, 2,000′ tramway, concen-
n furnace.
total to date said to have been 30,000 flasks. From 1900
o have netted $7,000 per month. Closed by litigation from 1904
rated in 1918, but Abbott Quicksilver Co. is planning to re-open

ES CO. **CALIFORNIA**
W. Bullock, Seattle, Wash., and W. B. Hubbard, Amador
nty, Calif.
ormerly operated under name of Original Amador Cons.
ns, covering 4,400′ on the lode at Amador City, is said to carry
llel veins, from 12′ to 50′ wide, with diabase hanging and Mari-
all.
t: by 780′ incline shaft.
includes compressor driven by 100 h. p. motor, hoist, and
which was remodelled in 1915. Idle in 1919.

REDGING CO. **CALIFORNIA**
Water, Light & Power Co., Sharon Bldg., San Francisco.
gr. of operations, Oroville, Calif.; R. L. Van der Naillen, v. p.

n California, to take over the dredging interests of the Oro
Power Co., whose power plants were acquired by the Pacific
o.
placer claims along the Mokelumne river in Calaveras
here are two dredges with from 5 to 9 cu. ft. buckets. Annual
is over $200,000. The boats dig up to 225,000 yards per month
rries about 10c gold per yard.

GOLD DREDGING CO. **CALIFORNIA**
t. K. Estep, supt., Redding, Shasta county, Cal.
Reid Ferry farm of 800 acres on Sacramento river, across
Redding. A new $125,000 dredge started operating in October,

MINING CO. **CALIFORNIA**
Redding, Shasta county, Cal.
as controlled by Jas. Sallee.
company started to work the old American mine in the French
whose holdings consist of 11 claims. Development work of the
es 4 tunnels from 50′ to 1,400′ in length, and one stope 125′ long
ht. When mine shut down under former management ore is said
$20 in gold per ton. It occurs in a fissure vein, strike N. 70°
E., slate walls. Pay-shoot is 2′ wide. A 10-stamp mill is on the

tion since 1915.

M. & M. CO. **CALIFORNIA**
Andrew Fitzgerald, supt., Downieville, Calif.
the Fruitvale mine, in the Allegheny district, near Downie-
nty, carries a vein of gold quartz ore. Developed by tunnel.
efinanced in 1914 and underground development work was to be
e have no recent information.

CALIFORNIA
Pacific Coast Gold Mines Corp., which see.

MINING CO. **CALIFORNIA**
Frank Green, Ono, Shasta county, Cal.
the Bell Cow gold mine on Arbuckle Mountain, near Red-
d reserves were 50,000 tons in October, 1919, some of which
0 to $15 per ton.
steam power, 10-stamp mill, 4½-mile road, and buildings.

CONS. MINING CO. **CALIFORNIA**
Cedar St., New York City. Controls Argonaut Mining Co.,
rolled by the White Knob Copper & Development Co., owning a
capital stock.

Officers: John T. Smith, pres.; H. H. Carlisle, v. p.; E. H. Ke
Arthur Kennedy, sec., New York.

Inc. Jan. 5, 1907, in Maine. **Cap.**, $2,000,000, par $5; $1,855,0
$1,200,000 owned by White Knob Copper & Development Co.

Dividends: 30c in 1914; 40c in 1915; 40c in 1916; 25c in 191
1918; 5c in 1919; 5c in January, 1920. Annual meeting, first Tue
June 1. Security Registrar & Transfer Co., tran. agt. and registrar.

ARGONAUT MINING CO. CALI

Address: 404 Humboldt Bank Bldg., San Francisco. **Mine off**
son, Amador county, Calif.

Officers: E. A. Stent, sec., with John Raggio, John T. Smit
Carlisle, directors; N. S. Kelsey, mgr.; E. Phillips, mine foreman; Geo.
mill foreman.

Inc. in 1893. **Cap.**, $1,000,000, shares $5 par; all issued. Is the
company of the Argonaut Cons. Mng. Co., control of which is held by
Knob Copper & Dev. Co.

Property: one mile north of Jackson, on the Mother Lode; ad
of the Kennedy Extension Mng. Co. on the south.

Geology: ore is a soft shattered white gold quartz in a reg
continuous vein 8′ to 12′ wide, with strike N. 10° W. Vein outcrops i
diabase; above the 290′ level it passes into the Mariposa slates, where, a
the fissure was originally opened by a thrust fault with a throw of
wall is a soft black slate, the other is slate or a greenstone schist.
shoots have been developed; the north shoot 325′ long, with average wid
the south shoot 600′ long, with average width of 10′. On the 1,240′ l
is a split in the vein, a branch running off into the schist hanging wall.
in the mill about $5.50 in free gold and $1.50 in concentrates.

Development: shaft 4,650′ deep, sunk at an angle of 60°, with
150′ intervals. At 290′ level shaft cuts the vein in diabase, from the 1
to present depth it is in the slate hanging-wall. Present work is being
the four lower levels. Ground is very heavy and the square-set minin
is used. Nearly half the force employed underground are timbermen
hoisted, in 4-ton skips, by a 500 h. p. double-drum electric hoist, aut
lumped into storage bins, then fed to a 10 by 16″ Knight crusher and
in 2½-ton cars to the mill.

In March, 1919, fire broke out on the 4,000′ level; after burnin
weeks, it was confined to sections between the 3,700′ and 4,300′ levels,
extensive damage. In October, north and south drifts at 4,600′ were
ore, and extensive surface improvements were under construction.

Mill: sixty 1,000-lb. stamps, dropping 96 times per minute, with
and crushing 5 tons per stamp through 20-mesh wire screen, with ca
300 tons daily. From the amalgamating plates pulp flows to 36 Frue
tailing goes to hydraulic classifiers, overflow being concentrated on 20
rotary concentrators. A 90% extraction is made by amalgamation an
tration. Company employs 225 men.

This mine has the highest average grade ore and is one of the
mines along the Mother Lode of California, and normally pays good
ARPS COPPER COMPANY CALIF

Office: 216-217 Russ Bldg., San Francisco, Calif. **Mine addre**
per City, Shasta county, Calif.

Officers: R. Vaun Montgomery, pres.-mgr., R. C. Montgome
with F. B. Hink, R. W. Maples, F. A. Bush, directors.

Inc. 1916, in Arizona. **Cap.**, $1,500,000; $1 par; 663,600 issued.

Property: 36 lode claims (unpatented) approximately 635 acres
eral land in Township 34 N., Range 3 W., Shasta county, adjoins the min
Bully Hill Copper M. & S. Co. The Arps group of 15 claims in p
patenting.

Development: by 6 tunnels, aggregate length 2,100′. Equippe
3-drill oil-driven compressor. Development suspended in December, 1
the copper market improves. To date, the property has opened up a con
tonnage of medium grade copper and zinc ore, carrying some silver value

pping grade has been encountered. The company attaches the large deposit of manganese ore because of high silica

ING MINES CORPORATION **CALIFORNIA**

Merchants Nat'l Bank Bldg., Los Angeles, Cal. (Is a upont Copper Co. of Nevada, which holds a 51% interest.) Priest, pres.-gen. mgr.; J. A. Brown, v. p.; F. W. An- ith M. Brines and R. F. Howard, directors. C. L. Logue,

sheet, September 16, 1919, covering period since incorpora- original purchase values mining properties, $596,252; total to development, $207,087, which includes: development and administrative and miscellaneous expenses, $42,900. Cur- racts in course of collection, $24,537; treasury stock, $177. capital, $576,994; notes payable, $3,025, and an item, capital nnual meeting, June 23.

Arica group of 28 claims, 560 acres, in the Ironwood erside county. Ore: gold-silver, in six veins between dolo- lorite schist foot-walls: ore is found in porphyry intrusions

by 2 shafts, one 930 deep, with 9 levels from the 80' to ' level said to be opened for 270' in ore assaying $10 to $30 he second shaft, 330' deep, has levels at 165', 230', and 330' id to average $20 per ton.

0-ton plant, equipped with crusher and rolls, Hardinge s, thickeners, and agitators, air-compressor, pumps, assay e and 10 buildings.

reported, 50,000 tons ready for stoping.

own 51% of the stock of the Rito Seco Gold Mines, Colo- e Mammoth Gold, Silver and Placer Mines, Colombia, South

OPPER CO. **CALIFORNIA**

Lewis, Atascadero, Cal. Alfred Hanford, supt.

aims, 360 acres, 160 acres patented, on Greenhorn Mt., ning district, Shasta county; includes the Greenhorn mine, Greenhorn Mountain Copper Co. Said to show gold-silver- occurring as a fissure in porphyry. Vein strikes N. 61° W., to average 4.5% copper per ton.

by over 3,000' of tunnels. Greatest depth of workings is laims 250,000 tons of 3% ore blocked out. There were 15 .

fficient for development by tunneling, but to include a h will use a process devised at Oakland, Calif.

t the mine is a good one, but the success of the method of l doubtful.

G CO. **CALIFORNIA**

Humboldt Sav. Bank Bldg., San Francisco. **Mine office:** rdino county, Cal.

Voorheis, pres.; E. A. Stent, sec.; Chas. S. Taylor, supt.; gr.

ia. **Cap.**, $100,000; shares $1 par.

led $5,264,500 to Sept., 1918.

mber of claims at Atolia on the Randsburg branch of R. R. are being worked for tungsten ores. The ore occurs lacer deposits and fissure veins. Also owns Saint Anthony

1,100' shaft with electric hoist and full equipment. The ing mill, destroyed by fire on January 25, 1916, caused sus- ons for several months, but a new mill with a daily capacity n built, making a concentrate containing from 50-75%

Equipment: ore is hauled from mine to mill on 4-ton trucks liver 100 tons a day. From a large bin the ore is fed to a 10x18" Jo jaw-crusher; then passes by bucket conveyor to the hopper feedin for finer crushing. Half of the product is fed into a single mill uni of two 5' Huntingtons. The discharge passes over two large Deist tables, where the most of the tungsten is extracted; the residue passe Frue vanners. The other half of the rolls product goes to the 8' mill, whose capacity is 30 to 40 tons in 24 hours. The 30-mesh charged onto a Deister roughing table and then passes to a Dorr cla slime from both units is thickened for concentration by the use Callow cones and then passes over three double-decked sliming tab three double-decked Deister tables, whence the tailings are carried The plant is operated by about 25 electric motors, each unit of mach driven by a separate motor.

Over 300 men are reported to be employed. Is the largest tungsten producer in America.

Shipments of concentrates in 1918 amounted to 1,200 tons.

Mine and mill closed down in April, 1919, until the tungsten proves.

AVAWATZ CONSOLIDATED MINES CAL

Address: M. L. Neely, care Pacific Gas & Electric Co., Fres **Inc.** May, 1919, in California.

Property: the old Crown mine in the Silver Lake district nardino county, 11 miles from rail. Examined in 1917 by Alvin B. Los Angeles.

A brecciated zone carries argentiferous galena. Considerable wo done and at present there is some rich ore exposed. Development w in July, 1919, and a hoist, air-compressor, and other machinery were

BAGDAD-CHASE GOLD MINING CO. CAL

Address: J. N. Beckley, treas., Rochester, N. Y. Is a holdin owning all the stock of the Soulsby Consolidated Gold Mining Co., Calif., also a stock interest in the Pacific Mines Corporation, Cam Calif., and in the Boise-Rochester Mining Co., Atlanta, Idaho.

BALAKLALA CENTRAL MG. & SMELTING CO. CAL

Address: Coram, Shasta county, Cal.

Inc. in Wyoming. **Cap.,** $5,000,000, shares $5 par; one-thi owned by Balaklala Consolidated Copper Co., the remainder by th Copper Mining Co.

Owns 3 claims surrounded on all sides by Balaklala Consolid Co.'s holdings. Inactive for years.

BALAKLALA CONSOLIDATED COPPER CO. CAL

Office: 111 Broadway, New York. **Works office:** Coram, Sh Calif.

Officers: Thomas W. Lawson, pres.; W. A. Kerr, v. p. an A. Holman, gen. mgr.; preceding officers and H. W. Hoops, direc Buchanan, sec.

Inc. Feb. 24, 1906, in Nevada. **Cap.,** $10,000,000; reduced t in 1917; shares $25 par. Bonds, $1,500,000 have been retired.

Company was a reorganization of the Balaklala Mining Co., cont was sold simultaneously to two parties, making a snarl requiring re to untangle. Is controlled, through ownership of entire stock issue, National Copper Co. Windsor Trust Co., New York, and Federa Boston, transfer agents; Trust Company of America, New York, a tional Bank, Boston, registrars.

Company report for fiscal year ending June 30, 1918, gives cash receivable, $250,413, and total assets, $1,605,313. Liabilities show loss, $90,086; First National Copper Co., $515,227.

ofit and loss statement, years ending June 30, shows:

s account:

	1918	1917
.....	$547,495	$837,910
ons.....	348.370	393,601
.....	199,125	444,305
.....	3,269	9,003
t	207,393	453,311
charges:		
other property.....	.....	52,975
ith Hall process.....	.....	116,909
.....	330,000	150,000
rges	.....	319,884
.....	90,086	133,427
lus	212,693	79,265
lus	90,086	212,693

of First National Copper Co., shows cash and accounts re- .
0, 1918, of $170,849, while Balaklala on same date had cash and
e of $250,413, in addition to Liberty bonds, $10,000.

claims, patented, 1,169 acres, also 800 acres of miscel-
cluding a smelter site, the townsite of Coram and right-of-
. Mineral holdings are at Kimberly, in the Flat Creek district,
of the Iron Mountain mine, and adjoin the Trinity mine. Prop-
arry 5 orebodies, with 2 developed. Apparently 4 orebodies are
me ore zone, separated by faulting. Lands carry 3,040′ of the
ore zone, developed for about 1,100′. Country rock is rhyolite,
enticular masses as replacement of country rock, in flat bodies,
north, and greatest extension east and west, with a series of
tep faults, causing displacement from a few feet to more than
ain ore-bodies are developed for lengths of 900′ and 1,100′.
s pyrite, copper values being mainly in chalcopyrite, with a
nd covellite, all carrying gold and silver values, estimated by
verage about 2.65% copper, 0.9 oz. silver and 50 to 60c gold
e ore-body developing about 1,000,000 tons, gives a typical analy-
r, 0.95 oz. silver, 0.03 oz. gold, 21.4% silica, 31.5% iron, 4.3%
a, 2.2% zinc and 35.2% sulphur.

kings are known as the Windy Camp and Weil. The mine has
low-grade ore. Development is by a large glory hole, and by
aises, providing for open-cast mining, giving cheap extraction,
20 tunnels, including the Weil tunnel of nearly 6,000′ length.
s were resumed August, 1913, and were of a desultory nature
property was operated from August 13, 1915, shipping 250 tons
eased May 13, 1916, to 300 tons, to the Kennett smelter of the
o. under a 10-year contract, but on May 13, 1919, the mine was
ccount of metal market condition.
: said to be about 3,000,000 tons of 2.83% copper ore with
l 60c. gold per ton, a year's supply (100,000 tons) being ready

ent includes a steam plant installation of about 1,000 h. p.
r. Machinery includes a number of hoists, 5 compound air
bout 40 rock drills. Buildings include an office, store, school,
nd about 75 dwellings, all but the necessary mine buildings
site at the smelter.

smelter are connected by a Bleichert aerial tram of 16,130′
ourly capacity, operated by gravity, having 62 wooden towers,
700-ton smelter is thoroughly modern and well equipped. Ore
0′ revolving sizing drums, coarse material going to the blast
o the calciners. The 500′ bin house has bins for ore, fluxes
ter building has four 50-ton McDougal calciners.

The furnace building, of steel frame, no wood being used, has th water-jacket blast furnaces, each 56"x240", first blown in October, 17x96' reverberatory furnace, of 150 tons daily capacity, for fin petroleum, the waste heat generating power in 2 Stirling boilers, house having 3 additional Stirling boilers, burning petroleum. Th plant has 96"x150" shells of horizontal type, and an electric traveling product, when operating is 99% blister copper carrying 75 oz. silver gold per ton, sent to Perth Amboy works for electrolytic refining. includes 3 Connersville blowers, each driven by a 450 h. p. tandem steam engine, direct-connected. The slag line has electric locomotive

Although the smelter is about 14 miles from the nearest culti the "smoke farmers" of northern California were busy and contr the Shasta County Farmers' Protective Association led to the install Cottrell electrolytic flue dust precipitator, which took out the dust, acid fumes, and hence was not successful. The Young process use Seco (Penn Mining Co.) and the Hall process were also unsucc Heslewood method in 1915 was the last one to be tried out, but w factory.

The smelting record is given in Vol. XI, the Copper Handbook

Production: 1917-1918, to June 30, 82,876 tons ore, assaying per, $1.57 in gold and silver, compared with the previous years' pr 76,559 tons, netting $174,656.

BALAKLALA COPPER CO. CA

Reorganized at First National Copper Co., q. v.

BARBAROSSA MINING CO. CA

Address: W. E. Wessinger, Duluth, Minn., mgr.

Inc. Oct., 1917. **Cap., $1,000,000; shares $1 par; $650,000**

Property: 11 claims, 140 acres, including the Barbarossa Loraine, 15 miles N. E. of Caliente, Kern county, Calif., shows which the Barbarossa alone has been worked. It has a N. W.-S. E. dip 40° E., average width 4', granite footwall, and quartz-porphy wall.

Ore: free milling gold. **Development:** by 140' shaft, 60' about 400' of drifts.

Equipment: 5-stamp mill, 1½ miles from the mine, gasolin

Mine credited with past production of 2,000 tons of $23 ore. N formation received.

BELGIUM-BOHEMIAN MINING CO. CA

A Belgian company, that in 1914, owned the Highland mine, Li district, 11 miles S. E. of Etna Mills in the Klamath Reserve, Sisk California.

Property: 100 acres at 640' elevation.

Ore: free-milling gold in shoots 130 long and 2' wide; st E.; dip 30° S. E. Footwall is a diorite schist and hanging-wall is quar

Development: tunnels with several thousand feet undergr ings: main tunnel 600' long. All work has been done near apex of that only a shallow shaft has been obtained. Supplies are packed in trail.

Equipment: includes a 10-stamp mill, run by gasoline. Mine with a production of $350,000. No recent returns.

BELMONT SHAWMUT MINING CO. CA

Subsidiary of Tonopah Belmont Development Co. of Nevada, 750,000 of the 1,000,000 shares, and spent $498,455 on property up of 1918. Property was acquired in February, 1917.

Offices: 500 Bullitt Bldg., Philadelphia, and Shawmut, Cal.

Officers: C. A. Heller, pres.; W. M. Potts, v. p.; S. D. Sinkl B. Taylor, general counsel; with H. C. Brougher, M. B. Cutter, R. G. Park and T. W. Synnott, directors. R. G. Wilson, sec.-treas Bradshaw, gen. mgr.; O. McCraney, supt.; Albert Silver, mill supt. rey, cons. geologist.

Inc. in Delaware. **Cap., $1,000,000; $1 par.**

ment is available, as ore treatment was only commenced
be suspended later in the year on account of abnormal
ed in April, 1919. Gold extracted during the period was
construction and development cost $161,042.
Eagle Shawmut mine in Tuolumne county; it is the
of any present importance on the "Mother Lode."
uring 15 years' operation a depth of 2,300' was attained.
as continuous from surface to lowest level. The future of
the downward extension of this orebody. On No. 16 level
main shoot consisted of a series of closely-joined or over-
phide ore, 490' long, 10' wide, worth $7.50 gold per ton.
n shaft was sunk from 1,834 to 2,243', measured from the
ng. An electric hoist was installed on the adit-level, also
18 levels. In 1918, new openings totaled 2,133', 85% being
On No. 18, the deepest level, the sulphide shoot is 400' long,
than above. Ore reserves are estimated at 424,733 tons.
uding mining machinery mentioned, compressor, drills,
te 70-stamp mill and oil-flotation plant, remodeled from the
mation and concentrating mill. Concentrates are sent to

to 1917 the total was $4,500,000. During the broken
was treated 29,336 tons of ore, averaging 0.237 oz. gold per
of concentrate assayed 1.987 oz., a total of 6,418 oz. The

ed under the present efficient management and with normal
d materially to the gold output of California, and prove
tholders.

CO. **CALIFORNIA**

Riverside county, Cal. Lester Scott, supt., at last ac-

any purchased in Jan., 1915, the Morgan and Bradley
les from Vidal and did development work during the year.
d and returns from shipment of several cars are said to be

150 incline shaft, with a 60' vertical winze from lower
1 to have opened up a 3' vein of ore. $75,000 said to have
small block of ground opened by the shaft. There is also
psum on the property. Company plans to sink a vertical
the winze. No recent information.

IS. MINES CO. **CALIFORNIA**

J. Padian, pres.; Sydney R. Brough, sec., 518 S. Van
les, Calif.

ims in Beveridge canyon, Inyo county, adjoins the old
S.
by 180' tunnel at an elevation of 7,500' on the War
to be 3' wide and to give assays of $45 per ton. The ore-
course and dips slightly S.
ns to base expectations on the past production of the ad-
erty.

NG CO. **CALIFORNIA**

eply to letters. See Vol. XII. Mine in Salmon River dis-
Etna Mills, Siskiyou county, Calif.

E **CALIFORNIA**

Associates Securities Co., 814 San Fernando Bldg., Los

M. Pierce, pres.: A. E. Nichols, v. p.; directors, T. J.
Kennedy, Dr. J. E. Cowles, A. E. Nichols, H. E. Miller and
. Remy, mng. engr.

Mine, 15 miles from Caliente, Kern county, is reported to show a 50′ v in porphyry, carrying 30% stibnite. Company claims to have shipped 350 t ore per month during 1917 and 1918, with earnings of $1,700 on royalty. F January to November, 1918.

BISHOP CREEK GOLD MINE CALIFORN

Owned by Cons. Wilshire Mining Co., which see.

BLACK BEAR MINING CO. CALIFORN

Office: David L. Killen & Co., 716 Copper Bldg., Denver, Colo.

Cap., $375,000; $1 par; 210,986 shares issued.

Property: 400 acres in Grass Valley district, Nevada county, Cal., s to show several veins carrying gold. Has 10-stamp mill, hoist and water po

Denver office's advertising matter was not favorably regarded, and no news obtainable.

BLACK HAWK MINE CALIFORN

Owned and operated by D. A. Blue, Randsburg, Calif.

Property: 7 claims, in the Stringer district, near Randsburg, K county, Cal. **Ore:** quartz in 6″ vein shows coarse gold veins, assaying per ton. Mill test of 50 tons of gravel from the placer claims said to assayed $6 gold and 3 oz. of 60% tungsten per yd. Developed by 125′ Equipped with 5-stamp mill and water power. Developing at last accounts.

BLACK HAWK TUNGSTEN MINING CORP. CALIFOR

Office: Atolia, Cal.

Officers: T. M. Gaffey, v. p.; A. G. Sepulveda, treas.; E. V. Seward, with W. C. Barlow, V. A. Goodrich, C. R. Miller, W. M. Rich, Charles Dr and D. W. McLennan, directors.

Inc. 1917, in California. **Cap.,** $200,000; $1 par; issued 176,209. Cla in November, 1918, to have $10,000 in cash and no debts. Stock is liste Los Angeles Stock Exchange.

Property: 16 claims, 200 acres, 2 claims patented, adjoins propere Atolia Mining Co., San Bernardino county. $200,000 is said to have been in exploration, development and equipment.

Development by 500′ shaft with 2,000′ of workings. Equipped electric hoist and compressor.

The property is a prospect.

BLACK OAK MINES & MILLING CO. CALIFOR

Office: First Nat'l Bank Bldg., San Francisco. **Mine office:** Sou ville, Tuolumne county, Calif. Chas. E. Knox, gen. mgr., Tonopah, Nev.; Knox, supt.; F. N. Watts, mill supt.

Property: several claims 1 mile west of Soulsbyville, Tuolumne co

Geology: ore is quartz, containing pyrrhotite, sphalerite, marcasite galena, in a vein in granodiorite. Vein has strike of N. 15° E., with dip 70° W., varying in width from 1′ to 25′, and has several branches com from the hanging-wall side. The ore occurs in lenses at the intersecti diorite dike crossings and also near faults. Diorite dikes have a strike of E., vertical dip, and 1 to 2′ in width.

Development: by a 70° incline shaft sunk in the foot-wall and lev intervals of 100′. Lowest workings are on the 1,800′ level. Two ore have been developed, one north of the shaft, 500′ long, average width other south of the shaft, 300′ long and average width of 20′. Ore milled ages $20 per ton.

Equipment: 100 h. p. single-drum electric hoist, Ingersoll-Rand ai pressor, and pumps, also a mill consisting of 20 1,250 lb. stamps, crush tons per stamp through 10-mesh screens. Ore is crushed in 1.85% solution. Remainder of equipment includes a Dorr classifier, a 5x18′ tu treatment tanks, and Oliver filter, capacity 100 tons per day. Lime is ad batteries and agitators, and 24 lb. lead oxide to the tube mill and agitators makes an extraction of 96%, consuming 1.5 lb. cyanide and 3 lb. lime per ore. Daily capacity of mill is 75 to 100 tons. Costs per ton are: Devel $1 , $2.22; treatment, $1.59; general and misc., $0.56; material $ mill, $0.62; total, $7.59. Employs 85 men. See Minera Min. Res. of Tuolumne county, p. 138.

disclosed some ore on 700′ level, and new work in 1916
de ore on 1,800′ level.
rocurable since 1917: company, like several others, operat-
Lode, being very secretive about operations, but in January,
ad opened 30″ of rich ore on which mill tests were to be

NE **CALIFORNIA**

er St., New York City. Mine near Hutton, Siskiyou
rty is held by the Mexican S. & R. Company, a subsidiary of
rgica Mexicana.
aims, patented, about 440 acres in the Elliott mining
elgate river, 4 miles south of the Oregon line, also a large
e Bar. Property located 1889, but only slightly developed
has spent over $700,000 in work since that time.
ein, with strike of N. 10° S., and almost vertical dip,
traceable some 3,000′ by prominent outcrops of 50 to 250′
footwall of gray to black, slightly micaceous schist, and a
white mica-schist, the wall not always being clearly defined,
on extending into the hanging wall. Orebodies are lenticular
uge, said, by several authorities, to be in huge laminations
n, but ore apparently is persistent to depth. Ore is mainly
ed with a little sphalerite and occasional native copper,
% copper and $5 gold per ton.
tunnels, with upwards of 2 miles of workings and
nd-drilling.
in width and the mine workings block out 110,000 tons of
ns more probable. Main working tunnel is connected with
urface 500′ above. A winze opens a 600′ drift on ore, 300′
l. The mineralized wall-rock carries commercial value and
gh-grade ore, but above estimate refers to the quartz vein

ludes a hydro-electric power plant, taking water from
head of about 150′, at pressure of 85 lb. Buildings include
boarding house, dwelling and sawmill. The company has
te with waterworks, sewers and a school house, and has
ween Hutton and Yreka. A 40-mile railway to connect with
at Medford, Ore., has been projected.

N MINING CO. **CALIFORNIA**

rity Bldg., Los Angeles, Cal.
K. Barnes, pres., mgr., White River, Cal.; H. H. Koons,
n, sec.; J. F. Kent, treas.; preceding with S. E. Yount, di-

na. Cap., $30,000; shares $1 par; assessable, 29,038 is-
g in July.
1916, $37,539; operating expenses, $15,233. Dividends paid

ims, 170 acres, unpatented, in the White River Mining
Calif.
ying gold and silver values occurs in shoots in a fissure
said to be 2′ wide and over 800′ long, carries 2% iron and
Average assay $13.60.
y 300′ incline shaft with 3,000 of workings. Company
f 20,000 tons with 5,000 blocked out.
ludes gas hoist, compressor, pump, etc., and a 5-stamp
daily.
on not available.

ING CO. **CALIFORNIA**

delivered from Sacramento, Cal., J. H. Byers, pres.; W. H.

res, in Sec. 5, T. 37 N., R. 12 W., in Trinity Reserve, at
, was located in 1883. Said to be the best producer in the

New River mining district, Trinity county, but is very expensive to operate supplies must be packed over a trail from North Fork, a distance of 40 m from the latter town.

Ore: gold in vein with diabase hanging wall and quartz-porphyry fo wall; strikes E.; dips 45° N.; width of ore-body 2', and length 260'; maxim depth of workings, 700'.

Development: tunnels; longest, 1,300; 6 levels from 60' to 700' lon crosscut tunnels, 300' and 600' in length; several thousand feet of workings.

Equipment: includes 3-stamp mill and one 3' Huntington mill, run steam and water power. Twelve men employed in 1914. Said to have prod $350,000.

BOREALIS CONSOLIDATED MINES CO. **CALIFORN**

Address: Letters returned from office of president, Dr. G. W. Hi gass, Bacon Bldg., Oakland, Calif., in 1917.

Property: 40 acres, including the Eureka mine, in Ophir district miles from Auburn, Placer county, Calif.

Ore: quartz, exposed in shoots, averaging $12 per ton.

Development: by 3-compartment shaft.

Ore reserves: estimated in1915, by company, at 17,000 tons of $12 in sight on Eureka ground.

Equipment: 20-stamp mill, electric hoist, good for 1,500', and air c pressor. Regular shipments of concentrates to custom smelter were mad 1915. No later returns.

BROOKLYN MINING CO. **CALIFORN**

Mail returned marked, "out of business." Formerly operated at D California.

BROWN BEAR MINING CO. **CALIFORN**

Address: Redding, Shasta Co., and Deadwood, Trinity Co., Cal.; Th McDonald, pres.; B. McDonald, supt.

Property: 586 acres, of mineral land, 200 patented, and 671 acres of t ber land, includes the Brown Bear mine, on north side of Deadwood Gulch Deadwood, discovered in 1875, and worked ever since. The property consolidation of several mines and as whole has been the largest producer in Weaverville Quadrangle and most famous mine in Trinity county. It is cred with a production of $7,000,000 to $10,000,000.

Geology: there are 2 main veins, the Monte Cristo and the Last Cha 200' south of the former, which lie for the most part in Bragdon slate format but also cut an intrusive soda granite porphyry. Veins are parallel, and st N. 80° E. The Monte Cristo dips steeply to the north; the Last Chance south 60° to 80°. Width as a rule is not over 2', more commonly about 6", stopes have been mined to a width of 22'. Ore-shoots are several hundred in length; those of the Last Chance vein pitch at a flat angle to the East. veins show clay slips along both walls, so it is rare that the ore is frozen to wall. Quartz is the principal gangue mineral; the ore contains pyrite, gal sphalerite and arsenopyrite. Pyrite being the most common, rich ore is usu found, where galena and sphalerite are present. The best ore mined runs a $100 per ton, but the average grade is between $20 and $50.

Development: 7 crosscut tunnels ranging in length from 100 to 2 the lowest being 1,080' below the outcrop. There are several miles of un ground workings.

Equipment: includes a 10-stamp mill, 2 Wilfley tables and water po obtained from Deadwood Creek through a 3-mile ditch.

Lessees have been working the mine.

See [illegible] Res. of Trinity county, State Mineralogist's Rept., p. [illegible] 70.

[illegible] SOLIDATED GOLD MINING CO. CALIFORN [illegible] Cal. Eastern office: 74 [illegible]

[illegible] Turner, v. p.-gen. [illegible] C. Camp, C. H. Mallen, [illegible]

Cap., $500,000; shares $1 par; 395,287 shares issued.
ty St., New York, transfer agent; **Farmers Loan and** registrar. Listed on San Francisco Exchange.
t: for fiscal year ending Jan. 25, 1918, shows balance disbursements, $207,729.
, 3c; in 1913, 6c; in 1914, 24c; in 1915, 18c per share; ends to date, 51c; total assessments, **$1.22** per share.
on the Mother Lode, at Grass Valley, has gold d slates. For geology see Lindgren's Gold-Quartz veins ss Valley districts, Calif.; U. S. Geol. Survey 17th Ann. 62.
incline shaft to 1,100′ level, and by 1,350′ vertical e 1,400 level. Underground work in 1917 totaled 1,896′. mated at 10,000 tons Jan. 24, 1918.
es two 20-stamp mills.

Costs Per Ton			Value Ore	%	Bullion Prod.	
g.	Mlg.	Total	Per Ton	Ext.	Oz. Au.	Oz. Ag.
32	$0.91	$6.26	$6.55	90.5	....	....
87	0.83	5.90	6.44	89.5	7,998	1,856
97	0.84	8.59	11.11	90.8	9,486	2,069
05	.93	10.22	....	93.9	12,992	2,622

$182,867; total production, 1893-1918, $1,765,361.
ed temporarily on account of abnormal conditions.

CO. OF CALIFORNIA **CALIFORNIA**

vay, New York. **Mine office:** Vernalis, Calif.
gan, pres.; C. L. Ball, v. p.; H. E. Bishop, sec.-treas. H. E. Bishop, W. E. Roberts, T. F. Donnelly, **mgr.**; J. E.

, in Delaware. **Cap.**, $200,000; $100 par; all issued. s, including the Buckeye mine, in Sect. 3, Twp. 5 S., Meridian. The mine was opened by M. A. Wright of , and taken over by E. S. Suffern in July, 1918. The ed the property January 1, 1919.
xide and carbonate, occurs as a chamber deposit in ed at 20,000 to 30,000 tons of 40% manganese.
incline shaft, tunnels, and open cuts.
ne hoist, 10 h. p. compressor, 3,000′ aerial tram.
tons in 1918, value, $45 per ton. Ore is sold under Ore Purchasing Co.

CALIFORNIA

tch & Clute, 100 Broadway, New York. Mine at Cal.
ch, pres.; Vincent P. Donihee, v. p.; Frank M. Clute, Frank F. Gearn, sec.; E. J. McLaggan, supt. **Cap.**,

e McClure group and has an option on the Michigan ljoining and west of the Bully Hill Copper Co.'s mine. ralized shear zones with clay gouge walls and about 40 6′ wide. The ore carries iron pyrite with chalcopyrite

Hawkeye tunnel, 1,050′ with 74 and 150′ drifts; 5′ and 3 drifts; North Star tunnel, 1,050′ and 2 drifts; nd winze; Recorder II, 400′ tunnel; Ydalpom I, 150′

les all necessary machinery, houses, etc. Company t Cave Creek, Maricopa county, Ariz.
wn of either property.

BULLY HILL COPPER MINING & SMELTING CO. CALIFOR

Office: 30 Church St., New York. Mine P. O.; Winthrop, S county, Cal.

Officers: D. M. Riordan, 525 Market St., San Francisco, Cal., pres mgr.; L. B. Judson, v. p.; M. F. Westover, sec; preceding officers, A. H. Jac A. W. Burchard and J. B. Keating, directors.

Inc. 1900, in New Jersey. **Cap.,** $2,500,000; shares $25 par, reduced to $1,000,000. Bonds, $400,000, issued for construction of Sacramento Vall Eastern railroad, stock of which is owned by the Bully Hill. Is contr through practically entire stock ownership, by the General Electric Co., S ectady, N. Y.

Property: 450 acres, 320 patented near Delamar, Shasta county cludes the Bully Hill, Rising Star, Rising Sun, and old Winthrop & B groups, all in the eastern end of the copper belt. Owns 14-mile railway (S mento & Eastern), connecting with S. P. R. R. at Pitt station.

Geology: ore occurs in nearly vertical N. E.-S. W. shear zone veins, in meta-rhyolite, varying from 4′ to 400′ and averaging 30′. Definite if present, are post-mineral gouges; basalt forms the east wall. The ore irregular lenticular bodies that average 45′ wide by 200′ long and are conn by narrow seams of ore. Ore is a complex mixture of sulphide carrying copyrite with zinc and antimony and low gold-silver values.

Development: several tunnels, lowest No. 3, crosscutting the at 1,100′ and 600′ below the outcrop. A 950′ shaft was sunk at this point levels 100′ apart, and all necessary connections for work and air.

Work since 1918 has been in the Rising Star mine.

The 400-ton smelter has one blast furnace, two calcining furnaces converters and all necessary machinery, etc. It has been idle since 1910.

Company built a small experimental plant at Delamar, Cal., to try el smelting and recovery of zinc. This plant, remodeled in 1915, produce to 400 lb. metallic zinc per day, using direct electrolysis of zinc sulphate sol with regeneration of acid. (See Met. & Chemical Engr'g, Feb. 1, 1916, p. ore has also been tested by the Minerals Separation Co.'s flotation process favorable results, and a flotation plant was built in 1918 when the group being operated under bond by Walter Arnstein and associates.

BUNKER HILL CONS. MINING CO. CALIFOR

Office: Humboldt Bldg., San Francisco. **Mine office:** Amador Amador county, Cal. W. F. Detert, pres.; C. E. Bunker, supt.

Inc. 1907. **Cap.,** $200,000, shares $1 par. The mine has paid divid for several years; in first half of 1915 six monthly dividends were paid, to $30,000. Owing to heavy construction and new equipment expense the div rate was reduced from 5 to 2½ cts. per share.

Property: 3 claims, the Bunker Hill, Mayflower and Nevada, 1½ north of Amador City, 2,587′ on the lode.

Geology: the gold-bearing ore occurs in the Bunker Hill vein, which N. 25° W., dip 58° E., with average width of 6′. From surface to 200′ lev vein occurs on the contact between Mariposa slate on the west and metad on the east; from the 200′ to the 1,400′ level, the vein is in slate; from the to the 2,400′ level the vein has a greenstone footwall and slate hanging-wall the 1,400′ level an orebody has been opened 40′ west of the Bunker Hill and running parallel with it. This orebody is 860′ long, average width 30 at a point 860′ N. of the shaft, joins the Bunker Hill vein; in places it form footwall of the Bunker Hill vein. Ore occurs in the form of lenses, the being cut by numerous stringers of quartz; the rock is highly impregnated pyrite, as high as 4 to 5%. The gray orebody has been developed on the 1,500′, 1,750′ and 1,950′ levels. Three oreshoots have been developed property; the north and south shoots on the Bunker Hill vein have an av length of 500′, average width of 6′, while the gray orebody is 600′ long, width of 15′.

Development: by shafts; main shaft is double-compartment, 2,342′ and sunk on an incline of 58°. From the 1,950′ to 2,400′ level it is

the 2,400′ level the distance from the shaft to the Bunker

includes a double-drum hoist, driven by a 300-h. p. motor. ompressor, driven by 100-h. p. motor, pumps, a 40-stamp mill lant. Ore is hoisted in 2½-ton skips, and is crushed by a before being trammed 550′ to the mill. Stamps, weighing 1,150 ½", 96 drops per min., crush 5 tons per stamp daily through screen. Pulp flows over double-compartment amalgamating rue vanners; tailings from the vanners go to the cyanide plant, treated in eight 100-ton leaching vats, treatment taking 8 days. first agitated with lime in Pachuca tanks, 50 lbs. lime for 11 gitated 8 hours with strong KCN solution; treatment lasting

runs 99c. per ton; a 45% extraction is made. Tailing is treated is by W. E. Darrow, V. R. Fitzsimmons and others of Sutter lker Hill Company employs 155 men. See U. S. G. S. Folio 63; s. of Amador county, p. 20, Cal. State Mng. Bureau.
17, company built a flume to carry tailing from the mill to the Rancheria creek.
six months of 1915, 42,087 tons of ore was mined and milled, 91, an average value of $3.60 per ton; aggregate total expenses, rofit has been made for several years as costs have been over

SOLIDATED MINING CO. **CALIFORNIA**

Lonsdale Bldg., Duluth, Minn. A. F. Becker, pres.; R. B. ; W. E. Wessinger, supt.
Delaware. **Cap.**, $1,000,000; shares $1 par. Is a reorganiza- s Copper Co., which was a reconstruction of the Cactus Develop- companies fully described in former issues of this book.
in the old company were given until June 10, 1915, to exchange or shares in the Cactus Cons. at the rate of 2½ for 1 and a s. per share. In March, 1915, the Mammoth group, consisting ms; 440 acres, in Kern county, Calif., was acquired.
nt: by several tunnels, said to show 32′ of ore, assaying silver, and a vein on claim No. 8 is claimed to assay 64-74% nd to be the richest ore in the district. Company also owned Leona gold mine, developed to depth of 150′ and said to have ′ wide, averaging from $12-$30 per ton.
years, presumably defunct.

OPPER CO. **CALIFORNIA**

Copper Co., Nevada.

CONSOLIDATED SYNDICATE **CALIFORNIA**

Carson Hill Gold Mines, Inc., which see.

COPPER CO. **CALIFORNIA**

nes Bldg., Boston, Mass. **Mine office:** Copperopolis, Cala-

s. M. Hayden, pres.; Herbert Goff, sec.-treas.; preceding s, F. Lothrop Ames, Samuel Carr, Gilmer Clapp, Wm. J. Ames, Ross F. Robertson, directors. S. M. Levy, mgr.
1909, in Del. **Cap.**, $5,000,000; shares $5 par; reduced $2,500,000, common shares $5 par; issued $1,868,750; $300,000 $5 par, none issued. Bonds (first mortgage, 6%) principal interest accrued to Dec. 31, 1915, $147,510; under refinancing tockholders in January, 1916, the principal of said bonds and est to Dec. 31, 1915, were extended so as to fall due in nine beginning Jan. 1, 1920, viz., $50,000 of principal and $16,390 nterest each year; each of said payments bearing interest at 1916. Under the same plan $99,000 face value of debenture payable at the rate of $5,000 per month, beginning April 1, ites $50,000 have already been paid. $75,000 of two year 6%

convertible notes which were due March 1, 1917, were either converted h or paid on that date. All the bonds are held by the Ames Estate of B which formerly owned the property. State Street Trust Co., Boston, regi Federal Trust Co., transfer agent. Stock is listed on the Boston Curb. A meeting, 2nd Monday in February.

Property: 2,833 acres, including the Union, Keystone and Empire n and also including ranch and water power lands, bought Aug. 31, 1909, of Copper Mining Co., 16 miles from Milton, the nearest rail point on the Sou Pacific. Mines opened 1861, were considerable producers and were w intermittently until 1907.

Engineers employed by the Calaveras company reported substantial follows:

Geology: the country rock is a basic igneous rock schistose in char The general strike of the schistosity is N. 30° W. The dip is 65° Northea This formation is traversed by a shear zone about 125′ wide, the strike ar of which conform with the strike and dip of the general schistosity. holdings of the Calaveras Copper Co, cover approximately 19,000′ alon strike of this shear zone. For the most part, the shear zone in whic orebodies occur is a distributive fault, in which the ore occurs as lent bodies within the crushed material (half fissile schist) resulting from move parallel with the schistosity.

In several new places a cross break cuts across that portion of the shear containing one of these lenticular orebodies. From this cross fault th makes out on either side for 20 or 30′, but within the fissile material of the zone. Thus, there is a lenticular orebody parallel with the schistosity another orebody which really runs across the schistosity. The ore ave about 3% copper.

Development: the strike of the vein is proven for about 8,000′. principal development is at the Union and Keystone mines.

Equipment: includes a 1,000-h. p. steam plant at the Union mine, 3 hoists, 15-drill Nordberg and 5-drill Leyner air compressors; company reports 500 electric h. p. at the mill and same at the smelter.

The company owns about 60 buildings, including office building, boa houses, bunk houses, 3 warehouses, machine shop, smithy, 3 barns, and 40 dwellings. The 600-ton mill equipped with three ball-mills is operating oil flotation, and is connected with the mines by a 4,000′ electric tram. A impounding water for the mill has 90,000 gals. storage capacity.

At the southerly end of the property a dam has been built. This arr ment to impound the tailings and a pump installed gives an additional for the concentrator.

The 300-ton smelter, now inoperative, had 2 McDougall calciners, a blast-furnace and a 150-ton reverberatory furnace. The converter has 2 Chalmers stands. Smelter fuel was petroleum and coke.

While the property was closed it was investigated by several enginee behalf of various persons, contemplating the purchase of the property operation under a lease. As a result it was determined, October, 1914, to o the property, with S. M. Levy, as manager. Under Frank W. Royer, as sulting engineer, the mine has since been operated and careful experiments made for the purpose of treating the ore by the oil flotation process. been determined that the average grade of the ore is approximately 3% that under oil flotation a concentrate of at least 16% can be made, the rec averaging approximately 92%. Ore now in sight ready to mine amoun 300,000 tons.

In March, 1916, new milling machinery was installed capable of tr about 250 tons of ore a day by oil flotation process; subsequently another ing unit was installed and the mill is now treating about 500 tons a day. further unit was installed, 1917, making total milling capacity 700 tons From March 1, 1916, to March 31, 1917, the mill treated over 90,000 tons o The concentrates are shipped to Tacoma for treatment, but tests are being reducing them to 40% copper matte in a blast-furnace, following D.-L. and machines.

closed for several months in 1919, but in December the tons daily.

OLD MINING & DEV. CO. CALIFORNIA

spect Ave., San Francisco. O. A. Ellis, sec.
rnia. **Cap.**, $50,000; outstanding 40,280; par $1. Annual 20.

Lincoln mine adjoining the Buchanon. A quartz vein in loped at a depth of 300 ft. by tunnels and drifts, exposing

mpressor, oil engine, small concentrator.

COPPER MINES CO. CALIFORNIA

ibed Vol. VIII. Property at Red Bluff, Tehama county, years to Chicago Copper Refining Co., which see.

ETAL AND MIN. PROD'S ASSN. CALIFORNIA

rt L. Kerr, sec., Merchants National Bank Bldg., 625 Francisco. G. W. Starr, Empire mine, pres.; E. C. Hutchin- v. p.

operating company, but a merger of the California Metal on and the State Chapter of the American Mining Congress, ne of mining politics or to aid and protect the mining and fornia.

AND MINES CO. CALIFORNIA

and Divide Mining Co.
Jamieson, or Alfred Harrell, or L. V. Olecase, Bakers- Williams, Randsburg, Cal.
9, in California.
er mine 1½ miles from Randsburg, San Bernardino by two prospectors—Hamp Williams and John Nosser—in at last accounts was down 100', and everything extracted has lby smelter, totaling 28 carloads from June to August. At 18" shoot of ore, which widened to 15', averaging 150 oz. the claims are being leased on royalty. An engine and rected in August. Mine is known as the Kelly, is described in the "Eng. & Min. Journal" of Dec. 27, 1919. 1,180 5 oz. gold, and 174,722 oz. of silver.

READWELL GOLD MINING CO. CALIFORNIA

adway, New York.
I. Heminway, pres.; Simon Eisendrath, v. p. L. J. L.

6, in Arizona. **Cap.**, $1,000,000; $1 par; non-assessable; 0 shares deposited in escrow for 1 year with Laidlaw & Co. Registrar Co., transfer and registrar. Shares were stricken the New York Curb in April, 1918.
claims at Plymouth, Amador county. Is a prospect.

LIFORNIA MINING CO. CALIFORNIA

See Mines Handbook, Vol. XIII, for description.

S CORPORATION CALIFORNIA

e St., Boston, Mass.
c B. Keever, pres.-gen. mgr.; Geo. H. Morrill, v. p.; H. .; Jas. J. McCarthy, and Frank G. Hobbs, directors.
. **Cap.**, 1,000,000 shares. $1 par. Company owns the ing company of same name.
acres, 2½ miles from Gorge, Nevada County, Cal., on the s west of the Nevada-California line, and 172 miles east of oldings cover a lode with hanging-wall country of gray a diorite dike footwall. The lode, said to vary from 5' to th end to 140' across at south end, consists of a stockwerk nd seams.
aggregates 6,188', mostly tunnels, the 1,137' uppermost face, the 1,862' No. 2 tunnel, 110' lower, while No. 3, 186'

below No. 2, is 2,349′ long, with a 112′ winze below its floor; the 840′ is 700′ lower. The superintendent figures reserves to average $4.9 Mill runs averaged $5.15 when mine was worked. No information years.

CARSON HILL GOLD MINES, INC. CAL

Addresses: 55 Congress St., Boston, Mass. W. J. Loring, mgr., 614 Crocker Bldg., San Francisco. Mine office: Melones, Cal California.

Officers: W. J. Loring, pres. and mgr.; E. A. Clark, v. p.; W. van, sec.-treas.; directors, E. A. Clark, W. J. Loring, W. H. Coolidg Stone, and W. A. Ogg. A. D. Stewart, supt.

Inc. Nov. 22, 1917 in Maine. **Cap.,** $1,000,000; $1 par; non-a issued 700,004. Bonds: $450,000, 7% 4-year convertible notes, so Sept., 1919, to a private syndicate, to pay off $450,000, balance o obtained from Amer. Zinc, Lead & Sm. Co. Notes convertible into s per share and callable at 110, privileges not operative until after one date of issue. First Natl. Bank, Boston, transfer agent; Natl. Shaw Boston, registrar Annual meeting, third Wednesday in November. S on Boston Stock Exchange. The company is the operating compa Carson Hill Gold Mining Co.; it absorbed the Calaveras Consolidated described in Vol. XIII.

Property: a tract of 500 acres, covering 9,576′ along the stri Mother Lode of the California gold belt, and including the Mo Calaveras mines.

The **Morgan mine,** in which a bonanza ore shoot was opene is on a branch vein of the Mother Lode. It is opened by a 600′ tu necting with 300′ level, and a winze and shaft with levels at 1 below the tunnel. On the 550′ level the lode was 16½′ thick an averaged $30.10 per ton. On the 675′ level the oreshoot is 20′ wid along the drift and averaged $31.90 per ton. On the 865′ level, ore $55.77 gold per ton for 200′.

Reserves: 210,000 tons of $28 ore; 500,000 of lower-grade ore, of $9,380,000 worth of ore, above present bottom of mine.

The **Calaveras mine** being on the main Mother Lode will ever the mainstay of the company. It is opened to a depth of 700′ o by a 1,200′ tunnel and by winze 375′ deeper. The vein averages and for a length of 500′ averages $3.75 in the tunnel but at 1,375′ bottom of winze) runs $5 to $7 per ton.

Equipment: includes a 20-stamp mill, Hardinge mill, 2 Deister s and 4 Overstrom tables for fine concentrates, 1 Wilfley table for middlings. Sand and slimes are elevated by centrifugal pumps to launder and conveyed to the cyanide plant of the Melones Mining plant is leased by Symons & Latham who treat Carson Hill sands and contract.

Production: 1917, 14,943 tons; 1918, 55,794.

From Jan. 1 to Dec. 31, 1919, the mine output was 72,387 tons o averaged $13.96 per ton actually recovered, mainly from developm Current production is over 8,000 tons monthly. Costs are $5.45 per to

The remarkable results obtained in a year's work justifies t that company will soon be a steady and large dividend payer.

CARSON HILL GOLD MINING CO. CALI

Holding company of Carson Hill Gold Mines, Inc.

CENTRAL CONSOLIDATED MINES CO. CALI

Address: John Nicol, mgr.; Paul W. Smith, supt., or W. J pres., Nevada City, Cal.

Property: the Banner, North Banner, and Central claims, old dumers, largely controlled by Honolulu capital, on Greenhorn creek, 3 of Nevada City, Nevada county. In August, 1919, shaft was being u preparatory to resuming development. The mine was operated up to of years ago with a 20-stamp mill, compressor, and electric hoist. E

moved after closing down. Property is developed by a 1,200′
l. A 150-ton mill is proposed.

EKA MINING CO. **CALIFORNIA**

alifornia St., San Francisco, and Sutter Creek, Amador

P. Henry, pres., J. Stadtfeld, sec.-treas. Albion S. Howe,
on, asst. supt.

ornia. **Cap.**, 400,000 shares, assessable. A total of 38
to July, 1919, when one of 3 cents was levied. Annual
esday in April.

cash amounted to $50,000.

26,323 from 1901 to 1908; 2c per share in Feb., 1915, and
Dec. 16, 1919. A total of about $940,000.

oining the South Eureka on the north, ½ mile south of
ws 3 parallel veins which have been developed. The veins
stringers, with strike N. 20° W., dip 55° to 70° E., and an
. The east vein is 20′ from the west vein, while the hanging-
ast of the west vein. East and west veins have slate walls;
has a slate footwall and greenstone hanging-wall. Two series
been developed, the north shoots being 60′, the south shoots

: 3-compartment shaft, 3,720′ deep, sunk on 57° incline.
ging-wall vein on the 500′ level and is sunk on the hanging-
00′ level, at which point it is deflected to the west and passes
tion. Below 3,425′ the shaft is in greenstone. In May, 1918,
gh ore blocked out to supply 20 stamps for two weeks. Added
ny had to keep water down as the South Eureka had stopped
n was decidedly unfavorable. Sinking was continued, and by
shaft was 3,720′ deep. A winze below 3,500′ opened good ore,
t was developed at 3,700′, and reserves are now sufficient to
in operation.

urchased electric power, steam power, hoist, compressor,
) stamps, vanners, and complete surface plant.

no recent figures are available, but the total to Oct., 1919,
,292,284.

TH YUBA COPPER MINE **CALIFORNIA**

. Coley, J. L. Craig of Stockton, Luke W. Williams, supt.,

) acres, 5 miles N. W. of Grass Valley, Nevada county and
vein between porphyry and slate containing gold, silver, cop-
hides. Vein 2′ to 8 ′wide, course N. W.-S. E., dip 75°, said
r, $6; copper, 3½%, zinc 6% per ton.

: 90′ incline shaft with 127′ of drifts; 800 tons ore blocked
tons during last 3 years, total to date 500 tons.

gasoline hoist and 4″ pump. It is planned to treat the ore

MINING CO. **CALIFORNIA**

ows, Glenn County, Cal. Incorporators: Z. E. Simpson, F.
E. Simpson, C. L. Austin and J. Schribner.

Sulphur Creek, Colusa County, Cal. Company organized
eral mining and milling business.

) MINES CO. **CALIFORNIA**

First Natl. Bank Bldg., San Francisco, Cal. **Mine address:**

nk J. Hambly, pres.; A. L. Dornberger, sec.; F. J. Hagen-
eding officers and J. E. Richards, directors; J. Wilson Reno,
gt.; J. C. Climo, supt.

1914, in Arizona. **Cap.**, $1,000,000; shares $1 par; non-
issued.

Dec. 31, 1917, showed a balance of $79,699. Cash receipts

$112,377 brought forward from 1916. Four
below [illegible] 1918, receipts totaled $263,188, including balan
$ 700 [illegible] No. 9 dividend, $50,000 was paid. Cash balanc

[illegible] Cerro Gordo mines. 46 claims, 8 miles fro
Ca[illegible] [illegible]on mine on Cerro Gordo hill and a water power on
[illegible]erty, formerly belonged to the Four Metals Sm. & Mi
[illegible] mine is an antigua worked by Mexicans in early days
[illegible] of 1,200'. The principal ores produced are silver-lead
[illegible] with some galena and lead sulphide; also zinc carbonate.
[illegible]ears from the surface to the 900' level, and the silver-lead ore
[illegible]ce to the 1,150' level. Ores also contain gold and copper va
S. G. S. Bull. 540, pp. 97-105.

Development: by the 900' Belshaw shaft, with a winze to
level, and tunnels. The Troeger tunnel is now in over 6,000' and cu
system 1,200' below the workings of the Union mine. Underground
are said to aggregate 20 miles. New work in 1918 amounted to 4,603
was cut off by a fault above the 900' level and 500' of exploration ha
failed to find it.

Equipment: includes a Joshua Hendy 100 h. p. electric hois
perial type 10 Ingersoll-Rand compressor, capacity 1,200 cu. ft. free ai
driven by a 150-h. p. constant speed motor. The former steam plan
and consists of 70-h. p. steam hoist, 350 cu. ft. Ingersoll-Rand air c
and 130-h. p. boiler. Electric power, voltage 400, is obtained from th
Sierras Power Co.

The Swansea smelter has a 50-ton furnace that was operated
months in 1909.

Production:

	Tons Ore	Oz. Gold	Oz. Silver	Lbs. Lead	Lbs. Copper
1915.....	8,926	126	112,541	748,952	121,510
1914.....	4,367	312	303,085	1,195,006	283,086

Ore produced in 1916 reported as 1,497 tons lead-silver ore, net val
per ton: 11,265 of zinc ore, $23.759; 27 tons of copper ore, $17.722 pe
9,431 tons slag valued at $40,383. Net cost of all ore mined was given
giving a net profit of $17.64 per ton. In 1917, production was 6,088
silver ore, net value $45.665 per ton; 5,417 tons of zinc ore, $20.384;
of slag, net value $7.558 per ton. Net cost of all ore mined was $15.
duction in 1918 was 619 tons zinc ore, 24.3 to 40.1% zinc; 2,166 tons
ore, 23.1 oz. silver, 21.4% lead; 9,389 tons slag, 2.9 oz. silver, 12.3% lea

CHICAGO COPPER REFINING CO. CALI

Dead. See Vol. XIII of this work for description of Co.

CHIPPS CREEK MINING CO. CALI

Address: Letson Balliet, Tonopah, Nev.

This is a private unincorporated company, driving a 1,300' tunne
to drain and work an ancient river channel about 6 miles S. of Belde
county, consisting of 500 acres.

CHRISTINA COPPER CO. CALI

Address: F. C. Fox, supt., Placerville, Cal.

Owns Seven Bells mine, an old copper producer, now reopened

CLIPPER MOUNTAIN GOLD MINING CO. CALI

Office: 600-1 Hellman Bldg., Los Angeles, Cal.

Officers: B. J. Doak, pres.; E. Petersen, sec.; preceding w
Hayes, C. J. Gardner and J. C. Meadows, directors.

Inc. Sept. 13, 1916, in California. **Cap.,** 1,000,000 shares, 10c p
shares outstandi

Property: [illegible] acres, in Clipper Mtns., near Danby,
[illegible] said to [illegible] the property. In 19
[illegible] and crosscutting
[illegible], pump, etc.

o 500′ level, crosscutting and drifting at 100′ intervals, also machinery.

ER CO. **CALIFORNIA**

information.

s office: Ivanpah, San Bernardino county, Cal. At last phy, pres.; Dr. L. D. Godshall, v. p. and gen. mgr.; G. Hol-s.

or description of property.

NSOLIDATED MINES CO. **CALIFORNIA**

es., Bridgeport, Conn.; E. C. Klinker, mgr.; J. A. Brown, Reno, Nev. Mine address: Sweetwater, Mineral county,

aims, unpatented, 160 acres, at Mt. Patterson, Mono of Nevada-California State line.

er in fissure vein in porphyry. In 1917 acquired 160 Ormonde. Vein has strike of N. 10° E. with 45° dip and ", of which ⅓ is workable and said to average .05 oz. gold ton.

by tunnels; No. 1 has about 850′ of workings; No. 2 is drifting. Underground workings total 4,500′, and are said ns ore. Shaft sinking progressing 1917.

ludes 30-stamp mill and an aerial tram to carry ore from Star mines to the mill. No recent returns.

ES CO. **CALIFORNIA**

Camp, Calaveras county, Cal.

Rear, pres.; N. N. Merriman, v. p.; A. Caminetti, treas.; C. Tupper, W. P. Smith, F. M. Woods and J. G. Ferraris,

, in California. **Cap.**, 750,000 shares, $1 par value, all

ims of low-grade gold ore. Shaft reported to be down fting. Has 100-ton stamp mill. Stock was stricken from Curb in June, 1918.

OLD MINES CORP'N. **CALIFORNIA**

ra, Tuolumne County, Cal.

B. Hunting, New York; E. S. Bolen and W. A. Stratta Edmund Juessen, mgr.

Virginia. **Cap.**, $600,000; shares $10 par; 1,000 preferred mmon. Listed on San Francisco Stock Exchange.

fidence group of claims and mill site, 12 miles E. of 33° shaft to depth of 1,100′ with good ore opened on 800′ r 10 years past, has produced $5,000,000 gold.

w hoist and air compressor installed 1917, and in 1918 cyanide plant.

AMADOR MINING CO. **CALIFORNIA**

Mining Co. Company dissolved.

MINES CO. **CALIFORNIA**

W. Hellman Bldg., Los Angeles, and Randsburg, Kern J. Tyler, supt.

Randsburg, carries a vein containing gold and tungsten 350′ and by a 500′ shaft. Idle in 1918—too low grade.

cludes 5-stamp mill, pumps, compressor and air-drills. les.

WILSHIRE MINING CO. **CALIFORNIA**

op:, Inyo County, Calif.

ord Wilshire, pres.; 800 Elizabeth St., Pasadena; Mrs. .; H. R. Kearns, sec.-treas.; Cooper Shapley, supt.

Cap., 1,000,000 shares; $5 par; in treasury, $500,000. An er share was due August 19, 1918, and another one of 2c. ber.

Property: referred to under various names, Bishop Creek Go Bishop Creek Milling Co., Wilshire Bishop Creek Gold mine and, more Rocky Point Cons. Mines Co. Consists of 99 claims, 12 patented, l hearwaters of Bishop Creek, 16 miles from Bishop, Cal.

Geology: claims are said to show a silicified shear-zone 800' granite; strike N. 50° W., dip 60° S. The vein is in the center of running N. 76° W., with no definite walls. It contains dense, band carrying very fine gold with some arsenopyrite and pyrrhotite.

Development: the mine, idle for several years, was unwatered 1915, and operations resumed; 300' shaft with 2 levels, 1,000' of workir claimed to disclose an orebody 20' wide and opened up for over 100' still in ore. Ore reserves estimated at 13,138 tons.

Equipment: includes a 70-h. p. electric hoist; Sullivan 12-d pressor, pumps, Bleichert tramway and a 10-stamp cyanide mill. A flotation plant was added in 1918.

Production: for 1915 reported as 6,196 tons of $11.34 ore. carries 86.3% insol., 4.67% iron, 1.80% alumina, 2.60% lime, 1.70% sul 1% arsenic. Recovery was 85%.

In a suit brought by a stockholder to get access to the company and secure the names and addresses of 6,000 stockholders, it was clai Wilshire held control of the stock; that there had been no stockholders since 1913 in London, when no quorum was present; that no financial had been furnished or had been accessible to the stockholders since N and that an assessment of 5c. was levied in order to pay indebtedness the amount secured by assessment. Wilshire is reported to have answ the books were available for examination, and that the actual purpo investigation was to secure a list of stockholders for the purpose of them to pay to the investigators a fee of 2 cts. per share for adju affairs of the company and winding up the corporation. A stockholders was called for March 12, 1919.

The company frequently appears in print, and the stockholders have a long wait before their officers get down to actual mining and a to pay dividends. In July, 1919, there were 60 men employed and con were being shipped.

CONTACT MINING & MILLING CO. CALIF

Mail returned from Trimmer, Fresno county, Cal.

Officers: J. K. Apperson, pres.; C. C. Overstreet, sec. Present have operated the property since 1894, incorporating in 1914.

Property: 3 claims, unpatented, 9 miles from Trimmer, shows taining free gold, galena and pyrite, in a flat pitching deposit in gra to average $21.25 per ton, including a little silver. The gold occurs the ochre on the footwall; pay shoot varies from 4" to 2' in width. vein on the property, 3' wide, said to assay $11.60 gold per ton.

Development: 110' adit and two 60' drifts on the vein. Ore was ½ mile to the mill.

Equipment: includes a Straub patent stamp-mill which has te stamps operating in a circular mortar, 115 drops per minute, 5½" dro by a 6-h. p. distillate engine; capacity 4 tons per day. Five men were See M. & M. Res. of Fresno Co., p. 15, California State Mineralogist' 1915. Probably defunct.

CONTINENTAL MINES DEVELOPMENT CO. CALIF

Office: 301 First National Bank Bldg., Riverside, Cal. Harwo bins, pres.

Inc. 1911 as a holding company. **Cap.,** $500,000; shares $1 No recent information.

COPPER KING MINING CO. CALIF

General offices: Union National Bank Bldg., Houston, Te **office:** Academy, Fresno County, Calif.

Officers: B. N. Garrett, pres.; J. R. Sims, v. p.; H. C. Bocc C. A. Lewis, treas.; D. C. Demorest, eng.; Wm. Stewart, trustee.

ssociation. **Cap.**, 100,000 shares, $10 par, fully paid and 00 shares issued.

claims, 220 acres, 10 of these claims are owned in fee and lease and option to purchase, 5 miles northeast of Letcher pping point at Clovis.

vein runs N. E.-S. W. and is a belt 100' wide of miner- etadiabase containing lenses of iron and copper ore. Grano- belt to the east and diorite to the west.

by 3 shafts, one working and two for ventilation, sunk vein. Main shaft has been sunk to the 8th level about 800' ' of drifts.

ed originally by the Copper King, Ltd., a London com- . H. Daily was gen. mgr. Company is said to have spent palatial residences and surface equipment, and to have pro- of copper. Company went into hands of receiver in 1903, by mismanagement. In 1907 property was sold for $44,000 g Co., who produced an amount equal to the purchase price close because of the low price of copper at that time. The hereafter till operated by the present company.

1917, was reported to be 50,000 tons of 8% copper.

o say what this company will do, as the only reports available tment brokers, but its directors are well known, and the Stock was offered at $7.50 in newspaper advertisements in ores repeated requests for information.

TAIN CONS. MINING CO. **CALIFORNIA**

ry K. White, 53 State St., Boston, Mass.

d. Former mine near Redding, Shasta Co., Cal. See Vol.

N MINE **CALIFORNIA**

la, Plumas county, now owned by the Walker Mining Co.,

NG & MILLING CO. **CALIFORNIA**

4th St., Salt Lake City, Utah.

Headlund, pres.; J. S. Ryan, v. p.; J. A. Stanley, sec.; as.; with Thos. W. Bell, J. P. Moss, J. H. Hurd, directors. .; C. E. Merwin, Spokane, Wash., and Moscow, Utah, fiscal

rizona. **Cap.**, $3,000,000; shares $1 par; issued $1,600,000, rmers & Stockgrowers Bank, Salt Lake City, registrar. June.

Confidence mine, known as the Mormon Gold mine, d, 240 acres, in Funeral Range, Death Valley, Inyo county, Shoshone, a station on the Tonopah & Tidewater R. R. The n early days by a small syndicate of Mormons.

ing gold and a little silver in fissure vein in granite; said n. Outcrop of vein said to be 1,200' long and from 4' to 70'

tunnels and several shafts, deepest 140'. Present man- re are 117,000 tons of $20 ore in place, which can be mined r ton. This cost figure is too low.

ed to erect a 100-ton stamp mill in 1917. No recent informa-

CALIFORNIA

oy Mining Co.

LD MINE **CALIFORNIA**

Plumas county, Cal., being developed by Philadelphia Explor- e), Crocker Bldg., San Francisco; Albert Burch, mgr. The wn in August, 1918, but reopened in May, 1919. A. McDonald

CROESUS MINING CO. **CALIFORNI**

Office: 734 Fifth Ave., New York. D. F. Sheehan, supt., Chas. Smith, mill supt.

Property: the old Plumbago mine at Allegheny, Sierra County, Cal.

Ore: gold quartz in veins in granite and amphibolite schist. Ve strike N. W.; dip N. to N. E. Ore usually occurs as small masses of hig grade in nearly barren quartz. See U. S. G. S. Bull. 580, pp. 176, 178.

Development: by tunnels, the longest over 4,000'.

Equipment: 15-stamp mill at Plumbago mine, put into commission Ju 5, 1915. Employed about 50 men at last accounts.

CURTZ CONSOLIDATED MINES CO. **CALIFORNI**

Probably dead; no response to letters. See Vol. XII. Mine near Mark ville, Alpine county, Cal.

DAIRY FARM MINING CO. **CALIFORNI**

Property operated by Van Trent Mining Co., was practically worked o and to be abandoned in 1917. See Vol. XII for description.

DAKIN MINE **CALIFORNI**

See Mason Valley Mines Co., Nev. Mine is also known as the Gray Eagle.

DARWIN LEAD & SILVER MINES DEVELOP. CO. **CALIFORNI**

On Nov. 11, 1919, it was stated that the "stockholders' agreement for t reorganization of the finances of the corporation has become effective by t deposit with the undersigned of the necessary stock. In order that the no depositing stockholders may share in the provisions of the agreement, th stock should be deposited with the Committee on or before the 15th day of De 1919." Henry W. Becker, sec. for Trustees, 33 New St., New York.

Address: Darwin, Calif. J. E. Rea, mine supt.; H. Stone, mill supt.

Property: a group of mines at Darwin, Inyo county, 20 miles sou of Keeler, includes the Lane, Lucky Jim, Promontory, Columbia and Defian mines, all silver-lead properties. The company was developing and securi options on new properties at last accounts.

DEFENDER MINE **CALIFORNI**

F. B. Joyce, owner, Volcano, Amador county, Cal. Mine office: Defend via Volcano, Amador county, Cal.

Property: 3 claims, unpatented, 5 miles S. E. of Volcano, Calif.

Ore: free milling by fine grinding, carries gold and some silver (partia value) in an ore with chalcopyrite, galena and sphalerite, in a vein in gran diorite. The lode has a strike of N. 15° W., dip 85° W., and an average wid of 3' 6".

Development: 360' vertical shaft, with 1,500' underground workings. 130' south shaft on 200' level the vein is cut by a diorite dike 22' thick; oth smaller diorite dikes cut the main shoot and seem to be associated with the o occurrence.

Equipment: includes steam hoist, compressor and a 10-stamp mi Eight men are employed.

Production: to date said to be 12,000 tons, yielding $140,000. Recen work has consisted of development work only.

DELHI MINES CO. **CALIFORNI**

Address: Box 703, Reno, Nevada.

Officers: A. A. Codd, pres.-gen. mgr.; B. F. Boerner, sec.-treas.; E Eddie, supt.

Inc. May, 1917, in Nevada. **Cap.,** $3,000,000; shares $1 par. Is a su cessor of an old and successful company of similar name that has been inacti for many years.

Dividends: forty-five of 10c each and two of 25c each were paid by th company.

Property: 11 claims, 5 patented, about 200 acres, in Columbia Hill min ing district, 19 miles N. of Nevada City and Grass Valley, Nevada county, Ca Claims contain two known vein systems, the Delhi and St. Gothard, the Delh vein being the only one worked extensively. Mines are credited with productio

1 1890 to 1914. Examined by Hamilton Eddie in May, 1917. g gold, with 1% pyrite.

: by 4 tunnels, about 200' apart, No. 4, the lowest, being by 400' vertical shaft. Vein at this depth said to be 3' to 8' ng. Shaft is to be sunk 100' below No. 4 tunnel. Flow of . per min. in 1914, when work was stopped.

surface tramway connecting tunnels, pumps, one 900 and compressor, twenty 1,000 lb. stamps, concentrators, ditches for buildings.

ject to reopen an old Californian mine, and if estimated costs ton are realized, a fair profit should be made, as property is

the Delhi mine was sold at sheriff's sale to satisfy a judgment as bought by Louis Nomenmann for $20,000. Mr. Codd had operty.

OLIDATED GOLD MINES CO. (THE) CALIFORNIA

ing, Shasta County, Calif. Mine on Dog Creek, near Delta,

Sherman T. White, pres.; C. Tracie, v. p.; S. D. Furber, reas.

1903, in So. Dakota. **Cap.**, $2,000,000; shares $1 par; out- shares, assessable. Last assessment ½c. due Sept. 15, 1917.

e Pioneer group of 11 patented claims, 115 acres, and 80 , on Dog creek, 6 miles west of Delta, shows quartz veins in s contain gold, silver, and a little copper. Ore shoots average length of 300' and are said to have average assay of $22.40.

t: by tunnels with 3,500' of workings. Management claims ons ore blocked out. Idle since 1915, but intends building a and cyanide plant.

s built a narrow-gauge railway connecting with the Southern Delta. No recent information.

ING CO. CALIFORNIA

08 Peters Bldg., Reno, Nev. **Mine office:** Forest City, alif.

de Bretteville, pres.; 1064 Francisco St., San Francisco; ., v. p., with G. Lozano, directors. Lee J. Davis, sec.; R. N. . E. Ossel, supt.

17, 1919, in Nevada. **Cap.**, $1,000,000; $1 par; non-assess- Annual meeting, first Monday in March. Security Transfer transfer agent and registrar.

unpatented claims at Forest City, Sierra county adjoins on north.

gold in a quartz vein in much altered amphibolite schist. t: 1,200' tunnel and 200' shaft with 125' drifting from shaft. $60,000 worth of ore blocked out and that shaft will be sunk present the property is a prospect.

ENEY MINING CO. CALIFORNIA

ased operations, Dec., 1917, and property formerly operated eing operated by the Pacific Coast Gold Mines Corp., which see.

ER CO. CALIFORNIA

Plumas county, Cal. Owns groups of claims covering low- osit with limited development. Company built small smelter, robably out of business.

MINE CALIFORNIA

H. Goodhue, mgr., Indian Falls, Calif.

3 claims, 460 acres, ½ mile east of Genesee, Plumas County, reported to show chalcopyrite ore occurring in contact and orphyry and carrying 2% copper, $1.10 gold and 2 oz. silver. t: by 48' vertical shaft and 560' tunnel. Is a prospect.

EAGLE SHAWMUT MINE **CALI**

Owned by Belmont Shawmut Mining Co., which see.

EARLY MINE **CALI**

Geo. H. Hook, supt.; W. H. Washburn, mill supt., Jerseydale, county, Cal. Is a gold mine in southern section of auriferous belt of medium grade and somewhat refractory. Mine unwatered 1917, after litigation, and new oreshoot found at a vein intersection on 200' level.

The property has been under a working bond to J. H. Roberts Francisco, at a price of $22,500, on which $14,000 has been paid. Mill gas engine, 10 stamps. Employs 30 men.

EASTERN MINING CO. **CALI**

Moses Ginsberg, pres., 25 Broad St., New York. P. L. Papish, supt., Yreka, Siskiyou county, Cal.

Property: 16 claims near Gottville, from which small ship chrome ore were being made in the fall of 1918.

ELDORADO EXPLORATION CO. **CALI**

John W. Cover, supt.; Burr Evans, cons. engr., Placerville, Cal.

Property: the Teddy Bear claims on the Mother Lode, abou south of Placerville, is said to show 2 veins. Some $60 ore reported 150' adit, at 160' depth, 1917. Plans building 50-ton mill and sinking

EMPIRE MINES **CALI**

Address: George W. Starr, pres., Grass Valley, Calif.

A close corporation, controlled by the Bourne family. No re issued or information is ever given. Dividends total several million.

Property: the Empire and Pennsylvania mines. The latt ¼ mile distant, was owned by the Pennsylvania Cons. Mine Co., and w for about $500,000 in 1911. The property is the largest deep-mine gold in California, being followed by the North Star. Ore is a free-mill and averages $13 per ton.

Company had a great deal of costly litigation in 1915-16 with the N Mines Co., over extra-lateral rights. The case was finally compromise and both companies mined part of the disputed orebody.

Development: by 2,600' and 4,600' incline shafts. About work is done annually. The mine has extensive drifts, one level being S

Equipment: modern electrically-driven machinery, power be chased. At main shafts are electric hoists, another being put in at 4, in August, 1919; also compressors, machine-shops, tramway from Pe mine, and 80-stamp mill and cyanide plant, treating ore from both m extraction of 97% is made. About 10,000 tons is treated monthly.

EMPIRE MINING & MILLING CO. **CALI**

Address: 1101 American Bank Bldg., Seattle, Wash. Min Yreka, Cal.

Officers and directors: H. B. Ernst, pres.-treas.; A. S. Abernat L. A. Ernst, sec.; J. C. Hubart, supt., Yreka, Cal.

Inc. 1916 in Washington. **Cap.**, $500,000; $1 par; 400,000 issued. meeting first Tuesday in January.

Property: 26 claims, 12 patented, 2 miles from Yreka, Siskiyo shows a gold vein in diorite, assays said to run from $2 to $15 in gold.

Development: several short incline shafts, deepest 125' and sev nels, the longest 390'. Company claims to have 50,000 tons of ore bl

Equipment: electric hoist, small compressor, and a 5-ton mill. ing expense for 1918 said to have been $5,980.

ENCINITAS COPPER CO. **CALI**

Office: 715 Timken Bldg., San Diego, Calif. C. A. McGee, pr returned from mine address, Encinitas, San Diego, county, Cal.

Property: 8 miles east of Encinitas shows a vein in diabase phyry, said to carry 4% copper, 5 oz. silver and $4 gold.

Tests have shown the ore amenable to flotation and a 50-ton pla be installed, 1917, but nothing more has been reported.

ER MINING CO. **CALIFORNIA**

ills Bldg., San Francisco. **Mine office:** Engelmine, Plumas

nry Engels, pres.; F. Klamp, v. p.; Landon A. Bell, sec.; as.-gen. mgr., above with Richard Spreckels, I. J. Truman, Jr., nd O. G. Traphagen, directors. R. A. Kinzie, in charge of

California. **Cap.,** $2,000,000; shares $1 par; non-assessable. 5, 1919, to $5,000,000; 2,808,621 issued. Stock listed on Honolulu

tement, years ending Dec. 31:

Assets.

	Plant and Equipment	Invest ments	Current	Deferred Charges	Sundry	Total
6	$1,112,637	$432,500	$395,309	$115,600	$205,500	$3,276,882
8	996,919	432,500	531,681	164,778	33,112	3,185,830
6	1,172,217	359,000	518,647	197,616	.....	3,059,736
2	1,100,772	180,000	807,879	352,432	225,500	2,659,583

Liabilities.

pital	Reserves	Current	Undivided Profits	Total
96,494	$867,224	$202,174	$210,990	$3,276,882
08,621	872,741	324,585	179,882	3,185,830
00,000	443,492	132,235	400,210	3,059,736
00,000	172,716	108,951	377,915	2,659,583

Profit and Loss.

Operating Charges	Profit	Deductions for Reserves	Balance from Previous Year	Dividends	Undivided Profits
$508,401	$35,362†	.....	.....	.....	.....
1,302,464	479,173	$429,249	$400,210	$270,253	$179,882
717,116	590,007	272,459	377,915	265,253	400,210
487,947	551,569	155,703	115,501	133,451	377,915

Loss.

paid 1½% per share monthly from July 20, 1916, to Oct. 20, suspended 1919 until copper market and cost conditions improve. 54 claims, about 3,175 acres, 23 of which, or about 475 acres, ie claims are well watered and timbered, and consist of 2 groups—rior. The former, at 5,000′ elevation, is in sections 3, 4, and 9 of

e copper belt is 1,800′ wide on the Engels group, runs N. E. vesterly dip, and has been developed for over 3,000′ and well elopment by tunnels. Orebodies consist of large lenses in ide of diorite dikes. Orebodies are pronounced by geologists ic origin. Ore contains bornite, with some chalcocite and chal- rages 2¾% copper. A carbonate capping overlies a portion of sulphide ore at shallow depth.

t: at Engels mine, mostly done within the past five years, niles of drifts, crosscuts, and raises. One tunnel is 4,000′ long. al depth of 700′.

r mine, opened in the summer of 1916, has a 1,400′ main tunnel, general strike of the ore zone. About 5,000′ of tunnels has ebody averages 2% copper, with large lenses of ore running

s: company claims 400,000 tons of broken ore in stopes and cked out above the stopes in between levels. Probable reserves mond-drilling and drifting are not less than 10,000,000 tons of

rtment shafts are being sunk at both Engels and Superior rebodies at lower levels already proved by drilling.

includes 500-ton Minerals Separation oil-flotation plant, at

Engels mine; new mill of 1,000 tons capacity at the Superior mine; 2½ m of aerial tramways; 400-h. p. hydro-electric plant; 6 air-compressors with t capacity of 6,000 feet per minute; two large double-drum hoists; trolley storage battery locomotive; sawmills, complete shops; up-to-date stores; rec tion hall; 150 residences for employees; lodging houses, hotel, etc.

Company owns 22 miles of standard-gauge railroad running from property to Paxton on main line of the Western Pacific, in Feather River can This cost about $500,000, is well equipped, and is clear of bonded and ot indebtedness.

Power used is hydro-electric, partly from the company's own plant, but mai from the Great Western Power Co.'s Las Plumas plant, from which transmiss line costing $200,000 was built to the Engels property in 1917. The mont demand is 1,000,000 k. w. hr., at a cost of $14,600. The new rate is 0.7 cents k. w. hr. for over 500,000 k. w. hr. per month.

Company is completing a second unit in the Superior mill, and plans to a a third unit during 1919, bringing the capacity up to 1,500 tons, which, with Engels mill, will make a total of 2,000 tons ore capacity per day.

Production and costs:

Year	Ore Milled, tons	Copper, %	Recovery %	Copper, lb.	Silver, oz.	Gold, oz.	Cost p lb., co
1919*....	158,301	2.06	70.75	4,551,694†	62,817	574	17.4
1918.....	265,888	2.23	77.94	9,419,957	119,708	1,108	19.5
1917.....	155,433	2.31	.....	5,940,741	.....	...	.....
1916.....	138,712	2.28	71.63	4,312,408	.....	...	14.8
1915.....	59,714	....	.....	2,893,133	.....	...	.....

* Half year. † Includes metal from crude ore smelted.

From 450 to 500 men are employed.

Indian Valley Railroad Co.

Results of this subsidiary, which hauls ore, supplies, and passengers for t Engels company, and for the public, show:

	Receipts	Operating Charges	Profit	Current Assets	Current Liabilities	Profit and Los Account
1918..	$151,292	$114,587	$36,704	$55,172	$28,250	$58,942
1917..	48,258	25,420	22,838	.....	.....	.....

This is one of the leading copper companies in California, and one of t promising mines in the country. Everything is favorable for low costs, with management that issues detailed reports and is not afraid of spending mone when adequate benefits are to be derived therefrom.

ENTERPRISE GOLD MINING CO. CALIFORNIA

Property: the Enterprise mine, 160 acres, in East Fork mining distric 7½ miles north of North Fork, in the Trinity Forest Reserve, Trinity county Cal. The first claim, Lone Jack, was located in 1882, and mine has been oper ated more or less continuously since.

Ore: free milling gold occurs in vein in diorite. Vein has N. E.-S. W strike and dip of 10° to 45° N. W. Ore occurs in 3 shoots, 900', 300' and 30 long, with average width of 14".

Development: by tunnels, longest 1,400', has 3,000' of workings, wit 3 stopes from 300' to 900' long, 50' to 240' high, and average width of 3 Greatest vertical depth of development is 500'. At last accounts considerabl ore was said to be blocked out.

Equipment: includes compressor plant, small electric plant and 10-stam mill. Employs 12 men. Produced to date said to be over $350,000. Cost o operating was over $7 per ton of [illegible] years ago. No data available since then.

ESTABROOK DREDGING CO. CALIFORNIA

Address: Trinity Center, [illegible] county, Calif.

Com[illegible] on the Trinity river.

ESTEL [illegible] CALIFORNIA

Office

Officers: [illegible]olved H. McAdoo, [illegible]

Adolph R[illegible]

California. Family and close corporation. 100,000 shares.
1 claims, over 700 acres, including the Morning Star,
ock and Southern Cross groups in the Cerro Gordo mining
y adjoins, and is the S. extension of the famous Cerro Gordo

in fissure veins and replacements in limestone, carrying
gold, copper and zinc in some of the veins.
at: by a 520' shaft and the 7,300' Troeger tunnel. Seven
ed to have been cut, carrying both shipping and concentrating
stoping backs in virgin ground of from 2,000' to 3,100' above
el.
er has been installed, and is available for any requirement.
miles east of Keeler and reported advantageously situated for
ystem.
y has been inoperative since October, 1917, owing to war con-
resume operations soon.

SILVER MINE **CALIFORNIA**

, de Golla, mgr., and E. B. Frost, supt., Calistoga, Napa

s situated 9 miles N. E. of Calistoga, and 20 miles from St.
ping point. Cinnabar was first found there in 1854, and pro-
silver is over 40,000 flasks.
at: by long tunnels and extensive workings.
includes a concentrating plant and retorts.
s producing in 1917, no information since.

INING CO. **CALIFORNIA**

Nevada county, Cal.
in 1914 as Calumet & California Mining Co., which see.

VER COPPER CO. **CALIFORNIA**

eorge W. Long, Phoenix, Ariz.
Arizona. **Cap.**, $1,000,000.
ormerly known as the Snowstorm mine in Plumas county,
to the Engels copper mine near Taylorsville. Tunnel was 250'
The new owners propose spending $100,000 on further develop-

ONAL COPPER CO. **CALIFORNIA**

a Cons. C. Co.
Broadway, New York. **Mine and works office:** Coram,
Cal.
hos. W. Lawson, pres.; Wm. A. Kerr, v. p. and treas.; A.
ec.; preceding, with H. W. Hoops, E. H. Whiting, John A.
I. Buchanan, directors. S. A. Holman, gen. mgr.
1908, in Nevada. **Cap.**, $3,000,000; shares $5 par, assessable;
0,000 shares outstanding. Cash and accounts receivable, June 30,

ave 4,000 shareholders, including American Smelters Securities
00 shares. Stock is listed on the New York and Boston Curbs.
o., New York and State Street Trust Co., Boston, registrars;
ansfer Co., New York, and International Trust Co., Boston,
Annual meeting last Thursday in October, at Carson City, Nev.
company, owning the entire capital stock of the Balaklala Con-
Co., which in turn owns the entire capital stock of the Coram
other subsidiaries, and a third interest in the Balaklala Central
lter Co. Dividends 25 cts., Aug., 1916; 40 cts. Aug., 1917;
15 cts. in Feb., 1919; total, $660,000.
property and smelter are described under the above titles. The
down in 1909 by fume litigation in the California courts, and
operations until some device is successful in eliminating the
smelter fumes. Mine closed Aug. 21, 1914, on account of low
and resumed operations Aug. 25, 1915. Shipping 300 tons of

2.8% ore daily to the Mammoth smelter of the U. S. Smelting Co. at Ke Cal. The mine was closed down May 13, 1919, on account of the unfavo metal market. Company entered into a 10-year contract with the U. S. Sm by which company claims it can earn about $2.25 per ton on 19c. copper.

The Balaklala Consolidated Copper Co. had a bond issue of $1,50 which was paid by the First National, in 4 annual installments of $375,000 The First National authorized, 1909, a $1,000,000 bond issue, flotation of was a failure, but pledged some of these bonds for a loan of $375,000, loan presumably was paid by the proceeds of the last assessment. The was manipulated to $10 per share by Boston interests in 1915. Property described under Balaklala Consolidated Copper Co.

FIVE BEARS MINING CO. **CALIFOR**

Office: 838 National Life Bldg., Chicago, Ill. **Mine office:** Gen Plumas county, Cal.

Officers: F. A. Meidinger, pres.; A. Vermaas, sec.; J. D. Meid treas.; preceding, with G. H. Goodhue, directors.

Inc. April 10, 1903, in South Dakota. **Cap.,** $2,500,000; shares $1 non-assessable; issued, $2,428,174.

Property: 10 claims, patented, 200 acres, well timbered, 28 miles the Indian Valley railway, shows fissure veins in talcose schist, and co replacement deposits between schist and porphyry. The gossan was wo 1876-93, for gold. Main vein, of 14′ estimated average width, carries copyrite, associated with pyrite, estimated by management to average copper, 1.5 oz. silver and $1.40 gold per ton.

Development: 2 tunnels, of 380′ and 1,540′, latter a drift tunnel, fol ing the vein fault-fissure, showing low-grade chalcopyrite for an avera about 12′ width. Mine has 3,774′ of workings, estimated to show 80,000 of ore, with 9,500 tons blocked out for stoping.

Equipment: includes a 50-h. p. water plant, a 3-drill air compre 50-ton mill with ten 850-lb. stamps, and electric light plant. There are 11 l ings. Operated under a bond and lease with 25 to 30 men employed in Idle in 1918, and probably in 1919.

FIVE PINES MINING CO. **CALIFOR**

Address: Five Pines, Trinity County, Calif. H. J. Van Ness, pres Van Ness, mgr.

Property: located in 1896, is on the N. E. side of Van Ness c about 1½ miles above its mouth and 2 miles N. W. of Minersville. Mi said to have produced to 1915 almost $300,000, and to be the best produc the district.

Ore: free milling gold quartz with calcite, occurs in a series of poc in a contact vein between meta-andesite and overlying slate and sandstone.

Development: 225′ incline shaft with a level at 125′.

Equipment: includes a small hoist and 2-stamp mill. Coarse gold 80% of total value is recovered in hand mortar. Water power is used. Em 4 men. See U. S. G. S. Bull. 540, p. 73, and Mines & Min. Res. of Trinity State Mineralogist's Report, 1915.

FORKS OF SALMON RIVER MINING CO. **CALIFOR**

Address: J. D. Hobbard, supt., Sawyers Bar, Siskiyou county, Cal

Officers: F. Salv[illegible], pres.; V. G. Bonaly, sec., 405 Fair Oaks St., Francisco.

Inc. Nov. 1, 19[illegible] alifornia. **Cap.,** $200,000; $1 par; all issued

Property: [illegible] one a hydraulic mine, located on the North F Salmon river [illegible] from Sawyer's Bar, Siskiyou county, and the [illegible] mine [illegible] City, Cal.

[illegible] mine [illegible] tunnels 1,700′, 1,300′, [illegible] a sluoot 6′ wide and [illegible] done at last acco [illegible] the Lagrange was c [illegible] which were rich [illegible] and bars alon

on river. Bedrock is schist, covered by 20 to 60' of gravel. miles. The main flume carries 3,000 miner's inches of water, ne 2,000 inches. In June, 1919, there were 3 No. 5 giants, under a 235-ft. head, at work. During May, 30,000 cu. yd. e main sluice. Nine men were at work. An 18-in. elevator water-power derrick handles rocks up to 7 tons.
200,000 since 1908, and over $60,000 in 1911 and 1912. No igures available.

MINING CO. **CALIFORNIA**

ost St., San Francisco. **Mine office:** Carrville, Trinity

. Foster, pres.; E. E. Tway, v. p.; E. N. Harmon, sec.- bove and C. T. Foster, D. W. Rason, A. E. Gillespie, O. A.

12. **Cap.,** not stated. Is a close corporation with four ers. No bonded debt or chattel mortgage.
unpatented claims in Trinity Center mining district, l., as follows: 116 mining claims, 28 mill sites, and 3 placer ng claims comprise two groups, the Bonanza King, and the hey carry a vein in gabbro, with course N. 53° W., and dip carries free gold. Length of vein within property stated to grade ore occurs where the vein is crossed by a basic dike

: entirely by tunnels, giving backs of 1,200'.
ncludes 100 h. p. compressor and a 20-stamp mill. Through company owns a hydro-electric power plant of 1,000 h. p., ie, ditches, etc.
company reports that ore worth $600,000 has been taken l and states that ore reserves blocked out aggregate 92,300 tons.

PER MINING CO. OF CALIFORNIA **CALIF.**

os. Allison, pres., 216 Wright & Callender Bldg., Los

915, in California. **Cap.,** $100,000; 10c par; assessable; all

unpatented claims in Kelso mining district, San Ber-

not reply to requests for information.

TENTION MINING CO. **CALIFORNIA**

Stent, Cal.
D. Waldman, pres.; H. C. Brentschneider, sec.; Casper, lick, v. p.; L. S. Grant, mgr.
) acres on Knight creek, Tuolumne County, Calif., closed of the war, and no later returns.

NSOLIDATED MINING CO. **CALIFORNIA**

Market St., San Francisco, and Dry Town, Amador County, lall, gen. mgr.; W. L. Palmer, supt.
California. **Cap.,** $500,000; shares $2.50 par. Reported to in dividends.
claims, 4,200' on the Mother Lode, 1½ miles north of vs gold ore occurring on contact of black slate on the west, n the east. Vein strikes N. 25° W., dip 50° E., and has an 5'. West of the main vein ore has been developed in schist. lenses, the ore being in the form of quartz stringers, cutting ck is highly mineralized with pyrite.
by the Fremont shaft, 2,950' deep, sunk on a 51° incline, shaft north of the Fremont shaft. There are several miles orkings.
ncludes a steam hoist at each shaft and a 40-stamp mill.

ed down in winter of 1918 due to high costs of gold mining, reopened up to late in 1919.

FRIDAY COPPER MINES CO. CALI

Care Beecher Sterne, 1169 22nd St., San Diego, Calif. **Mine** Julian, San Diego County, Calif. **Is** a close corporation. **Inc.** in C

Owns a nickel property, 4 miles S. of Julian and 64 miles from S Ore is closely similar to that of Sudbury, Ontario, and carries 6% ni but 1% copper. Ore is 35% sulphide. Described in U. S. G. S. Bu 77, 1917.

Development: work in progress, blocking out tonnage by 250

FRIDAY-LOWDEN COPPER CO. CALI

Dead. See description in Vol. XIII. Property of former com owned by Mammoth Co., which see.

GARDELLA DREDGING CO. CALI

Lawrence Gardella, who operated gold dredges at Oroville for sev is manager of this company. Two boats worked on Clear creek, near Shasta county, for some time. A new dredge started operating in returns are published.

GENESEE VALLEY COPPER CO. CALI

Last address, Genesee, Plumas county, Cal.

Officers: A. L. Beardsley, pres.; Henry Metz, v. p.; Mel. J. Sm treas.; A. B. Clark and J. E. Baum, directors.

Inc. Nov. 1, 1909, in Nevada. **Cap.,** $2,000,000: shares $1 par, no able; issued $1,000,000. Annual meeting, August 1. Properties have b ferred to Mel. J. Smith, trustee, to satisfy creditors' demands.

Property: 15 claims, unpatented, 300 acres, in 3 groups, ar acre mill site, showing porphyry dike in meta-andesite, with bornite dis through the porphyry. Dike runs N. 20° W., dips 54° S. W. Orebody as 80 to 300′ wide, 3,000′ long and proven for 150′ depth, assaying 3 2 oz. silver and $0.50 gold per ton. Company reported, 1913, about 10 No recent development except drilling to determine tonnage and v shows 90% recovery by Minerals Separation flotation process, concen rying 35% copper, 10 oz. silver and 1 oz. gold per ton.

Property considered promising, but is idle and will probably rem some time.

GEORGIA SLIDE MINING CO. CALI

Property at Georgetown, Eldorado county, Cal., Robert Crans The Bebee, Mulby Point, and Eureka mines were taken over. Co exploration done on the Georgia Slide. Possibilities fair. Idle in 191

GIANT LEDGE GOLD & COPPER CO. CALI

Office: 500 Frost Bldg., Los Angeles, Cal. **Mine** office: Barn Bernardino county, Cal. A. Glassell, pres. and gen. mgr.; H. G. Stode Mrs. L. Stone, sec.

Inc. July, 1901, in Arizona. **Cap.,** $1,000,000, increased, 1910, 000; shares $1 par. Company has kept out of debt.

Property: 30 claims, a 40-acre mill site and miscellaneous about 800 acres, in the New York district, 5 miles from Barnwell, cl for eight years. Fully described Vol. XII.

GIBRALTAR CONSOLIDATED GOLD MINING CO. CALI

Address: Jacob Kiefer, pres., Downieville, Sierra county driving was under way in this old producer in August, 1919. C. D. was said to have taken a bond on it at that time.

GLOBE CONSOLIDATED LEASE, INC. CALI

Subsidiary of Crown-Reserve Mining Co., Ltd., Cobalt, Ont. H on Globe mine, Trinity county, Cal., but according to gen. mgr., S. anticipations were not realized, and the option allowed to lapse.

GLOBE CONSOLIDATED MINING CO. CALI

Address: Dedrick, Trinity county, Calif. H. M. Hall, of 1 Street, San Francisco, was the principal owner.

Property: Bailey, Chloride, Globe groups, 200 acres, at an el 6,100′, in Canyon Creek mining district, 4 miles north of Dedrick, Reserve, Trinity Co. Claims said to have 4 veins in hornblende

nd Bailey are the main veins; the Globe is 6′ wide, with a
f 1,500′ length; the Bailey can be seen 500′ below this. Ore
aying $9 per ton.
to date, by 6 tunnels, from 250′ to 1,700′ long, greatest
′ with several thousand feet of underground workings. A
grade ore is said to be blocked out. The mine is 27 miles
ransportation is by auto.
ncludes a 5,600′ gravity tram from mine to mill, com-
plant, sawmill and dwellings. There is a 20-stamp mill and
lant. Water power is obtained from Canyon Creek. Plant
ver $300,000.
said to have produced $750,000 in gold under previous
insufficient ore blocked out to operate at a profit. See U. S.
6-76; Mines & Min. Res. Trinity Co., Cal.; State Mineralogists
45-7.
orted sold to Bulkeley Wells and others in Oct., 1919. There
yed then with Roy H. Elliott in charge. Several years ago
e Mining Co of Ontario held an option on the Globe, but

NING CO. **CALIFORNIA**
alifornia St., San Francisco, Calif.
. McIntire, pres. and gen. mgr.; W. N. Lamb, v. p.; H.
W. P. Madill and Floyd Seger, directors.
15, in California. Cap., 75,000 shares, $1 par; authorized
s for development purposes August, 1917.
miles from Valley Springs, Calaveras county, Calif. Pro-
lava-capped drift-gravel channel, and wash gravel by improved
system. Expected to start operations in August, 1919. A
is indicates great optimism.

CONSOLIDATED MINES, INC. **CALIFORNIA**
ncorporated and property taken over by Idaho Maryland

MINING CO. **CALIFORNIA**
O. Box 595, Bakersfield, Calif.
ted. Organized in 1918. F. G. Brassell, D. Bordagaray and
ino, trustees. G. D. Aldrich, sec.; M. J. Errecart, mgr., Teha-

npatented claims in Green Mountain district, Kern county,
in vein with granite walls.
: 545′ of tunnelling. Plans to build 3-stamp mill.

'ER MINING CO. **CALIFORNIA**
Grass Valley, Cal.
lney McCormick, pres.; J. W. Howard, sec.; with Albert
. Alltucker, directors. C. A. Brockington, supt.
shares, $1 par; 285,000 issued.
3 years' operation, $312,291, of which $152,000 was spent for
or improvements, $21,990 in dividends.
) acres, including Golden Center Peabody workings under
Valley. During 1919 an interesting suit was heard concern-
rtain property within the city limits. The city authorities did
the ground, but wanted to protect the townsite patent. The
decided finally by Oct. 1919.
: over 6,000′ to date; main shaft, 1,860′ deep. In July,
n and milling were suspended to allow extensive exploration
was to be spent.
ncludes hoist, compressor, 20-stamp mill, etc. Cyanide
.
good yields were made for a time, enabling a dividend to
improvements to be made; but in 1918 the $5.80 ore being
r operating expenses and assessments were levied to pay for

further development. In May, 1919, work was confined to upper l account of insufficient pumping facilities to keep lower workings un In August, it was decided to suspend operations until financial arra could be made for putting in an adequate pumping system. Property hands.

GOLDEN GATE EXPLORATION CO. CALIF

Offices: 120 Broadway, New York; Hobart Bldg., San Francisco ranch, Calaveras county, Calif.

Officers: H. R. Plate, pres.; C. S. Jennison, v. p.; with R. F and Joseph B. Cotton, directors. E. R. Grochau, sec.-treas.

Inc. 1917 in Delaware. **Cap.**, $3,000,000; $5 par; non-assessal standing 300,000 shares. Transfer agent, Registrar & Transfer Co., Ne Registrar, Mercantile Trust Co., New York.

Company was organized to operate the Sheep Ranch mine and t other gold properties.

Property: the Sheep Ranch mine, about 132 acres, extendi along the strike of the Sheep Ranch vein, on the east belt of the Moth 17 miles N. E. of Angels, at an elevation of 2,200′; also not far from In past years the mine was opened by shaft to the 1,300′ level, and from that level to a depth of 1,550′, and is said to have produced $4,0 gold.

Ore: free gold occurs in a well defined fissure vein, the pay or width of 5′ and a 72° dip. The hanging wall is gray schist and slate f foot-wall. Ores average $10 to $15 per ton.

Development: present management after unwatering the mine working on the lower levels and started sinking to the 1,700′ level. In little stoping was done between the 1,300′ and 1,500′ levels, and on wes shaft no stoping has been done between the 300 and 1,000′ levels. A la of ore was reported opened by Sept., 1919.

Equipment: pump, hoist, and an old 20-stamp mill which is rep have been overhauled. Power is purchased from the Utica Mining C hydro-electric plant is near Murphys.

GOLDEN WEST MINING CO. CALIF

Address: Needles, Calif. **Officers:** Chas. P. Blanton, pres., Ariz.; A. Rossiter, gen. mgr., sec.-treas.; Jos. Onetta, supt. Compar 100,000 shares each to T. A. Dumont and H. C. Adams for 17 patente in Ibex district, San Bernardino county, Cal.; also selling 50,000 share for development and plant. The property is in the Ibex mining district, end of Manchester Mt., 26 miles from Needles.

GOLDSTONE MINING CO. CALIF

Address: Goldstone, San Bernardino County, Calif.

Officers: C. C. Rumrill, pres.; F. A. Shorey, v. p.; G. M. Leona W. S. Hubbard, treas.; all of Springfield, Mass. A. A. Turner, cons.

Cap. $2,000,000; shares $1 par.

Property: 14 claims in new Goldstone district, 35 miles from Cal., developed by shafts and pits. Ore occurs at limestone-diorite con

Company well known at Springfield, Mass., on account of queer sh ings by certain firms. No recent news, as property is mostly leased.

GOLINSKY COPPER CO. CALIF

Property: 14 claims, adjoining the Mammoth mine on the ea miles west of Kennett, shows an ore shoot 30′ wide carrying low-grad ore with gold values. Equipment includes electric power. Idle since 1

GOLINSKY MINING CO. CALIF

Mine near Kennett, Shasta county, Cal. George Bayha, pres.; W Iotson, v. p. Sold to the Golinsky Copper Co. in 1911.

GOOD WILL COPPER CO. CALIF

Address: M. B. Ayars, pres., Paso Robles, Cal.; Geo. F. Root, A. Iversen, sec.-treas.; B. F. Mason, supt., and J. A. Peterson, directors.

Inc. Jan., 1918, in Cal. **Cap.**, $250,000; $5 par; outstanding 30,00 assessable.

0 acres, 10 miles N. W. of San Luis Obispo has copper ore
e.
t: 625' of tunneling, with total of 1,450' underground work-
4"x6" compressor on the property.
gives receipts from ore sales as $15,050 for past year, and
5,000 tons of 3½% ore.

CY BULLION EXPLORATION CO. CALIFORNIA

E. Mainhart, Grass Valley, Calif.
California. **Cap.**, $1,000,000; $1 par.
he Bullion group of claims in the southern part of the
rict, Nevada county, said to have yielded gold worth $1,000,000,
or 15 years. Development is by an incline shaft, 1,500' deep.
rogress in August, 1919.

EY CONS. GOLD MINES CO. CALIFORNIA

605 J. St., Sacramento, Calif.
E. McMichael, pres.; Scott Ennis, v. p.; H. A. Heilbron, Jr.,
. H. Buck, A. E. Nelson, P. Huth, H. Kleinsorge, and S. Jones,

shares, $1 par; 615,709 issued.
ost of property, $88,000; improvement acct., $175,000.
llison Ranch mine, south of Grass Valley, which produced
0,000 from 1856 to 1866. In July, 1917, the adjoining Benoit
was bought.
t: by 9,000' of underground work to depth of 1,662'. Fair
ming from several upper levels and considerable prospecting is

twenty 1,575-lb. stamps, cyanide plant, etc. Mill started

with good record and possibilities.

COPPER CO. CALIFORNIA

4 patented claims, about 256 acres, at Happy Camp, Siski-
ed by the Mason Valley Mines Co (which see) of Thompson,
w a blanket copper sulphide deposit in mica-schist, with dip of
N. W. strike.
t: by tunnels. The mine has 1,000,000 tons of chalcopyrite

COPPER CO. CALIFORNIA

oody, Kern County, Calif. Joseph Weringer, owner.
520 acres, 18 miles east of Jasmin, on the Porterville branch
Pacific railroad. County rock is granodiorite, showing an ore
nses of 20' maximum width, with granite walls irregularly
chalcopyrite.
t: by a 185' incline shaft, with 3 levels opened. Carbonate
the upper levels have averaged 19.4% copper and 5.7 oz. silver
resumed in 1913, after several years, but no recent returns.

ER MINING CO. CALIFORNIA

J. Greenblower, Meadow Valley, Plumas county, Calif.
placer mine near Mt. Ararat in Plumas county. Gravel
raulicking is estimated at 500,000 yards. A concrete restrain-
ipe-line, and wagon-road were decided upon in Oct., 1919.

N MOUNTAIN COPPER CO. CALIFORNIA

quired by Atascadero Copper Co., which see.

ATS GOLD MINING CO. CALIFORNIA

Sacramento St., San Francisco, Calif.
C. Van Schaick, pres.; F. M. Hall, v. p.; W. H. Blanchard,
on, treas.
22, 1916, in Nev. **Cap.**, $250,000; $1 par; non-assessable;
Registrar & Transfer Co., New York, transfer agent and
d on New York Curb.
old claims at Grizzly Flats, Eldorado county.

GRIZZLY MINING CO. CALIFORNI

Manager: O. F. Heizer, Tuolumne, Calif.

Inc. 1918, in California. **Cap.,** $150,000; all issued; par $1.

Property: 8 claims, Tuolumne county. Quartz vein in slate, report to be 8′ wide, carrying free milling gold, assaying $8 per ton.

Development: by 3,000′ tunnel with 20,000′ of underground workin

Equipment: includes a 100-ton cyanide plant. Reported extent of ope ings seems excessive as we have found no reference to this company State Mineral Bureau reports.

Planning to re-open Eureka and Dead Horse mines. Operating expen for 1918 given as $5,000; no production reported.

GRUSS MINING CO. CALIFORNI

Address: W. J. Gruss, Portola, Plumas county, Calif.

Property: the old Gruss mine, said to have yielded $1,000,000 in go and silver, now to be worked for copper. Mine is 3 miles from the Wall copper mine, and has been examined by H. W. Turner and J. M. Nicol.

The vein is mainly on a slate-metaandesite contact. Minerals are ch cocite and massive sulphides. Work is under way below the 400′ level, a the stamp-mill will have a tube-mill and flotation added.

GWIN MINE & DEVELOPMENT CO. CALIFORNI

Address: F. B. Moors, 128 Sutter St., San Francisco, Calif.

Officers: Ansel M. Easton, pres.; J. J. Hachman, sec.

Property: the well-known Gwin gold mine, near Jackson, Amad county, Cal., which, up to the time of closing, 10 years ago, had paid lar dividends. Shut down on account of power conditions and want of mode machinery.

Development: reported (see letter M. & S. Press, July 5, 1919), th there was more developed ore, of better grade, and the mine looked mo promising than it had for many years previous to closing down. Accordi to Moors, the bottom of the 2,400′ vertical shaft and 450′ winze below th level of the mine show ore-shoots of a combined length of over 450 f averaging $10 per ton; also hundreds of feet of $5 ore. These orebodies a practically intact. In addition, there is a very large tonnage of ore ava able in the upper levels of the south shaft. Two-thirds of the mine has n been prospected. The contact with the greenstone was never reached either the east or west side. All of the ore encountered was found in th slate. One chimney was over 1,600 ft. of continuous pay-ore from 4 to 8 thick. In other places the ore was over 20 ft. thick for many hundreds feet." According to the California State Mining Bureau, 14th Report f 1913-14, on page 84, is said: "The ore-shoots of the main vein are of gre length, varying in width from a few inches to 20 ft. The vein is usual of a banded structure and exhibits a branching tendency, with many spu running into the hanging-wall."

Equipment: was complete with hoists, compressor, 100-stamp mi which has mostly been sold.

Production: about 1,000,000 tons of ore yielding $5,000,000 in gold.

If these statements are correct, and verified by an examination, th Gwin should be another Plymouth or Old Eureka, and should not be le idle with so much ore available.

HARDENBERG MINING SYNDICATE CALIFORNI

Operated the Hardenberg gold mine at Jackson, Amador county, Ca Developed by 1,800′ shaft and equipped with 20-stamp amalgamation-co centration mill.

Syndicate suspended operations in October, 1917, owing to unsati factory results. In 1918 equipment was dismantled and the mine sold trustees' sale for $10,000 to John Dohrmann. Proceeds of sale netted cred tors only about 18% on their claims.

HARVARD MINE, INC. CALIFORNI

James E. Simpson, pres., 70 Kilby St., Boston; H. E. Buckminster, ge mgr., same address.

claims, and a mill site, 80 acres, on the S. E. slope of
ıe mile S. W. of Jamestown, Tuolumne county, Cal. Claims
g the strike of the veins.
s, the east, central and west, with strike N. 37° W., dip
erage width 10', have been explored. Central vein consists
to 12' wide, but values are, as a rule, too low to mine. The
ins consist of a mass of quartz stringers cutting the schist
ree gold. Main footwall is serpentine with hanging-wall of
Ore occurs W. of the central vein. There are 7 distinct
oped on the property, average length 200', width 6'. Veins
. end of orebody between the 1,200 and 1,400' levels, and
etween the 1,100' and 1,200' levels; they are faulted 8' to 25'

t; 3-compartment shaft, 1,650' deep, with levels at 200', 500'
low this at 150' intervals; lowest level is at 1,400'. Total
rkings about 4 miles. Ore pockets, 100 to 200 tons capacity.
all of shaft.

MINING CO. **CALIFORNIA**

ench Gulch, Shasta County, Calif. J. O. Jillson, pres.; E.
last accounts.
78 acres patented and 485 acres, unpatented, at 2,300' eleva-
of Cline Gulch, 5 miles N. E. of French Gulch, includes
nine, the largest gold quartz producer in Shasta county.
ginally located by T. Cummings in 1896. After exhaustion
the mine changed hands several times until acquired by
y in 1901.
illing gold. Two fissure veins with E. W. strike and dip
been mined from adit level to 7th level; below 7th the dip
p N.; average width 2½' to 3'; walls are slate. Ore shoot
illing ore averages about $10 per ton.
t: the upper 1,000' of vein has been mined by tunnels, while
worked from a winze on the main adit (Ohio) level. On
00' level, a 700' crosscut opened the vein in Nov., 1915. Mine
gal. water per minute.
includes a 375-h. p. double-drum electric hoist, compressor
ıaulage from mine to mill, 9 miles of power and 5 miles
ıes. An electrically driven 30-stamp mill is equipped with
ables and electroplating plant. Stamps weigh 1,050 lbs.,
per min., from height of 6"; capacity, 100 tons in 24 hours,
esh screen; 92% extraction. Power-house destroyed by fire
0,000. Company employs 140 men.
previous to 1901, said to be $85.000; 1901-1914 said to be
y production about $360,000.
. S. Bull. No. 540, pp. 35, 37, 46, 57-60; Mines & Min. Res.
State Mineral Report 1915, pp. 43-44.

QUICKSILVER CO. **CALIFORNIA**

. B. Ulrey, mgr., King City, Calif.
. G. Ramires, pres.; P. Morasci, v. p.; A. E. Reynolds, sec.;
k, King City, treas.
1912, in California. Cap., $500,000; $1 par; outstanding

4 claims in New Idria mining district, San Benito county.
ior to 1916, a small yearly production was made, from ore
outcrop or from the surface. There are 3 inclined shafts,
ıd two of 50' depth. Mine was idle in 1918. See p. 105, Bull.
Res. of Cal. published by Cal. State Mng. Bureau.

G CO. **CALIFORNIA**

. N. Miller & Co., fiscal agents, Tonopah, Nevada.
00 shares; 40,000 offered at 12½c each in Nov., 1919.
at Alturas in the Winters district, Modoc county, Calif.

Operated in desultory manner by amateurs that extracted $200,000 fr above the 200′ level.

Geology: Vein is a replacement of the andesite hanging wall, and from 3 to 10′ wide, carrying silver and gold in about equal proportion. T footwall is diorite.

Development: by 300′ and 120′ shafts, the former an incline be main opening. All ore above 150′ and some down to 200′ has been tracted. The ore is said to have assayed $15.40 per ton on the 150′ le $12 on the 200′, $20 at 250′, and rich ore is shown at bottom of main sh The 120′ vertical shaft is to be sunk deeper and connected with the old wo ings. Reserves said to be worth $200,000 above 300′ level.

Equipment: includes steam power, hoist, compressor, stamp-mill a cyanide plant, suitable for present operations. Mine is near a farming trict.

Judging by past performance the Hess seems to be a fair speculation to whether the values in the vein persist or not. The fiscal agents say the physical character of the deposit and the geology indicate a deep-sea deposition, while the large silver content also indicates persistence, a sta ment which is not a particularly good argument. It appears, however, t further work is warranted.

HIDDEN TREASURE MINING CO. CALIFORN

Address: Harold T. Power, mgr., Call Bldg., San Franciso, Calif.

Owns gold-bearing gravel mine, 1,545 acres, five miles north of Mi gan Bluff, in Damascus mining district, Placer county, but no informati as to operations.

HILDA GOLD MINING CO. CALIFORN

Address: Sierra City, Calif. Samuel H. Dolbear, cons. engr., 625 M ket St. San Francisco.

Officers: C. P. Doelger, pres.; L. J. Baumer, v. p.; Carl Ambrosey, se treas.; Alex. Schloesser, supt.

Inc. Oct. 20, 1919, in Delaware. **Cap.,** $1,000,000; $1 par; 500,000 issu

Property: a section of the Tertiary river channel, 5 miles from Sier City, Sierra county. The mine has been worked in a desultory fashion lessees since 1869. It has been explored by 2 hydraulic pits, a 100′ surf tunnel, and a bedrock tunnel, 700′ long, with raises and drifts in the grav channel, covering several hundred feet of laterals. Some gravel has b found, as high as $20 per yard. Ground includes the confluence of the M ton-Alleghany channel with the ancient Jura river, at which point there expected to be a concentration of high-grade gravel.

HOPE MINES DEVELOPMENT CO. CALIFORN

Address: P. O. Box 154, Salt Lake City, Utah. **Mine address:** Sono Tuolumne county, Cal.

Officers: T. W. Whiteley, pres.; M. Reedal, v. p.; T. L. Mitchell, v C. W. Johnson, treas.; F. O. Horn, sec.; Geo. Weston, mgr.; preceding w G. M. Stenhouse, L. A. Jeffs and G. O. Quackenbush, directors.

Inc. 1913, in Utah. **Cap.,** $500,000; $1 par; issued 370,000 shares; asse able.

Gross earnings for 1918 were $10,626, with operating expenses of $13,3

Property: an old one, is on the Bonanza lead, ½-mile E. of Sono and is said to show free milling gold ore. Vein strikes N. 85° E. with of 23° W. and 2′ average width. Has mica schist footwall and porph hanging. Bought 3 adjoining fractions, 1916.

Development: by tunnels, main tunnel is in 1,200′. New work in 19 totaled 1,860′.

Equipment: includes a 25-h. p. gasoline engine and a 5-stamp m Eight men are employed.

Production: 400 tons in 1916. Average returns, 1917 amount to $1,5 gross per month.

With new equipment and additional claims, operations should show profit, but no data is at hand concerning results.

)LD MINING CO. **CALIFORNIA**

Montgomery St., San Farncisco; and Hornitos, Mariposa W. Morris, pres. In May, 1913, company took over and in ting the Ruth Pierce gold mine, consisting of 2 claims, rom Hornitos. Mine had been idle for some time. Vein lth; developed by a 550′ shaft, part vertical and part incline, underground workings.

ncludes a hoist, driven by 105-h. p. motor, 4-drill com--stamp mill. No recent information.

TAIN COPPER CO. **CALIFORNIA**

boldt county, Cal. David Wilson, pres.; George Wilson, ; D. W. Stapp, supt.

0. **Cap.**, $1,000,000.

claims, unpatented, in vicinity of the Humboldt Copper his corporation apparently is connected in ownership and wns the Ruby copper mine on Horse mountain in the orse River district, on the watershed between Redwood river, in T. 6 N. R. 1 E. For miles copper occurs along ro contact; claims show native copper in a vein 30′ thick -grade ore.

: by 6 tunnels, No. 6 of 900′, another of 450′, 3,000′ in all. ncludes engines, boilers, 35 buildings and a $12,000, 50-ton Huntington mill, installed in 1912. Concentrates shipped nelters, averaging 20% copper and $4 gold per ton.

any shipped 350 tons of chrome ore. In May, 1919, prop-tion to Pittsburgh people.

S. MINING CO. **CALIFORNIA**

Dorr, Jr., pres.-mgr., Syracuse, N. Y.

e Owasco mine, near Oroville, Butte county, said to show ed mineralized ledges. No reliable record of operations.

OPPER MINING CO. **CALIFORNIA**

reka, Humboldt Co., Cal. T. L. Loofbourrow, pres.; W. L.

claims, unpatented, well watered and timbered, in Secs. N., R. 4 E., said to show strong veins with a good showing o some gold.

: by 1,750′ of drifts, 210′ raise, 30′ winze, and 700′ of

consists of 3 surface buildings only. Shipped chrome ore

LAND MINES CO. **CALIFORNIA**

Hobart Bldg., San Francisco. **Mine office:** Grass Valley, Cal.

keley Wells, pres.; Roy H. Elliott, v. p.; A. D. Snodgrass, Errol MacBoyle, F. W. McNear, Rufus Thayer and Robt. ors. John A. Fulton, mgr., Grass Valley.

1919. **Cap.**, $3,000,000; par $1, non-assessable. **Bonds:** au-00; outstanding $413,000.

out 540 acres, includes all the holdings of the Gold Point ., and the Union Hill Mines, which companies have been Claims are just E. of Grass Valley and cover about 2 miles f the Union Hill and several other important quartz veins; erated are the Eureka, Roannaise, Idaho-Maryland, South ll, and Tracy.

: several shafts, deepest, an incline shaft, 2,180′ deep and orkings.

old in quartz, the vein ore having a diabase hanging wall oot-wall. Total output to time present management ac-

quired property said to be about $23,000,000 in gold. Company will reop mine to 1,000′ depth and do further development.

Equipment: includes a 20-stamp mill.

INDIAN SPRINGS MINE CALIFORN

Address: J. Woodruff, Magalia, Butte county, Calif.

Property: an old drift-gravel mine in the Magalia district north Oroville, which has produced $4,000,000 of gold. The adjoining Hupp m has also been acquired, and both mines will be operated from the Ind Springs tunnel, 4,000′ long. Los Angeles capital is interested.

INYO COPPER MINES CORPORATION CALIFORN

Mail returned from 215 Balboa Bldg., San Francisco, Cal. **Mine addre** Keeler, Inyo county, Cal. R. G. Paddock, pres. and gen. mgr.; F. J. O'D secretary.

Inc. Nov. 19, 1910, in California. **Cap.,** $1,000,000, shares $1 par, asse able; issued, $550,000.

Company is a reorganization of the Inyo Copper Mines & Smelters (The president stated, 1918, that it is free of debt but waiting for bet financial conditions before attempting to raise money and only a sm amount of work is being done.

Property: 19 claims in Ubehebe district, covering a contact zone, tween limestone and granite porphyry. For a mile this contact is said show places where there is a 1′ to 20′ of ore carrying 8% to 40% copp The steep mountain side permits development by tunnel and future wo will be of this character.

Development: amounting to 650′, includes 6 shallow prospects sha and as many short tunnels, the longest 120′, together with 100′ of trenche Ores carry appreciable value in gold and silver, as well as copper.

Probably out of business.

INYO GOLD MINING CO. CALIFORN

Cap., $1,000,000; shares $1 par; assessable. Stock listed on Salt La Exchange.

Property: 17 claims, patented, at Elko, Inyo county, Calif., develop by 350′ of shafts, 700′ of tunnels and 75′ of crosscuts. Company offici estimate $650,000 worth of gold-silver ore in sight.

Letters returned from Elko, Cal., in May, 1917, and no news since, probably defunct.

IRON MOUNTAIN COPPER CO. CALIFORN

Office: 301 First National Bank Bldg., Riverside, Cal. Mine a Blythe City, Riverside county, Cal.

Officers: Harwood Robbins, pres.; E. W. Tucker, v. p.; Holton Wel sec.-treas.

Inc. about July, 1911, in California. **Cap.,** $10,000; shares $1 par; issu 5,000 shares.

Property: 35 claims, about 700 acres, known as the Crescent grou in Ironwood mining district, Riverside county, Cal., 26 miles S. of Bly Junction on the Parker cut-off of the Santa Fe railroad. Claims show sure veins in granite and porphyry, the main ledge being traceable 2 mil

Development: includes 120′ shaft with a level at 100′ depth that is long and shows high-grade copper ore containing visible gold. Ore sh ments by [illegible] owners averaged $100 per ton. Outcrop shows fin rock [illegible] places. Mr. Robbins, who is said to have furnish [illegible] planned on putting in a small smelter. No rece

[illegible] CALIFORN

[illegible] Fesler, Howard W. Wi [illegible] R. Rader, of Barzilla, S

[illegible] Hills district, Siski [illegible] from. Probably

PER CO. **CALIFORNIA**
Union Savings Bank Bldg., Oakland, Cal. Frank A. Leach,
cox, v. p.; E. R. Leach, mgr.
patented mining claims and other property aggregating
e S. W. corner of Trinity county, within 500 yards of the
acific R. R., operating from San Francisco to Humboldt bay.
s Island Mountain, Trinity county, Cal.
lenticular body of copper-iron sulphide occurs in metamor-
tary rocks, outcropping at several places. Development is
that these various outcrops are part of one mass, whose
nsions are 90′ to 100′ in width, 450′ in length and a proven
0 to 145′. Ores carry 3½% copper, 1½ oz. silver, and $2 in

nt: over 2,500′ of underground workings, opening 275,000
to Jan. 1, 1919, 30,000 tons had been shipped.

EXPLORATION CO. **CALIFORNIA**
le.
claim, patented, 20 acres, ¾ mile W. of Jamestown, Tuo-
Work stopped since 1915, owing to lack of funds. Described

E M., M. & SM. CO. **CALIFORNIA**
urned unclaimed from Madera, Cal. Probably closed down.
ol. XIII.

COPPER CO. **CALIFORNIA**
ed from Hutton, Siskiyou county, Cal. Is one of the many
copper belt of northern California, whose owners believed a
could be made to pay cost of development and equipment
from shallow workings.
pparently owned formerly by Copper King Mining Co., lying
omfield group and the Blue Ledge mine, has opencuts and
oping the mine to a depth of 400′. Mine is said to carry
ebodies, ranging 5 to 8% in copper tenor and $8 per ton in
an estimate considered excessive.
veral years.

LIFORNIAN GOLD MINES CO. **CALIFORNIA**
P. E. de Caplane, pres.; W. D. Waltman, v. p.; Lester S.

120 acres at Stent, Tuolumne County, Calif., on the Mother
ped to depth of 1,800′ by an incline shaft.
includes a 60-ton 20-stamp mill. Operated for nearly 3
s. Annual yield about $100,000. Company receives 25% roy-
s $1 a ton for milling ore extracted.

Y MINES CO. **CALIFORNIA**
V. M. Cooper, pres., San Jose, Calif.
ued 250,000 shares for a lease and option to purchase the

he Kate Hardy mine and mill at Forest, Sierra County, Calif.,
ted intermittently since 1860 and is credited with a produc-
5,000 in gold. Six veins have been cut on the property from
arrying mainly oxides, but some sulphides. The main vein
and dips about 80° W. Pay-ore occurs in patches of free
rous arsenopyrite. Developed by several tunnels, longest

lly described in U. S. G. S. Bull. 580, pp. 181.
includes a 3-stamp mill, 1 classifier, and Wilfley tables.
19, company was rebuilding its power line and enlarging its

NG CORPORATION **CALIFORNIA**
H. Kelly, 636 No. Van Ness Ave., Santa Ana, Calif.

Officers and directors: H. H. Kelly, pres.; L. M. Kelly, v. p.; W. Stewart, sec.-treas.-supt.

Inc. July 19, 1917, Calif. **Cap.,** $200,000; par $1; outstanding 159,1 shares.

Property: 9 unpatented claims near Quincy, Plumas county, shows quartz vein in serpentine.

Development: 200′ tunnel and a 460′ tunnel with 350′ opened unde ground. Company claims to have about 20,000 tons gold ore averaging per ton.

Not producing. Putting up a 50-ton concentrator. Estimated expen tures, 1919, $15,000 to $20,000.

KELLY SILVER MINE **CALIFORNI**

See under California Rand Mines Co.

KENNEDY MINING & MILLING CO. **CALIFORNI**

Office: E. C. Hutchinson, pres., 409 Montgomery St., San Francis Cal. Webb Smith, supt.

Cap., $100,000; shares $100 par.

Dividends: a large sum has been paid, but no figures are obtainab

Property: 9 claims, covering 3,100′ on the Mother Lode, includes t Kennedy mine adjoining the Argonaut, 1 mile north of Jackson, Amad county, Cal. The Kennedy vein, one of three veins in the Lode, outcrops andesite passing downward into Mariposa slate, following roughly the co tact between the two rocks. The vein dips 57° E. and the payshoots ra to the north. The best ore occurs near the footwall over a black gouge to 2′ thick. Company purchased the Zeila mine and 40-stamp mill at Jac son, about 1½ miles S. of the Kennedy, in 1915, for $35,000. The Zeila worked out down to the 450′ level, but new orebodies averaging $4 per t are said to have been disclosed below the old workings.

Development: by 3 shafts; the vertical south shaft, 2,300′ deep, nor shaft, 2,500′ deep and the 3-compartment east shaft sunk to vertical dep of 4,200′ with crosscuts and drifts, run N. and S. on the veins. Shaft bei sunk with the object of reaching junction of two orebodies. Ore in t lower levels is generally of better grade than above.

Equipment: includes air-drills, 15″x30″ Murry compressor, 25″x3 Fulton compressor, nine 80-h. p. boilers, oil-fired steam power, electric pow is purchased, 800-h. p. double-drum hoist and 100-stamp mill, making an e traction of 83%. Monthly capacity is 15,000 tons. Concentrates assay $1 per ton and tailings run about 60c per ton. Concentrates are treated at t mine in a 10-ton chlorination plant with 2 roasting furnaces. Employs 3 men.

Production: figures are unobtainable, but probably around $60,000 month under normal conditions.

KEYSTONE MINING CO. **CALIFORNI**

Address: Carlton R. Downs, Amador City, Calif., mgr.

Property: the Keystone mine at Amador City, Amador County, cove imp[illegible]long the Mother Lode, has been operated continuously since t dis[illegible]

[illegible]m, 12 to 200′ wide, occurring on the contac betw[illegible]ll and meta-andesite hanging-wall. Tw other[illegible] have been developed; the latte is now [illegible] mined above the 900′ lev See M[illegible]'s Report, p. 34-36.

Dev[illegible] 2,680′ deep and 1,0 south sh[illegible] and N. on the 10 900′, 1,00[illegible] now being done a the 1,80[illegible]′ 1,000′, 1,200′ an 1,400′ lev[illegible]

[illegible]ncentration mil[illegible] Air compres[illegible]

rates run $50 per ton; the tailings 30c per ton. About

last 6 months of 1918, was 44,322 tons of $2.52 gold
2 in bullion and $106,860 in concentrates; the total was
y freight and smelter charges.
ormal conditions and low-grade ore this company con-
issues regular reports.

MINE **CALIFORNIA**

. Cottrell, Westerly, R. I. W. H. Young, supt., Cecil-
y, Cal.
es in Secs. 6 and 7, T. 38 N., R. 11 W., near Randsburg,
ing district, Siskiyou county, Cal., shows a 5′ vein of
th quartz porphyry foot and slate hanging-wall. The
dips 60° E. Developed by 460′ tunnel, 130′ shaft and

ludes an 8-stamp mill, hoist, boiler and buildings.
being produced from 450′ level, no later returns.

LVER MINING CO., LTD. **CALIFORNIA**

g St., London, Ont., Canada.
Gray, pres.; W. P. Darsh, sec.; A. A. Lewis, supt.
up of claims, in Sec. 20, T. 23 S., R. 16 E., Kings County,
ield, Monterey county, Cal. Leased by Patriquin broth-

rcury, cinnabar and calcite, occurs in a crushed zone,
S. E. with dip 45° S. W. Country rock is serpentine,
phic sandstone.
o depth of 200′ by 700′ upper and 850′ lower tunnels,
ize.
ludes 10-ton Scott fine ore furnace with brick condensers
ine. Mine worked intermittently since 1902. In Nov.,
was being sunk.

INE **CALIFORNIA**

Kleinsorge, Sacramento, Cal.
xtensive area 30 miles by road S. W. of Red Bluff,
the S. P. R. R., in rough and bare country.
ills, which are steep, consist mainly of serpentine, in
red. In this rock chrome occurs as veins, pockets and
e last type of deposit covers a considerable area, and
rcial by concentrating.
ile road, two camps, 3 aerial trams, 10-stamp mill, load-

rted about mid-year, 1917, and amounted to several car-
e assaying 45% Cr_2O_3 and low in silica.
on account of the unsettled market for chromite.

LD CO. **CALIFORNIA**

range, Tuolumne county, Calif.
been operating a dredge on the Tuolumne river some

NING CO. **CALIFORNIA**

Gold Fields Am. Dev. Co., which see. Operations were
8, and part of the equipment sold. See Vol. XIII.

PPER MINE **CALIFORNIA**

leeville, Calif.
Leviathan group, 16 claims, located in Alpine county, 22
eville. The Leviathan claim was first located in 1863,
el driven to almost its present length, 460′; in all there
orkings. In 1869, a second tunnel, 175′ lower, was driven
0 tons of 30% copper was shipped. A small blast-furnace
ted for a short time. Examined by W. H. Weed in 1918.

LIGHTNER GOLD MINING CO. CALIFORN

Office: 301 N. Eldorado St., Stockton, Calif.

Officers: C. M. Jackson, pres.; Alex. Chalmers, v. p.-mgr.; B. F. W liams, Jr., sec.-treas., with A. D. Schindler and L. J. Wagner, directo

Inc. Oct. 26, 1896, in California. **Cap.,** $125,000; shares $1 par; asse able; 62,287 shares outstanding. Dividends paid to date, $550,000. Ass Feb., 1916, amounted to $224,281 and liabilities to $85,186. Annual meet last Thursday in Oct.

Property: 1 patented claim, 4½ acres, in Angels Camp, Calaveras Cou between the Utica and Angels quartz mines, shows a quartz fissure vein s to be 80' wide, running N. W.-S. E., with dip of 70° and assaying $5 ton. The mine is credited with a total production to date of $2,000,0 Property was closed down in 1910, owing to caving of the old shaft s on the orebody.

Equipment: includes hoist, drills, electric power, compressor and stamp amalgamation and concentration mill. When working employs ab 70 men and maintains daily output of 150 tons. Management estimates reserves at 200,000 tons above the 300' level, Feb., 1916.

LINCOLN CONSOLIDATED CALIFORN

Address: Sutter Creek, Amador county, Calif.

Property reported sold October, 1917, to Jas. Hoatson, et al., of Hou ton, Michigan, and 10% dividends paid shareholders from proceeds. Plan to reopen and develop.

LITTLE BULLY HILL MINING & SMELTING CO. CALIFORN

Probably dead. See description in Vol. XIII.

LITTLE NELLIE MINING CO. CALIFORN

Address: Redding, Shasta county, Cal.

Operations resumed Oct., 1917, after two years' shut-down, during wh time 30 diamond-drill holes were put down to an average depth of 8 defining lenses of 2 to 7% copper ore. In 1917, 15 stamps were crush gold ore; copper ore was to be shipped to Mammoth. No news since.

LORETTO COPPER MINING CO. CALIFORN

Main office: Tonopah, Nev. **Mine office:** Big Pine, Inyo County, Ca John G. Kirchen, mgr.; John Cole, supt. Is controlled through stock ow ership by Chas. M. Schwab, and the Gail Borden estate.

Property: about 750 acres, east of Bishop, has a 40' vein, carrying said to average 4% copper, and about $3 gold per ton.

Development: by 1,700' main shaft, said to be in commercial ore, a 2 crosscut tunnels to the N. E., 1 of 90' length said to have cut a 74' v Improvements include a smithy and several small mine buildings. Devel ing and planning to install a 100-h. p. electric hoist and build a railroad Coaldale, the nearest R. R. point.

Reported early in 1917, that mine was to be reopened and that a proc had been found to treat the highly-silicious ore, but nothing known operations since.

LOUISIANA DEVELOPMENT CO. CALIFORN

Letters returned. Probably idle. See description in Vol. XIII.

LUCILE GOLD & COPPER MINING CO. CALIFORN

Letters returned. Probably dead. Mine near Kelso, San Bernar county, Cal

MADERA [illegible] MINES & LAND CO. CALIFORN

[illegible], Calif.

[illegible] A. L. Emberson, sec.-trea

[illegible] close corporation.

[illegible] W Cates mine, 3 mi

[illegible] Vein runs N. [illegible] for a short

is said to have yielded over $108,000 from ore averaging
t was then idle until April, 1913.
t: by 4 tunnels, longest 365', drifts and winzes, totaling
ound workings.
10-stamp, 25-ton mill, built by present owners, air com-
ine. Water from the Fresno river furnishes power, except
n, when a gasoline engine is used; there are 1½ miles of
No returns since 1916.

D MINING CO. **CALIFORNIA**
ut of business. Described in Vol. XIII.

MINING CO. **CALIFORNIA**
Mad Mule mine, formerly known as the Banghart, 5 miles
, in the Shasta mining district.
lly described in U. S. G. S. Bull. 540, pp. 40, 42, 52-54. See
Mineralogist's Report 1915, Mines & Min. Res. of Shasta
o information is available; probably closed, as mine was

CONS. MINING CO. **CALIFORNIA**
dead, as no data is obtainable.
Bakersfield, Kern Co., Calif.
9, 1910, in Minnesota. Cap., $800,000; $1 par; non-assessable;
Annual meeting, 2nd Tuesday in January.
22 claims, 100 acres, 20 miles from the railroad, is said to
old ore in quartz.

COPPER MINING CO. OF MAINE. **CALIFORNIA**
a subsidiary of U. S. Smelting, Ref. & Mng., stopped doing
31, 1917. The properties which it formerly operated were
Jan. 1, 1918, by the U. S. S. R. & M. Co., which see.

A MINE. **CALIFORNIA**
E. N. Fissier, gen. mgr., Placerville, Eldorado county, Calif.
: a gold mine in the Kelsey district, 3½ miles north of Placer-
have an ore shoot 700' long and 20' wide, with a 5' ore band
17 per ton. Vein has a diabase hanging and slate footwall.
tunnel. Equipped with 10-ton Bryant mill and a small con-

lans incorporating a company and operating on a larger scale.

COMMERCIAL & MINING CO. **CALIFORNIA**
043 Mills Bldg., San Francisco, Cal. Owns several mining
ar Mariposa, Mariposa county, Calif.
: the Green Gulch quartz mine, 1 patented claim, in Secs. 12
e Mariposa Grant, 12 miles from Bagby; shows a 3' quartz vein
gold ore.
nent: 300' shaft, and 550' tunnel, total underground workings
Equipped with hoist and compressor. At last accounts was
by lessees.
daloupe quartz mine, Sec. 32, Mariposa Grant, 17 miles from
an 18" vein in granite; worked by lessees.
posa quartz mine, 1 patented claim, in Sec. 23, 16 miles from
rly a large producer, is idle. In 1914 a roasting furnace and
was being built to treat concentrates at the mine.
915, suit was brought against the company by G. W. Langan
involving title to Mt. Bullion property, the Mariposa mine,
ite of Ophir, alleging that company failed to fulfill contract
erties after agreements to this effect had been arranged and
t made.

DREDGING CO. **CALIFORNIA**
L. Ames, Pres., 14 Ashburton Place, Boston, Mass.
operates 3 dredges on the Yuba river, Cal. Paid no divi-
reduced a bonded indebtedness from $600,000 to $150,000.

Late in 1919 it was reported that the State Debris Commission ha joined company from working on the Yuba river on account of the s cumulating.

McALPINE MINES CO. **CALIFO**

Address: Coulterville, Mariposa county, Calif.

Officers: Frank R. Whitcomb, pres, and gen. mgr.; C. L. La and F. S. Ewer, v. p.; Fannie W. McLean, sec.-treas.; with M. C. H directors. W. A. Irwin, supt.

Cap., $1,500,000; shares $1 par; fully paid and non-assessable.

Company was formed by California people to reopen the old Mc mine on the Mother Lode, Tuolumne county, near the line between lumne and Mariposa counties. The mine was a well-known producer 60's.

Property: 120 acres, covers 2,100' on the strike of the Mother including the water rights of Moccasin Creek.

Development: a 650' shaft with 2,000' underground workings, to block out 350,000 tons of $7 ore.

Equipment: includes a 5-drill air compressor. A 200-ton mill w be erected, using flotation.

MELONES MINING CO. **CALIFO**

Office: 131 State St., Boston, Mass. **Mine office:** W. G. Devereux, Melones, Calif.

Officers: W. E. Eustis, pres., Boston; A. H. Eustis, sec-treas.; James Parker, Frank Lyman, W. B. Devereux, T. H. Watkins, W. Ro Peabody and Richard Austin, directors.

Inc. in West Virginia. **Cap.,** $400,000; shares $1 par; nonassess 275,000 issued. Bonds authorized $500,000, $400,000 outstanding. Stat Trust Co., Boston, Mass., transfer agent. Annual meeting, 3rd Wedn in March.

Property: 16 claims, 152 acres, on Carson Hill, has been steadily ated since 1898.

Ore: gold, occurs in a quartz vein in schist with N. W.-S. E. strik a dip of 70° N. E.

Development: by tunnel 5,000' long on 1,100' level. At this po 3-compartment shaft has been sunk in the footwall to 2,550' level. above 1,100' has mostly been extracted. Shrinkage stoping is in vogue w the vein is not too flat. Ore is trammed from mine to mill in 8-ton hauled by a. d. c. 500-volt locomotive.

Equipment: includes double-drum electric hoist, driven by 250-h 2,000-volt induction motor, hoisting at 1,000' per minute; 600-cu. ft. Ing compressor driven by 100-h. p. motor; 1,200-cu. ft. Laidlaw-Dunn-Go compressor; and a 100-h. p. trolley generator in power-house at Two Knight water-wheels partly drive these helped by a 250-h. p. 2,000-volt motor. Mill and other plant driven by water-power, 1,200 being available. Flume and ditch line is 4 miles long.

Mill: 100 stamps, weight 1,050 lbs. each, dropping 7", 102 drops minute, crushing 5 tons ore per stamp through 20-mesh screen; on amalgamation is used; battery pulp concentrated on Wilfley tables; dlings elevated, reclassified and reconcentrated; concentrates to cya plant, capacity 600 to 700 tons per month. Concentrates assay $30 to per ton. All tailings on tables are treated by cyanide. Classification place on the tables. Sand is treated by percolation (cyanide), and slime Dorr counter-current (C. C. D.) plant. Total recovery averages 85%. is shut-down at present owing to high cost of operation.

Mines & Mining Resources of Calaveras Co., Cal. State Mi report, 1915, pp. 93-96.

EXPLORATION CO. **CALIFOR**

New York, and Hobart Bldg., San Francisc location, controlled by Harry Payne Whi

p. Reported that company acquired the Globe mine, Trinity
l of the Gold Point Cons. Mines, Inc., Calif., succeeded by
ines Co., operating at Grass Valley.

INANCE CO. (Western Metals Co.) CALIFORNIA

kers Security Bldg., Los Angeles, Calif. Company in 1915, smelter at Industrial Harbor, Los Angeles, operated anti- alifornia and Nevada and bought ores from the Western d foreign countries. The largest production was made ntimony ochre and stibnite near Wild Rose Spring, on the lescope Peak in the Panamint range, Cal. These deposits years, were too far from transportation to be profitably high price of antimony in 1915 and the completion of a on Searles Lake, 25 miles from the property made their le. The company also worked deposits 30 miles N. E. of nty, Calif.

LTING & REFINING CO. CALIFORNIA

ver St., New York. A subsidiary of the Compania Meta- nd holds title to the Blue Ledge mine in Siskiyou county,

CO. CALIFORNIA

grade, Modoc Co., Cal.
Wrigley, Jr., pres.; Jas. C. Cox, sec.-treas., Kesner Bldg., uyot, v. p. and mgr., Kingman, Ariz., directors.
909, in Arizona. **Cap.**, $1,000,000; all outstanding; shares eeting July 1. Is a close corporation.
acres, patented in High Grade mining district, in the ner of Modoc county.
a vertical quartz vein in rhyolite, with average width of r 150′ in length downward to the 200′ level. The ore in d $23 per ton gross.
by 210 vertical shaft, with 1,800′ of underground work-

ncludes 6x10″ hoist. Steam power is used. In 1915 $23 ore was shipped. Working conditions are bad, due fall and opposition of ranchers and others. District has ubtless remain undeveloped until better feelings prevails k, Oregon, the railroad station for the district, according Modoc company.
f the district, see U. S. G. S. Bull 594, pp. 38-48. Probably est of the High Grade district.

ED MINING & MILLING CO. CALIFORNIA

Central Bldg., Phoenix, Ariz., and Copper King Camp, axter, Cal.
. Lietzow, pres. and mgr.; John Hoeft, v. p. and supt.; -treas., also directors with A. A. Hoeft and R. Muehlmann.
16, in Arizona. **Cap.**, originally $100,000; shares 10c par; reased to $1,000,000, April, 1918; shares, $1 par; 560,000

claims, 2,840 acres, in San Bernardino county, Cal. Gold- ccurs in granite schist.
reported to depth of 360′, by tunnels and shaft.
owns the Gold Star group of claims, 5 miles distant.

X TUNGSTEN MINING CO. CALIFORNIA

I. W. Hellman Bldg., Los Angeles, Cal.
Evans, pres.; H. G. Parsons, sec.-treas.; with C. M. Dun-
P. H. O'Connor, supt.
916, in Nevada. **Cap.**, $250,000; shares $1 par.
ut 140 acres in the Clark Mountain district, San Ber- alif., 12 miles from Roach, Nev., on the Salt Lake Route.

Claims are adjacent to the Mojave Tungsten Co. Wolfram veins said carry 5% tungstic trioxide (WO_3).

Equipment: includes 20-ton mill.

MOJAVE TUNGSTEN CO. CALIFORN

Office: 74 Broadway, New York.

Officers: G. F. Stringer, pres.; J. T. Smith, v. p.; M. A. Fitch, sec.; J. Anyon, treas., with W. W. Cohen, and A. H. Carlisle, directors. F. Naething, supt., in California; N. H. Brown, supt. in Colorado.

Inc. Nov. 23, 1915, in Del. **Cap.**, $1,000,000; par value $2; non-assessal all outstanding. Traded on New York and Boston Curbs. Transfer offic The Corporation Trust Co., Jersey City; American Trust Co., Boston. R istrars: Empire Trust Co., New York; State Street Trust Co., Boston.

Statement issued Aug. 31, 1916 showed a profit of $34,888 for 8 mon

Property: (California) 32 unpatented claims in the Clarke mining trict, San Bernardino county, Calif., 20 miles from Jean, Nev., the shipp point. Tungsten occurs chiefly as wolframite in a quartz vein in gneiss granite. The vein is practically vertical with N. W.-S. E. course.

Development: by 2 main and 5 prospecting shafts, disclosing numer small bodies of high grade wolframite ore. The longest oreshoot so encountered was about 125' long on the 100' level in No. 1 shaft.

Colorado Property: the Bracken group of 6 patented claims, at Boul Falls, Boulder, Colo., containing the well-known Good Friday vein with usual ferberite ore.

Development: by 3 shafts, the Burdette main shaft 350' deep, conne ing with No. 1 tunnel. There are 3 tunnels in the face of the mount Ore in No. 2 has been continuous for a distance of nearly 1,000'. On J uary 1, 1917, the consulting engineer estimated ore containing 330,000 of tungstic acid opened up.

Equipment: includes a small mill on the California property. At Colorado property the Degge-Clarke mill was acquired in May, 1917; was the leading custom mill of the district with a capacity of 1,000 tons tungsten ore monthly.

The Colorado property of its subsidiary the Mohave Boulder Tungst Mining Co., was sold at public auction, June 28, 1918.

In June, 1919, a suit was filed by one of the shareholders against promoters of the stock, claiming that $2,000,000 should be put into the tre ury of the company by the defendants. The complaint alleges that abo three-fourths of the entire stock of the company was issued to the p moters as "promotion stock" at the time of its organization in 1915, and th they listed it on the New York and Boston Curbs, boosting it as high $7.50, also that when the promotion stock was disposed of the brokers wi drew their support and the price dropped to 4 cts. a share.

A "war baby," the result of the boom in tungsten mining.

MONTEZUMA MINING & REDUCTION CORP. CALIFORNI

Address: F. W. Nash, 752 State St., San Diego, Cal.

Officers: F. G. Webb, pres.; F. E. Wallace and F. W. Nash, v. p.'s.; H. Halstead, sec.; W. C. Harlow, treas.; also directors.

Inc. 1917, in Delaware. **Cap.**, $1,000,000; shares $1 par, fully paid a issued.

Property: 13 claims, 260 acres, in Grapevine district, Hot Springs mou tain, San Diego county, Calif. Said to show a vein in granite, carryi gold values.

Development: by about 5,000' of workings to depth of 200'.

Equipment: includes 40 h. p. hoist, 120 h. p. compressor and 100-ton mi

MORNING STAR MINE CALIFORNI

Owned by Curtz Consolidated Mines Co.

MOUNT GAINES GOLD MINING CO. CALIFORNI

Address: Hornitos, Mariposa county, Cal. Said to be financed by L Angeles and Chicago capital.

B. Davidson, pres.; A. L. Irish, v. p.; D. J. Hoge, sec.-
Rutherford and P. B. Ellis, directors; W. J. McCray, mgr.
shares 10c par. The new company has paid for the
ck and given a first mortgage trust deed for $66,000.
acres patented and 300 acres unpatented land in sec. 35,
½ miles E of Hornitos, on the west vein of the Mother
w gold ore.
by 1,350' incline shaft with 11 levels and about 8,000' of
sent the mine is full of water, but old records are said
assaying $7 per ton.
ncludes electric hoist, air compressor and 20-stamp mill
n and concentration tables. Electric power is obtained
quin Power & Light Co.
idle from 1910, until new company came into possession
Reported to have added a 100-h. p. electric hoist and
l, preparatory to starting operations.

PPER CO., LTD. **CALIFORNIA**

dress: 3 Lombard St., London, E. C., England. Operat-
e St., San Francisco, Calif. **Mine office:** Keswick, Shasta
rks office: Martinez, Contra Costa county, Calif.
jor F. B. Lawson, chairman; Henry J. Wenham, J. T.
McCarthy and A. N. Frewer; Wm. F. Kett, gen. mgr.; M.
upt.; T. B. Swift, smelter supt.; Jardine, Matheson & Co.,
ve., New York, American sales agents.
96, in Great Britain, and reorganized May 10, 1902. **Cap.,**
£1 par. In 1899 the company changed its capitaliza-
in shares and £1,000,000 in 6% in debenture stock;
which a first payment of £1 per share was made Jan. 16,
,000 of stock outstanding. The change in 1899 was prac-
amortization. A further refund of 10s per share was
ing the outstanding, as at Jan. 1, 1919, £625,000.
fore reconstruction, 1897-1901, aggregated 58½%. No
l until debentures are paid off.
£150,255 in 1907; £28,115 in 1908; £24,557 in 1909;
2 in 1910; profit of £55,069 in 1911; £81,686 in 1912;
£35,562 in 1914; £106,365 in 1915; £232,106 in 1916;

xtensive, including the Iron Mountain and Hornet mines,
Redding. The Iron Mountain mine was opened, 1880, for
0-stamp mill, treating the gossan in a small way for some

ntain mine had a gossan of 100' to 300' width, covering
to 400' wide, 800' long and 500' deep, in a shear zone of
e ore carries chalcopyrite associated with pyrite, averag-
per, 2 oz. silver and slightly under $1 gold per ton. The
ed pillar-and-stall, and stopes filled with waste, but pillars
and the mine now shows little high-grade suphide ore.
eing pyrite, there was trouble from fires, but the applica-
n system of ventilation, by Mr. Wright, restored normal
derable cement copper was secured from the charged
m the fire zone.
No. 8 mine at end of 1918 were 300,000 tons.
nine, lying to the north of the Iron Mountain, developed
s of pyrite ore, averaging only about 1% in copper tenor,
2.5% copper, and carrying 47 to 50% sulphur. Gold and
very small, but the ore is valuable for the manufacture of
ving the copper and precious metals as by-products. A
his ore is sold around San Francisco Bay, and a description
d screening plant that prepares the pyrite for market will
ining and Scientific Press of Nov. 1, 1919, by L. C. White.

The mines are connected with Keswick by an 11-mile narrow-ga steam railway, traversing a rugged country, with an average grade of nea 4%, the elevation gained being 2,000'.

Since Sept., 1917, company has been treating an average of 500 tons da in its flotation mill. Including mill concentrates, pyrites from the Hor mines and other ores, about 20,000 tons a month are shipped from the mi to the Martinez smelter.

Employs about 500 men in Shasta county, and 200 at the smelter Contra Costa county.

The Keswick smelter, fully described in Vol. VIII, Copper Handbo has been dismantled. The 250-ton oil flotation mill started operating March, 1915, and was enlarged to 550-ton capacity in 1917. It is locate miles from Iron Mountain on the narrow-gauge railway. A complete scription is in the Mining and Scientific Press of Sept. 6, 1919.

The 350-ton Martinez smelter, on San Francisco bay, has extensive a works built at a cost of approximately $1,250,000. The Hornet ores, h in copper but rich in sulphur, are burned, the sulphur fumes collected lead-lined chambers and transformed into sulphuric acid by the Mey chamber process, the cinder remaining after the roasting is smelted its copper contents. The acid is sold crude and also is used as the basis commercial fertilizers for which there is a considerable demand in the ri fruit and agricultural districts of California and the other Pacific coast stat The Martinez works also do a general custom business and are fully equipp with steam, electric and pneumatic power.

A 150-ton leaching plant was added to the smelter in 1917, and is su cessfully extracting copper from the cinders remaining after the sulph is burned from the Hornet sulphide in the manufacture of sulphuric ac

Production: Jan., 1919, was at the rate of 650 tons daily from the min at Iron Mountain, and 500 tons daily from the Hornet. At one time, on a decade ago, this company was among the largest copper producers of t world, but has since greatly declined in output, production having be 29,727,040 lb. fine copper in 1901; 19,116,160 lb. in 1903; 6,814,000 lb. 1907; 3,638,619 lb. in 1908; 2,775,197 lb. in 1909; 2,987,815 lb. in 1910; 5,400,0 lb. in 1911; 5,614,000 lb. in 1912; 6,890,000 lb. in 1913; 5,454,000 lb. in 191 7,280,712 lb. in 1915; 9,172,390 lb. in 1916; 8,122,325 lb. in 1917, and 6,802,6 lb. in 1918. In Aug., 1919, the company stood at the head of Shasta coun copper producers as the result of increased output and idleness of the Ke nett smelter of the Mammoth Copper Co.

Company has been managed with great prudence and marked succe both financially and technically and notwithstanding the depletion of originally rich mine, has been able to make a success by the treatment of lo grade pyrite ores, with the manufacture of acid.

MOUNTAIN KING MINING CO. CALIFORNI

Office: 244 Kearny St., San Francisco.

Officers: Anthony McMillan, pres. and managing director; A. T. Do bar, v. p.; J. C. Fitzsimmons, v. p.; Jas. S. Spilman, sec.-treas.; with H. Harper, R. W. VanNorden, C. G. Campbell, and John Watt, director Arthur Hillier, supt., Mountain King, Mariposa county, Cal.

Cap., $600,000; $1 par; assessable, 598,340 issued. Annual report f year ending March 31, 1919, shows total receipts of $145,267 of which amou $123,764 was from bullion. Disbursements were $126,638, leaving a ca balance of $18,629. Initial dividend of $17,950 paid May 31, 1916, equal 3c per share.

Property: 19 claims, patented, on the north fork of the Merced riv on the Yosemite Valley R. R., in Coulterville, Mariposa county.

Geology: the Mountain King quartz vein is in slate and greenstone, si carries gold and silver in iron pyrite and tetrahedrite.

Development: by 450' [illegible] at 55° incline; also 2,645' tunnel, whi

The 1,700′ level is being developed and company intends
evel.
ng operations were mainly on the 1,100, 1,200 and 1,400′
ie ore coming from the 1,400′ level. It has been found
the ore are not evenly distributed, that there exist zones
ich alternate with areas of lower gold content, that there
vement as depth is gained. New work for the year totaled

ıcludes air-compressor, hydro-electric plant, built in 1915,
p mill with concentrator. Power plant has one 350-kva.
generator direct connected to a turbine running at 600
ound haulage is by electric trolley locomotive.
'ears ending March 31:

re	Value		Recovered		Cost per Ton	
d	per ton	Amal.	Conc.	Total	Op't'g.	M'l'g.
8	$5.63	78.9%	13.1%	92.0%	$5.168	$0.488
0	4.59	64.5	26.6	91.1	5.538	0.462
6	3.09	53.2	35.1	83.3	3.646	0.331

perating a mine with good equipment and capable man-

ONARCH GOLD MINING CO. **CALIFORNIA**

d. A Shasta county promotion. See Vol. XII.

R MINES CONSOLIDATED **CALIFORNIA**

. J. Sloat, 240 N. 7th St., Hamilton, Ohio.
l Searles, pres.; Carrol Searles, sec.; F. J. J. Sloat, treas.;
nd, Ed. Schmidt and Peter Bender, directors.
00; shares $13 par. Capital reduced from $3,750,000, and
completed since.
claims, 3 patented, next to the Champion mine, in Nevada
ada county, Calif. Claims contain a gold vein in grano-
ıveraging $11 per ton.
: by 1,200′ incline shaft and 2,000′ tunnel with total work-
depth of 1,200′. Ore reserves estimated, but not blocked
ıs. Mine worked by lessees at last accounts.
9, Peter Bender of San Jose, Calif., who had loaned the
ms of money, and held a mortgage on the mine, bid in the
,475. Mine has had a checkered career as a gold producer.

INING CO. **CALIFORNIA**

D. Adams, Milton, Calaveras county, Cal. D. E. Cougha-

e Napoleon copper mine, 10 miles S. W. of Copperopolis,
ır lease by the above. The ore is mainly chalcopyrite, oc-
aped masses up to 20′ in width.
: 500′ shaft which is only unwatered to 200′.
in 1918 a new hoist was added, also 2 Diesel engines to
ıambers ball-mill, and an M. S. flotation unit, planned to
daily.
as operated as early as 1881, and is credited with a past
,200,000 in copper and gold.

PER CO. **CALIFORNIA**

d from 339 Bush St., San Francisco. A caretaker is at the
Angels, Calif.
patented claims, 40 acres, and 1,560 acres of agricultural
orth of Copperopolis, Calaveras county, Calif., covering a
on the lode. Ore occurs in lenses and streaks as copper
gold, silver and zinc in a 10′ vein running N. 35° W. and

by 200′ shaft with 1,000′ of drifting N. and S. on the
of drifting N. and S. on the 200′ level. Ore was shipped

to the Selby smelter from Angels, 9 miles distant. Shipments averag 17.90% zinc, 5.22% copper, 4.60 oz. silver, 0.20 oz. gold, 11.90% iro 39% silica.

The complex character of the ore and consequent low returns, coupl with litigation have led to a shut-down, and the mine is closed, save f keeping water down. The mine-water is run through troughs containi scrap iron to recover copper-content. Property is reported to have po sibilities.

NATIONAL GOLD MINES CALIFORNI

Address: Jesse Mangante and William Trenton, Sonora, Cal.

Property: the National quartz mine near Priest station, Tuolum county, opened by a tunnel and shaft. A hoist, 10-stamp mill, and oth equipment were to be erected late in 1919.

NATIVE COPPER MINING CO. CALIFORNI

Inc. in 1911, to develop the Copper King, Native Copper and oth claims on Table mountain, Monterey county, Calif. W. H. Kerr, Coalin Calif., pres., at last report.

NATOMAS COMPANY OF CALIFORNIA CALIFORNI

Officers: P. C. Knapp, sec., 310 Sansome St., San Francisco; L. Hopfield in charge of dredges at Natoma.

Officers: F. B. Anderson, pres.; Louis Sloss, v. p.; John D. McK treas., with P. T. Morgan, J. D. McKee, Leon Schloss, W. M. Newhall, G. Webber, H. Fleishhacker, F. W. Griffin, all of San Francisco, and F. Kiesel, of Sacramento, directors. Emery Oliver, gen. mgr.

Inc. Dec. 24, 1914, in California. **Cap.,** $25,000,000; shares $100 pa non-assessable; $16,104,000 issued. Bonds authorized: $16,500,000; $10 282,665 issued.

Balance sheet for 1918 shows gross earnings of $2,008,966, and n earnings of $749,119 compared with 1917 figures of $2,303,000 and $1,099,3 respectively. Properties are valued at $16,061,896.

The financial statement: To present briefly the operations for 1918 is i possible, owing to the complexities of the land business, but the followi gives an idea of the position; the report being mainly a restrospect or sum mary of operations since the reorganization:

Indebtedness at end of 1914, exclusive of bonds, interest, and stock of Natomas Consolidated	$3,698,7
Indebtedness at end of 1918	460,5
Mortgage and bonded debt	10,860,8
Current liabilities	200,6
Capital assets	16,061,8
Securities at end of 1918	1,074,1
Current assets ($367,315 cash)	1,439,7
Total of last two items	$2,533,8

Company is a reconstruction of Natomas Consolidated of Californ whose history is long and complicated. Past troubles have been due t incorrect estimates of value and amounts of dredging ground, the l reclamation project, and because the large profits of dredges were larg absorbed by bond interest. These burdens are gradually being lifted b a careful management.

Property: over 15,000 acres of mining lands, near Folsom, Sacram county, and near Oroville, Butte county, Calif.; and about 70,000 acres farm lands in Sacramento county.

Equipment: includes 10 large, modern, electrically-driven dredges, 2 large rock crushing plants. Improvements in machinery and gold-sa apparatus are continually being made, also in leaving the dredged ar suitable for agriculture.

Production: during 1918 [illegible] 24,172,626 cu. yd., recover gold worth $2,009,0[illegible]. In five years the [illegible] All of the dredg

d in paying bond interest. In 1915 it was estimated that 000 cu. yd. of pay-gravel, but additions have been made, 00,000 yd. of the original area have been dredged, there still available, plus 40,000,000 yd. if pre-war costs pre- ound is reached. The apparatus placed on the boats to recovered $107,000 net, most of which would have been us methods. Four boats must be reconstructed during s so as to complete the dredging operations.

g: in five years, the plant at Fair Oaks produced 1,733,944 ock, 198,944 tons of washed gravel, and 275,724 tons of nd the plant at Oroville 451,364 tons of crushed rock, and reened gravel. The crusher products and field gravel are he State.

nent: reclamation work has cost $4,480,500 to date, inclu- nterest, etc. In district No. 1000, there have been sold 2,889,446; and in No. 1001, 1292 acres for $343,537. All of are being irrigated, provided with roads, and generally

vere operating its dredges alone, good dividends could be ie land project is self-sustaining there can be no distri- See Addenda for later information.

N CO., INC. **CALIFORNIA**

ting subsidiary of the Quicksilver Investment Co., Inc., r lease on the entire holdings of the Quicksilver mining e New Almaden mines.

working the New Almaden mine, save to clean up old mining quicksilver ore from the Senator mine, nearby—See ng Co. for owners of property, for discription.

UPE MINING CO. **CALIFORNIA**

pres.; R. F. D. No. 5, Los Gatos, Calif. John L. Stubbs,

00 acres including the Guadalupe quicksilver mine, 10 miles was discovered in the early 50's. Operated at one time entury Mining Co.

t: 700' incline shaft, tunnels, and many miles of workings. 740' long, 55' wide, 9' high was built in 1917 to carry the mine beneath, so that the old 625' vertical shaft could

includes electric hoists, air-compressors, and a reduction 18-ton coarse-ore furnaces, and two 30-ton fine-ore fur- ton concentrating plant to handle material from old mine company employed 75 men.

total recorded output to 1919 about 106,772 flasks of quick- e yield was close to 1,000, but in 1919 only 200 flasks.

ver Resources of California. Bull. 78, p. 158, published by Bureau.

UICKSILVER MINING CO. **CALIFORNIA**

ilby St., Boston, Mass.

drew Adie, pres.; H. C. Buckminster, sec.-treas., and gen. Sterns, F. Rothschild, Sydney Harwood, C. B. Wiggin, J. Jas. D. Colt, directors; H. W. Gould, mgr.

Wyoming. Cap., $500,000; shares $5 par; all issued. Stock Stock Exchange. State Street Trust Co., transfer agents, Co., Boston, registrar. Annual meeting, third Wednes- at Cheyenne, Wyo. Company has been a dividend payer otal disbursements to date of $24.30 per share, or $2,430,000.

Comparative Balance Sheet:

Assets:

	Plant	Deprec.	Supplies	Cash	Quicksil
1918	$704,877	.....	.....	$17,869	$305,98
1917	571,085	.....	.....	33,311	234,00
1916	186,471	$302,718	$55,737	9,575	200,00
1915	234,979	254,209	19,482	24,448	98,85
1914	258,170	231,019	20,651	6,823	73,20

Liabilities:

	Capital Stock	Accts. and Notes Payable	Profit and Loss	Sell. Agents	Tax Reserve	Dep. Reserve	Tota
1918	$500,000	$157,203	.....	.....	$60,991	$3,930,755	$4,729,
1917	500,000	237,713	.....	.....	99,481	3,823,814	4,560,
1916	500,000	37,284	$118,128	$99,089	.....	.....	754,
1915	500,000	33,078	98,892	.....	.....	.....	631,
1914	500,000	.....	89,863	.....	.....	.....	589,

Income in 1918 was $1,311,394 from quicksilver sold. Operating penses, depreciation, and depletion totaled $1,101,205. In 1917, paid dividends, totalling $3; in 1918, four of 50c each; Jan. 1, 1919, 25c was p and the next one, due April 1, was passed.

Property: the new Idria and San Carlos mines at Idria, San Be county, Calif.

Operating results:	Flasks Quicksilver	Net Earnings	Cost per Flask	Aver Pri
1918	10,700	$167,540	.....	
1917	11,000	207,762	.....	†$10
1916	10,828	419,236	$47.50*	8
1915	6,250	159,028	55.50	7
1914	6,550	Loss 45,010	52.	4
1913	9,700	65,012	30.	3
1912	9,600	73,763	31.60	4
1911	9,750	136,809	26.50	4
1910	10,800	186,939	26.	4
1909	8,900	109,639	27.50	4
1908	9,600	147,289	25.50	4
1907	7,675	89,650	25.50	4

* Includes cost of erecting new mill and aerial-tram, $70,000, or $6.40 per flask. †On government requisitions; average price in open ket was about $125.

A large amount of construction work was done in 1918; 5 rotary furnaces were added with total roasting capacity of 400 to 500 tons per This was done upon practical request of War Industries Board stated that 1919 requirements would be largely in excess of those for In spring of 1919 mines were idle for several months, but reopened in The management at New Idria is progressive, and leads in metall of quicksilver.

NEW PROVIDENCE GOLD MINING CO. CALIFOR

Office: 2041 Emerson St., Berkeley, Cal. John D. Hammond, sec

Property: 5 claims, 90 acres, including the Providence and Co about 2½ miles S. E. of Tuolumne county, Calif., said to show 2 veins, 5' wide, in black Calaveras slate, running N. 8° E., with dip Ore is gold with galena and 2% pyrite.

Development: by 4 [illegible] shaft with levels every 100'.

Equipment: [illegible] Product is a gold-silver train said to run better than $ [illegible] Mond 12 men used to be employed. No recent returns.

K MINING CO. **CALIFORNIA**

Post St., San Francisco, Cal. **Mine office:** Forest, Sierra

Lewis Tasheira, pres.; W. C. Wallace, sec.; Geo. F. Stone,

the North Fork mine and adjoining properties, in Alleghany orest, shows a quartz vein 4′ to 20′ wide with occasional lenses ng arsenical sulphides and free gold.

ent: 700′ tunnel and 300′ incline shaft, lowest workings 265′

R MINES CO. **CALIFORNIA**

William St., New York; 15 Exchange Place, Jersey City, N. ey, Calif.

Geo. B. Agnew, pres.; Sidney M. Colgate, v. p.; with C. E. Douglas, and Ernest Howe, directors; W. D. Pagan, sec.-oote, gen. supt.

10, 1899, in New Jersey. **Cap.**, $5,000,000; shares $10 par; tanding. Stock is listed on Boston Exchange. New York Colony Trust Co., Boston, transfer agents. Central Trust , registrar. Annual meeting, 2nd Wednesday in April.

count for 1918, exclusive of balance of $989,408 carried for-otal production North Star mine, $775,688; production Cham-,108; interest and dividends, $36,331; total, $1,083,128.

res: total operating expenses, $1,021,888; dividends absorbed ovement and property purchase, $32,759; total $1,121,888.

eet:

	Plant and			
perty	Improvm'ts.	Current	Deficit	Total
1,955	$369,974	$950,648	$187,423	$2,450,000

	Stock	(Distribution of Capital Assets)		Total
	Capital	Less Div. 55		
.....	$2,500,000	$50,000		$2,450,000

2% in 1899; 5% in 1903; 6% in 1904; 8% in 1905; 10% in 15% in 1908; 23% in 1909 and 1910; 17% in 1911; 12% in 1912 in 1914; 10% in 1915; 12% in 1916; 10% in 1917; 4% in 1918. s paid in 1919. Total dividends, to date, $5,562,040.

the North Star mine, 1½ miles S. of Grass Valley, and the e, at Nevada City, Nevada county, Calif.

Star, the main producer of the group, was discovered 1851 continuously to date, with exception of 10 years, 1874-1884, ginal locators and later by the North Star Quartz, the North ing Co., and the North Star Mining Co. It is the second oducer in the State.

re carries gold and silver in a quartz gangue, the precious g free or associated with pyrite, galena, and sphalerite. The aximum width of 5′, with ore shoots averaging 400′ to 600′ d for over 2,000′ in depth.

nt: at the North Star mine, most of the ore in 1918 came 4,000, 4,400, 4,700 and 5,000 ft. levels. Conditions are favor-level where X vein has been opened for 1,000′. The mill ons of $7.79 ore from this mine with an extraction of 94%; re mined and milled, $7.29. The prospects for developing rces in the North Star mine are considered favorable, on ,000′ level, and on the 6,300′ level.

ion mine produced 41,300 tons of $6.56 ore, mainly from levels of the Providence mine and for the first time showed t $9,000. This mine has thus far been disappointing and it ook is not encouraging.

Milling plants: company now operates 2 mills, sixty 1,500-l for the North Star mine, and forty 1,000-lb. stamps for the C Ore is hoisted at the Central shaft of the North Star mine in 4- dumping into bins over 1½" grizzlies. The coarse from the griz into a bin separate from the fines and thence over two sorting two 14x14" Wheeling crushers. As it passes over the sorting ta washed and the waste sorted by hand; 7 men picking out 70 tons a day. Bins at shaft have capacity of 500 tons of ore and 10 waste. Ore is hauled to mill in 2½-ton side dump cars by 5½-to locomotive. Mill bins have a capacity of 1,000 tons. Each ten mill are belted to a 35-h. p. back-geared motor. Pulp flows ov 3'x16' copper plates, thence to 7 Richards pulsator classifiers 5' cones. Overflow (slime) to cyanide; underflow to 7 double-dec concentrators. Middlings from concentrators to single-deck con concentrates to 5'x10' tube-mill, tailings to twelve 100-ton leac for cyanidation. Ground concentrates from tube-mill over ama plate to thickeners to 3 Devereaux agitators, slime overflows from to Dorr thickeners, thence to Pachuca agitators and Oliver filte centrate tailings after treatment in Devereaux agitators are added Merrill presses used for precipitation.

Production: total to the end of 1918 was 1,898,584 tons, averag per ton, yielding $21,780,034. In 1918 the yield was 99,550 tons ore from the North Star, and 41,300 tons of $6.56 from the Champio were $7.29 per ton, compared with $5.20 in 1913. The average 1884 was $7.77 per ton.

NYMAN CONSOLIDATED MINES CO. CALI

Office: 502 Humboldt Bank Bldg., San Francisco, Cal. Mi Stent, Tuolumne county, Calif.

Officers: A. L. Trowbridge, pres.; R. W. Barrett, v. p.; W. C sec.-treas.; with C. P. Cutten and F. G. Mudgett, directors; F bourne, supt.

Inc. March 19, 1915, in California. **Cap.**, $200,000; $1 par; a 161,586 shares issued.

Gross earnings from July, 1915, to March, 1917, were $51,086, of operation and maintenance, $53,614. Cash assets at end of A were $8,791.

Property: 5 patented claims, 240 acres, on the Mother Lode Quartz and Stent, 2 miles S. of Jamestown, adjoining the Dutc north and Cloudman-Jumper group on the south.

Geology: claims show a contact zone between amphibolite greenstone. Three vein systems have been opened. The Wes is 20 to 90' wide, showing at N. end of Nyman claim; the Heslop is 50' long, with $5 to $10 ore across 7'; the Knox & Boyle show of higher grade ore on the 700' and 800' levels. The Mascot sho of high grade ore in Calaveras slate hanging wall.

Production: in 20 months ended March 31, 1917, 8,550 ton $51,000 of gold. Mill recovery was 85 to 90% by amalgamation an tration. Output to date is $2,000,000. Costs with full equipment mated at between $2.50 and $3 per ton.

Development: by 15,000' of underground workings, consistin tunnel, 850' vertical shaft and 2 incline shafts, one 825' and the deep, both dipping 60° E., with levels 100' and 200' apart. Drifts started on $6 ore N. and S. of old crosscuts that apparently had sampled years ago.

Equipment: includes 2,000' double-drum hoist, 750 cu. ft. air co pumps, electric power; 200-ton 40-stamp mill, with Frue vanne stamps and 22 buildings. No recent information.

OCEANIC QUICKSILVER MINE CALI

Murray Innes, owner, 217 Kohl Bldg., San Francisco, Ca

nbria, San Luis Obispo county, Calif.; Thos. Knowles,

ıtented claims, 500 acres, about 5 miles E. of Cambria,
eposit 800'x650'x20' in width running N. W., with nearly
erpentine and sandstone formation. The ore contains
sulphide, assaying 0.4% quicksilver.
to depth of 650' by 300' vertical winze and 1,500' tunnel.
cings total 5,000'.
estimated by owner at 300,000 tons with 150,000 tons
1, 1917.
ıcludes 25 h. p. hoist, compressor, pump, ½-mile wire
50-ton furnaces.
tion: 1,125 flasks in 1913; 1,256 flasks in 1914; 1,213 flasks
s in 1916; June-July, 1917, at rate of 150 flasks monthly.
s were sold for $100 per flask.

MINING CO. **CALIFORNIA**

C. H. Bryson, pres., Los Angeles. Theodore Martin, sec.,
s Angeles, Calif.
close corporation owning the Cowboy mine near Caliente,
ıe worked 1919 under bond and lease by Walter X. Os-
6 men. A 5-ton cyanide plant is in operation and ore
made. Ore is said to assay about 140 oz. silver, and $12
re is said to be a considerable tonnage of 20 oz. silver ore.

MINING CO. **CALIFORNIA**

adway, New York City. Mine at Sutter Creek, Amador

D. Thornton, New York, pres.; G. E. Tener, Pittsburgh,
sec.-treas; T. C. Gorrie, gen. mgr.
Delaware. **Cap.,** $3,000,000; shares $10 par; 100,000 issued,
ginally owned by Hetty Green, was purchased in 1916
Cons. Mng. Co. Is credited with past production of $20,000,-
s a depth of 2,063'. In February, 1916, large trees were grow-
, and water was flowing from the collar.
the property, see Mining and Scientific Press, Vol. 112,
runs N. W., dips 71° E. and has a 700' ore shoot.
nwatered in 1917, after a shut-down of over 40 years. The
larged from a one to 3-compartment shaft below the 1,600'
nk 1,000' deeper, with a station cut on 3,000' level. Large
ade ore have been found in the 1,200, 1,600 and 2,100' levels.
a contract was let to sink 550' below the 3,000' level at $29
ng continues at 2,100 and 3,000' depth.
odern sinking pumps, 300-h. p. electric hoist, Ingersoll
cessary buildings.
ıe and expensive project to reopen an old gold producer, the
he continuity of the Mother Lode ore-channels, and the eco-
afforded by power, water and climate in handling them. The
d highly profitable, so probably will the Old Eureka.

IINE **CALIFORNIA**

ı Bernardino county, 12 miles south of Daggett, shows a series
to be traceable 3 miles across country, with widths in places
opper ore and good gold values. Gangue is heavy in barite,
centration impossible. New York capitalists are said to have
perty on a development basis, no payments for a year, but
work per month in 1919.

LD MINING CO. **CALIFORNIA**

York Office, 734 Fifth Ave. **Mine office:** Alleghany,
if.
Oriental mine, on Kanaka creek, about 1½ miles W. of
quartz veins in granite and schist, with strike N. 70°
. The ore contains pyrite, arsenopyrite and gold.

Development: by tunnel 4,150′ long and several crosscuts.

Equipment: includes 10-stamp mill with two 6′ Frue vanners. Prope was idle for several years, but lease was acquired by the Croesus Gold & M. Co. several years ago and some development work was done. T lease has since been cancelled and property closed down.

ORIGINAL AMADOR CONSOLIDATED MINES CO. CALIFORN

Company dissolved: described in Vol. XIII. See also Amador Mi Company.

ORIGINAL MINING & MILLING CO. CALIFORN

Office: Merced, Merced county, Calif.

Property: the Original Quartz mine, 4 unpatented claims, in Maripo county, in Sec. 21, T. 3 S., R. 19 E., said to carry a 2′ vein, with slate han ing and footwall.

Development: by 800′ shaft and several thousand feet of workings.

Equipment: includes compressor, electric hoist, machine-drills, 10-sta mill and several buildings. Employed 40 men in 1917, and was working co tinuously in 1919.

ORO BELLE CONS. MINES CO. CALIFORN

Address: W. B. Andrews, 402 Palladio Bldg., Duluth, Minn.

Officers: W. B. Andrews, pres.-treas.-mgr.; C. Wilson, sec.; with Th A. Merritt and Stella Andrews, directors.

Inc. 1916, in Nevada. **Cap.,** $1,250,000; $1 par; 625,000 issued; 500,0 reported to have been given for the property, 1,000 shares issued to rectors and incorporators and balance under option until Oct., 1918, John Hays Hammond and associates, of New York.

Property: the Oro Belle mine and millsite, in Hart mining district, S Bernardino county, Cal., about 14 miles W. of Searchlight, Nev. Or mainly gold, occurs in two veins. On the 700′ level the vein is said to be wide and to carry 4′ of ore averaging $8 per ton. The Woodward lode w cut on the 100′ level, showing a width of 125′ and giving assays of from to $20.

Development: by 814′ vertical main working shaft with levels at eve 100′, a total of 2,700′ of lateral work.

In 1915, the Oro Belle was under lease to the Tonopah Belmont D velopment Co., but option was relinquished within the year; mine idle present.

ORO BELLE MINES CO. CALIFORNI

Reorganized, 1917, as Oro Belle Cons. Mines Co., which see. Sto exchangeable on basis of 2 old shares for 1 of the new.

ORO FINO MINING CO. CALIFORNI

Address: East Auburn, Cal.

Officers: Wm. L. Curtis, pres.; Geo. H. Hyde, v. p.; Haines Gridle sec.-treas.-mgr.

Inc. Aug. 29, 1913, in California. **Cap.,** $200,000; shares $1 par; 196,8 outstanding. Annual meeting, 2nd Monday in March.

Dividends: at rate of 12% yearly started Dec. 20, 1916. Paid to 191 $11,722.

Property: the Bellevue & Bullion mines, 13 claims, 8 patented, 95 acre in Ophir Mining district, Ophir, Placer county. Shows a fissure vein, 1′ wide, running E.-W., with dip of 75°, between schist hanging-wall a grano-diorite footwall. Ore is quartz with some sulphides, assaying fr $7-$10 per ton in gold and silver.

Development: by 600′ vertical shaft, with a total of 6,800′ underg workings. Management estimated 36,000 tons of ore blocked out, Jan.

Equipment: includes 50 h. p. electric hoist, compressor, 3 electric pu and 10-stamp forty-ton mill. Mill started operating in Oct., 191

Production: gross in 1918, yielded $69,176.

OROVILLE DREDGING, LTD. CALIFORN

Controlled by Oroville Dredging Co. Ltd., of England. Henry

alisbury House, London Wall, London, E. C. 2, Eng. Di- Baker, chairman; John A. Agnew, F. D. Behrend, Lord S. Elmore and H. C. Porter. W. A. Prichard, cons. engr. lso controls Pato Mines and Nechi Mines, Ltd., Colombia,

ka Commercial Bldg., San Francisco, Cal.
, 1905, in Maine. **Cap.**, $3,500,000; $5 par; 686,531 issued.
American company for year ended Sept. 30, 1918, shows s of $25,908, compared with $206,537 the previous year. Re- ctions show a loss of $19,185, compared with a profit of vious year.
2½% in 1905, 10% in 1906, 7½% in 1907, 10% in 1908, 7½% rom 1910 to 1913, on account of expenditure on English erty in Colombia, 5% in 1913-14, 7½% in 1914-15, 10% in % in 1916-17. In 1917-18 four dividends, Nos. 27 to 30, ng $354,202.
,500 acres of placer ground along the Feather river, near county, Cal.
at present includes 2 dredges. Company maintains repair le.
during year ended Sept. 30, 1918, 2,433,161 cu. yd. excavated s. per cu. yd., with a net revenue of 0.55 cents. In 1917, yielded 8.15 cts. per yard, at cost of 4.58 cents.
er dredging companies at Oroville, this one has been near- ome time, and is now being liquidated.

ST GOLD MINES CORP. **CALIFORNIA**

4 Crocker Bldg., San Francisco.
J. Loring, pres. and mgr.; John F. Davis, v. p.; C. H. Bees- with M. E. Loring and J. S. Wallace, directors. Phil. uartz, Tuolumne county, Cal.
1917, in California. **Cap.**, $1,500,000; par $1.
he Dutch mine, formerly owned by the Dutch Cons. Gold Dutch Sweeney Mining Co., 70 acres, and the App. Heslep groups. Claims are on the Mother Lode and carry gold Dutch claim the vein splits into 2 veins about 75′ apart; irregular, breaking up into stringers running in all direc- west vein is more regular. General course of veins is N. of 65° N. E. Both walls are of Calaveras slate.
t: by incline shafts. Main working shaft, 2,250′ is sunk on levels to the 1,200′ level at 100′ intervals, remaining levels s. On the 1,650′ level the orebody has an average width

includes 150 h. p. double-drum electric hoist, one 450 cu. ft. 1,000 cu. ft. Rand duplex air-compressor. Water is pumped l by a Deane triplex pump. Mill employs 40 stamps, and ravity concentration and flotation.

P MINE **CALIFORNIA**

H. Sexton, Placerville, Eldorado county, Cal.
drift-gravel mine 17 miles E. of Placerville, sold in Septem- ove by J. H. Zimmerman. In October, a dozen men were -compressor, smithy, change-house, etc. A 1,300′ crosscut r than the old 900′ tunnel, is to be driven.

ES CORPORATION **CALIFORNIA**

Broadway, New York, N. Y. **Mine office:** Stagg, San Ber- Cal.
[illegible] Beckley, pres.; David I. Walsh, v. p.; J. H. Hobbs, sec.- [illegible] and sec.-treas.; above, with Jas. M. Curley, Col. Sir [illegible] and D. C. MacDonald, directors; Frank W. Royer, mgr. [illegible] York. **Cap.**, $1,000,000; shares $5 par; reincorporated

May 2, 1916, in Maine. Cap., $1,000,000; shares $1 par; 642,000 shares issued; 300,000 shares treasury stock offered to the public, 1916.

International Trust Co., Boston, and U. S. Corporation Co., New York, transfer agents; Federal Trust Co., Boston, and U. S. Corporation Co., New York, registrars. Company is a consolidation of the Bagdad Chase Gold Mining Co. and the Roosevelt Mining & Milling Co. **Dividends:** to end of 1912, $205,440. Last payment of 2% paid July, 1916. Listed for 642,000 shares on New York and Boston Curbs.

Property: 15 claims, patented, about 300 acres, in Bullion Mountain district, 9 miles from Ludlow. Country rock is trachyte porphyry and quartz monzonite. Orebodies occur in a silicified breccia along an E.-W. fault line, and have an average dip of about 35° N. Ores carry malachite and oxide with a little chalcocite and average 1.5% copper, 1.56 oz. silver and 0.36 oz. gold per ton.

Development: by about 8,000′ of workings, including three shafts, deepest 300′, and several tunnels. **Ore reserves:** estimated at 100,000 tons of $10 ore and 200,000 tons of $5 ore, according to report of F. W. Royer.

Equipment: includes an 85 h. p. Union gas engine, 3 hoists and a 10-drill compressor. Company also owns the Ludlow and Southern 9-mile standard-gauge railroad, with 2 locomotives. A concentrator was finished in 1918.

Production: to end of 1915 is estimated at $3,000,000. Production in 1914, 1915 and 1916 was about 100 tons per day. No production reported since.

PACIFIC GOLD MINING & MILLING CO. — CALIFORNIA

Office: 1120 Investment Bldg., Los Angeles, Cal. **Mine office:** Mokelumne Hill, Calaveras Co.

Officers: Max Muller, pres.; W. H. Rocholl, v. p.; Walter Wessels, sec.-treas.; A. M. Howat, mgr.

Inc. August, 1917, in California. **Cap.,** $1,000,000; issued 995,000 shares. Par $1; assessable. Annual meeting, February.

Property: 420 acres, 1 mile E. of Mokelumne Hill, Calaveras county, shows a quartz vein in diorite worked by 315′ shaft, 300′ tunnel and 4,000′ underground workings. Shoots vary from 6′ to 20′ wide, 60′ to 150′ long, and average 0.30 oz. gold, trace silver, 5% iron pyrite. Mining is by square sets and shrinkage stopes. Ore reserves reported at 30,000 tons. A 125-ton concentrator produces concentrate stated to assay 3½ ozs. gold per ton, extraction averaging 86.7%.

Equipment: besides mill, 30 h. p. hoist, electric compressor, etc.

In 1918, company received $40,908.40 from sale of concentrate. Ore treated 1917, 10,000 tons; 1918, 11,100 tons.

PARADISE MINE — CALIFORNIA

Address: R. Randolph Bruce, mgr.

Property: 5 claims on Spring creek, about 20 miles N. of Barstow, said to have an orebody, proved for 1,000′ in length, carrying carbonate and sulphide of lead, with iron oxide, in a gangue of silicious lime. The mine was idle from 1903-16.

The property is credited with production of 2,000 tons ore to 1904, that averaged 51.4 oz. silver and 59% lead. Shipments from Oct. 1, 1916, to Jan. 31, 1917, amounted to 1,050 tons, averaging 40 oz. silver and 40% lead p. t. No production reported since. In 1918, W. F. Bray, of Bakersfield, was reported to have taken a lease on the mine.

PATRIQUIN QUICKSILVER MINE — CALIFORNIA

Owned by Louis and A. G. Patriquin, Parkfield, Monterey county, Cal. Gross earnings for 1915 were $60,000 and operating expenses, $12,000. No returns reported since.

Property: 6 claims, 160 acres, in Sec. 2, T. 23 S., R. 14 E.; near Parkfield, [illegible] chamber deposit in serpentine [illegible] strike and dip of 60° N. E. [illegible] of workings. [illegible] retort furnace. About 1,800 [illegible] of quicksilver. Sold

uction, but in 1918 operations were stopped at the Patriquin
ed in Kings county, about 2 miles from the Scott furnace
ilver Mining Co., a former producer. Ore is hauled to the

CO. **CALIFORNIA**

ter Bldg., Denver, Colo. **Mine office:** Campo Seco, Cala-

Loughridge, pres.; Wm. D. McIlvaine, sec.-treas.; Alfred
ıgr.

10, in Wyoming, as successor of Penn Chemical Works.
es $1 par. Is operated as a close corporation.

Campo Seco, Hecla, Little Satellite and Satellite, pat-
Campo Seco, in the foothill copper belt,. 80 acres, with a
and 2,305 acres of timber and miscellaneous lands, giving
05 acres.

re deposit, having a maximum width of 30′ at depth of
ıphibolite schist and talcose shale, and north of the Campo
veins known as the East and West, which continue parallel.
opyrite, associated with sphalerite, sometimes occurring in
es, and pyrite, and also includes occasional chalcocite and
e assay of ore smelted in 1916 was 5-15% copper, 2.39 oz.
3 oz. gold. The gangue ranges from talcose schist, through
lting considerably displaced the vein below 700′ depth.

includes the 2,900′ working shaft, No. 3, and a tunnel,
on the East vein at the Campo Seco and Hecla mines and
at the Satellite mine. No. 1 shaft, 300′ deep, is useful only
2 shaft, 750′ deep, at the Satellite mine, is the main working
ein, with a compressed air hoist; No. 3 shaft, at the Campo
00′ from No. 2, is 2,900′ deep, with levels at 150′ intervals,
ı hoist; No. 4 shaft, at the Campo Seco mine, 200′ deep, is
and manway; No. 5 shaft, at the Hecla mine, 400′ deep, is

stimated sufficient for two years.

cludes 2 Wellman-Seaver-Morgan electric hoists with
ıcity drums. The smelter has a 400-h. p. steam and electric
ıping plant and a Nordberg air compressor, capacity 1,400
e mine and smelter. Fuel is crude petroleum, which also
ɔmotives. The Southern Pacific Railway is 5 miles distant,
and transportation between that point and the mine is by
e round trip daily. A short private railway connects the

00-ton smelter, a quarter of a mile from the mine, has
ɔnverter, one Herreshoff roaster, two oil-fired 150-ton rever-
nd eight 16-ton McDougall calciners. The smelter railway,
ags, has electric locomotives. Some cement copper is pro-
ter.

shipped to the American Metal Co. for refining.

as experimented on the Thiogen process for elimination of
account of fume litigation. The smelter was in continuous
6 years, but was closed April 1, 1919, for extensive repairs.

	Tons Ore Treated	Lbs. Refined Copper
.....	36,097	3,076,858
.....	35,653	3,235,286
.....	43,210	3,973,111
.....	42,365	3,152,071
.....	42,928	4,007,149
.....	50,427	4,467,982
.....	51,163	5,175,875

anaged and profitable property.

PHILADELPHIA EXPLORATION CO. **CALIFORNIA**

Office: Albert Burch, mgr., Crocker Bldg., San Francisco, Cal.

Officers: Harold Boericke, pres.; Gideon Boericke, v. p.; John Boericke sec.; C. A. Joy, supt.

Inc. Oct., 1916, in Delaware. **Cap.**, $100,000; increased to $200,000; assessable. Is a close corporation with only 5 shareholders.

Property: 14 claims, 3 patented, 140 acres, including the old Crescent and Green Mountain mines, near Crescent Mills, Plumas county, Cal. Mines have not produced since 1886. **Ore:** gold-bearing quartz veins in granodiorite

Development: by 600′ shaft and 6,000′ tunnel. Workings were unwatered and reopened, 1917, closed down in August, 1918, and reopened again in May, 1919.

Equipment: includes 50 h..p. electric hoist, compressor, 5 centrifugal pumps.

PHOENIX CONSOLIDATED MINES CO. **CALIFORNIA**

Office: Humboldt Bank Bldg., San Francisco, Cal. A. Goering, supt. Box 171, Nevada City, Cal.

Officers: Judge B. V. Sargent, pres.; A. B. Mahony, v. p.; C. Martel sec.; S. O. Trescott treas.; H. C. Bocchio, mgr.; all of San Francisco.

Inc. Dec. 21, 1916, in Nevada. **Cap.**, $1,000,000; $1 par; 600,000 issued 400,000 held for development fund.

Has a 4-year lease and option to 1921 on the Phoenix Cons. mine, formerly worked by the Phoenix Gold Mng. Co., for $15,000, payable out of a 15% royalty

Property: 4 claims, 2 patented, 320 acres, 1 mile N. of Nevada City Nevada county, Cal., adjoining the Odin and Manzanita mines. Ore deposit consists of a gravel channel which is believed to be the continuation of the Manzanita channel, credited with $7,000,000 gold production. There are also 3 quartz veins occurring along a rhyolite-granodiorite contact. One vein was worked to water early in the 80's and the ore is said to average $20 gold per ton

Development: in 1917 tunnel was being driven to tap the Manzanita channel. Quartz veins are not being developed at present.

PINE CREEK TUNGSTEN MINE **CALIFORNIA**

Twenty miles from Bishop, Inyo county, at an altitude of 11,000′; operated by Cooper Shapley, James Seager, Fred Close, and associates. Said to have 200,000 tons of ore that will average 1.34% tungstic oxide.

In 1918 a 300-ton mill was built, also a 2,200′ gravity tramway between the mine and mill. Closed down in spring of 1919 to wait for better market for tungsten.

PIONEER CHIEF GOLD MINING CO. **CALIFORNIA**

Mail returned from former address, 923 Monadnock Bldg., San Francisco Cal. Mine office: San Andreas, Cal.

Officers: at last accounts, N. J. Martin, pres.-mgr.; B. F. Marshall, v. p. Judge W. F. Crist, sec.-treas.; with M. V. Van Fleet and G. G. Damon, directors J. E. King, supt.

Inc. Aug. 26, 1915, in California. **Cap.**, $300,000; shares $10 par; assessable; 23,603 shares outstanding. Transfer office: 923 Monadnock Bldg., San Francisco, Cal.

Property: 15 patented claims, 200 acres, on the footwall belt of the Mother Lode, near San Andreas, Calaveras county, said to show gold ore occurring in veins with slate hanging and diabase footwall. Veins have N. 30° W. strike and dip 65° E. Management reports pay-ores in shoots 7′ wide and 20′ long, containing quartz sulphides, chalcopyrite, pyrite and galena, with average assay of $9 in gold.

Development: by 2-compartment, 500′ shaft.

Equipment: includes electric power, 40 h. p. single-drum hoist and [illegible] cu. ft. compressor. No recent information obtainable.

PITTSBURG LIBERTY MINE **CALIFORNIA**

Address: [illegible] Mono county, Cal.

Property: [illegible] in 1914 for $20,000 by the [illegible] Bros., was [illegible] Liberty Mining Co. The [illegible]

located in 1902 and started shipping to Selby smelter in 1907, with a reported production of $600,000; idle until 1915 when Operated recently by lessees.
rries gold, is found in 5 veins, occurring in metamorphic ite and intrusive granite. Veins strike N. 25° W. and dip

by 172′ shaft and 2 adits, cutting the vein at 271′ and 413′

cludes 100-h. p. gasoline engine, and the 60-ton Pittsburg- was remodeled and equipped with cyanide plant and tube-

MOUNT SHASTA GOLD M. & M. CO. CALIFORNIA
eal Estate Savings Bldg., Pittsburgh, Pa. **Mine office:** unty, Cal.
Schneider, pres.; Buffalo, N. Y.; R. Schmitt, v. p.; T. V. bove with E. G. Lang, J. S. Phillips, F. A. Johnston, R. W. er, Frederick Reineke, J. P. Jayne, G. H. Clapp and H. C. F. Wieland, mgr.; J. J. Partington, supt.
West Virginia. **Cap.**, $2,500,000; shares $1 par. Bonded ,000 authorized 6% first mortgage notes, due May 20, 1919, s. Interest paid to May 20, 1919, payable semi-annually.
claims, patented, 175 acres, known as the Bennington Creek district, north of Redding, said to have been bought d $60,000 shares, also 20 claims, on which final payment was atent, known as the Alleghany group.
several thousand feet of underground work. A 4,000′ main tunnels show a vein of gold and silver-bearing copper ore In Sept., 1919, the ore was said to be changing from gold to ond-drills were working in 1917, cutting a good grade of be sunk at end of the long tunnel.
cludes 15-stamp mill, carpenter shop, smithy, boarding ouses, with electric power.

VER PEAK GOLD MINING CO. CALIFORNIA
lifornia Bank Bldg., Pittsburg, Pa.
Flinn, pres.; Geo. T. Oliver, v. p.; T. J. Crump, sec.- dley, gen. mgr.; John Mocine, supt.; B. A. Rives, res. pur. agt. 906. **Cap.**, $3,000,000; shares $1 par; 2,793,733 shares out- meeting, first Monday in May. Stock is listed on San sburg Exchanges Owns all the stock of the Silver Peak 99¼% of the stock of the Mohawk-Alpine Mining Co., and Silver Peak R. R. running 17½ miles from Blair, Nev., to the R. R., at Blair Junction.
aid July 1, 1914, was 2 cts. per share, with total dividends to r 28%.
npany acquired the Rawhide gold mine near Sonora, Tuo- in 1915, and moved the 120-ton mill and cyanide plant from roperty. The Rawhide mine is developed by an old 1,800′ nwatered.
00 acres of mineral-bearing land at Blair, Esmeralda county, of the largest producers of low-grade ore in the State. exhausted, and it is reported, 1919, that company has ceased ations, and equipment is being disposed of.

CALIFORNIA
R. W. Crampton, mgr., Santa Monica, Cal.; Geo. Z. Smith, , supt., Santa Monica.
laims, 260 acres, in Bullion mining district, near Cima, nty, shows lead-silver-gold-platinum ore in limestone-granite ssays said to run 26% lead, 3.2 oz. silver, .05 oz. gold and

200′ shaft with 1,000′ of workings and 800′ of tunneling.

Equipment: includes a hoi
Production: in 1917, 1,000
1918; developing in 1919.
Management plans developin

PLUMAS BASIN MINES C

Address: U. S. Exploratic
and bond by company which fou

PLUMAS EUREKA CORPO

Address: Chas. D. Stark,
Company was reorganized in 191
Property: one of the old
of California, having distributed

PLYMOUTH CONS. GOLD

Offices: 20 Copthall Ave.,
Amador county, Cal. Gen. mg
London, E. C., Eng. San Franc
Officers: C. Wanklyn, ch
Barry, J. P. and David Richards
Inc. Jan. 15, 1914, in Engla
Gross earnings for 1918 we
net earnings, after writing off de
leaving balance of $19,212.
Dividends: in 1915, were 3
Property: the Plymouth C
a tract of agricultural land, ab
The holdings cover 4,800' alon
Mariposa slate. The veins run
occurring in shoots 6' to 30' wid
gold and 0.14 oz. silver, per ton.
Development: by several
2,700'. Workings total about 4
3-compartment shaft to 1,600' l
the footwall of the Empire-P
amounted to 6,681', mainly drift
Equipment: includes 500 h
compressors, a 30-stamp 360-ton
which makes a 90% extraction.
crusher, Hardinge mills, classi
for the tailings recovered 25cts
per ton. The concentrates aver
per ton. Total cost per ton
reserves at 108,000 tons of $6 o
Production: 44,775 tons o
tons in 1915, yielding 31,193 oz.
125,000 tons in 1916, yielding 3
$681,150. In 1918, 125,300 tons
value $698,315, compared with $
The property is an old mine,
producer through the able jud
Loring.

POCAHONTAS MINING C

Office: 112 Mark
county.
P
the
diori
occu
abou
many
De

includes steam power and a hoist, and buildings include ory, smithy and bunk houses. Making small shipments to the Property worked by lessees in 1915-16. No later returns.

L BLUE LEAD MINES CO. **CALIFORNIA**

Wall St., New York City. H. L. Engelbright, mgr., Ne-

n Delaware. **Cap.**, $3,500,000.

ors: H. E. Latter, C. L. Rimlinger and C. M. Enger.

own gravel properties in the Colfax quadrangle, Nevada county, upplied by a 21-mile flume.

E **CALIFORNIA**

. H. Hamstadt, owner, Nipton, Cal. Operated for a while W. W. Wishon, Searchlight, Nev.

9 claims, 150 acres, in New York mountains, San Bernardino id to show fissure veins in monzonite carrying gold-silver values. ent: by 1,100' of underground workings, mainly tunnels. No. ted to have opened up 10' of ore assaying 2.5% copper, 0.9 oz.

n 1917, but nothing reported since.

NING CO. **CALIFORNIA**

ears.

Quinby, via Burnt ranch, Cal.

: 6 claims, on Quinby Creek, in Trinity Reserve, showing 4' r ore, developed by 2 tunnels, 100' and 400' long and 300' drifts.

VER INVESTMENT CO., INC. (THE) **CALIFORNIA**

5 Broadway, New York.

Geo. H. Sexton, pres.; Robt. Gibson, v. p.; Harry A. Nichols, as. A. Frank, sec.-treas.; A. Heyward McAlpin, asst. sec.-treas.; a Barrows and Wm. Herbert, directors.

, in Virginia. **Cap.**, $1,061,900, in $61,900—7% cumulative, 1st ued to noteholders of old company; $421,300—7% 2nd preferred, common shares; shares $100 par; $461,900 outstanding. All stock 5-year voting trust; voting trustees: Chas. A. Frank, chairman, and Ira Barrows, N. Y. City.

has a 25-year lease from 1915 on the Almaden quicksilver mine silver Mining Co., through its subsidiary the New Almaden Co., see), and will pay 20% of its net profits to owners. Reported a loss; indebtedness to noteholders, March 1, 1915, was $61,900. 0,000,000 has been produced by Almaden mine.

VER MINING CO. **CALIFORNIA**

5 Broadway, New York.

Jos. Kaufmann, pres.; Edw. Reynaud, v. p.; Chas. F. Tracey, h. Clinton F. Whitney, T. Tileston Wells, Clarence W. Francis, . L. Steinharge, Wm. H. Lotty, Henry L. Steitz and A. H. Jarman.

in New York. **Cap.**, 100,000 shares; $1 par, in 57,087 common ferred, 7% non-cumulative. Annual meeting, third Wednesday Y. City. Stock stricken from the New York Stock Exchange, Loan & Trust Co., New York, transfer agent; Equitable Trust regist[illegible] In 1914, company defaulted on payment of notes, and larch 1[illegible]

[illegible] between; none have been paid on the common [illegible] Payments on preferred: June, 1891, 4%; May, May, 1901, ½%; May, 1902, ½%; May, 1903, ½%.

[illegible] 6,800 acres, including the New Almaden quick- [illegible] near San Jose, Cal. Mine is the oldest producer [illegible]. Total production to end of 1917, was 1,021,183 [illegible] property. See Quicksilver Resources of Cal., Bull. [illegible] Bureau. Company has given a 25-year lease [illegible] the New Almaden Co., a subsidiary of the

Quicksilver Investment Co., Inc., and will receive 20% of net profits. Stockholders were offered voting trust certificates in new company on basis of one share of second preferred for 10 shares of old preferred in consideration of payment of $3 for each share of old stock. New common was exchangeable for old common stock at same ratio plus $1.50 per share of old common.

The ores recently worked carry 0.2% to 1% mercury, being the low-grade ore left in previous years workings and old fills. Prospecting of unworked territory had not been successful at last accounts.

On Dec. 1, 1917, it was reported that the directors had applied to the Supreme Court of New York for a voluntary dissolution of the company, on the ground that its assets, $98,000, did not ensure payment of obligations. Maurice Deiches was appointed receiver.

Output in 1919 was about 20% of normal.

RAND DIVIDE MINING CO. **CALIFORNIA**

Now the California Rand Silver Mines, which see.

RAND MINERALS CO. **CALIFORNIA**

Mail returned from old address, F. R. Heineck, mgr., Glenville, Cal.

Property: probably idle. See Vol. XIII.

REDWOOD COPPER QUEEN MINING CO. **CALIFORNIA**

Idle. Is a San Francisco corporation. E. R. Leach, pres.; Thos. Meller, sec.-treas., at last accounts.

Property: 840 acres, patented, is 25 miles from Cloverdale, nearest railroad point, Mendocino county, Cal. Developed by tunnels and winzes. Veins much broken by faults prominent on surface, has a 2' to 4' gossan capping, traceable for a mile. Country rocks are brecciated porphyry and sandstone. Ores include cuprite, melaconite, malachite, azurite, chalcopyrite, and tetrahedrite.

Mineralized zone is 300' long, 10 to 40' wide, 125' deep, carrying kidneys and lenses of sulphide ore with as much as 8-9% copper and small gold-silver values. High sulphur content and absence of arsenic said to make ore desirable for manufacture of sulphuric acid. No recent information obtainable.

REWARD GOLD MINES SYNDICATE **CALIFORNIA**

Was controlled by Crown-Reserve Mining Co., Ltd., whose exploratory work proved unsatisfactory and mine was closed down. Described in Vol. XI.

ROCKY POINT CONS. MINES CO. **CALIFORNIA**

Reorganized as Consolidated Wilshire Mining Co., which see. Troubles of old company described in Vol. XIII.

ROXBURY MINING CO. **CALIFORNIA**

Address: Yreka, or Scott Bar, Siskiyou county, Cal. Boston capital behind this concern.

Property: placer claims near Scott bar. In Aug., 1919, company applied to State Water Commission for permission to divert water from Canyon and Kelsey creeks for hydraulicking. The present supply is only enough for two giants for about 4 months each year.

ROYAL GOLD MINES CO. **CALIFORNIA**

Acquired by Stockholders' Mining Co., which see.

RUBY COPPER MINING CO. **CALIFORNIA**

Mail returned from former address, E. A. Walters, Eureka, Cal. F. Belcher, sec. Mine near Korbel, Humboldt county, Cal.

Property: the Blind Lead and Ruby groups, 38 claims, 760 acres, unpatented, in Horse Mountain mining district said to show a copper deposit developed by a 1,000' tunnel, and other short openings. Ores are chalcopyrite, cuprite, chalcocite and bornite, with some black oxides and gold. Formation is serpentine with porphyritic diorite dikes and quartzite.

Company planned installation of concentrator. Mine in development stage and evidently idle at present.

RUBY KING COPPER CO. **CALIFORNIA**

Mine near Ladoga, Colusa county, Cal. Although generally known as a copper mine, no copper ore has been discovered and property is operated

ne, by the Ruby King Mineral Paint Co., 1027 Eighth St.

ntented claims, developed by 1,200' shaft and 1,000' tunnel.
ontaining a small precentage of cinnabar.
00 tons in 1914. No recent returns.

MINING CO. **CALIFORNIA**

C. Waring, Santa Monica, Cal.
A. Crampton, pres.-mgr.; C. C. Waring, sec.-treas.; J. R
upt. Company is a close corporation.
groups of mining claims near Cima, San Bernardino county.
1 claim, Navajo group, 6 claims, 123 acres; Ruth mine, 7
; covering contact deposits 2 to 10' wide in limestone and
ed by J. Nelson Nevius, A. H. Black, O. B. Suhr, and A. W.

t: Ruby Silver mine has 250' tunnel and 500' workings, from
ead-silver ore were shipped in 1917; Navajo group, 800' of
ed 120 tons copper ore up to 1918; Ruth mine, 210' shaft, and
gs produced 560 tons of lead ore to 1918, and is said to have
d out of 32% lead with some platinum.
due to the war, but management states that development work
1919 and a mill erected.

O VALLEY COPPER CO. **CALIFORNIA**

W. Winn, fiscal agent, 149 Broadway, New York; A. B.
25 Singer Bldg., New York; T. G. Patton, sec., Placerville, Cal.;
upt., Greenwood, Cal.
. H. Wilkins, pres. and treas.; A. B. Winkins, v. p.; with W.
Voorhies and Donald Woodrum, directors; A. B. Wilkins, mgr.
, 1911, in Arizona. Cap., $1,000,000; shares $1 par; fully paid;
all issued.
Shamrock group of 24 claims, about 492 acres, in Sec. 26,
E., in Eldorado Co., Cal., 2 miles south and 1 mile west of
oes not embrace 12 claims adjacent N. E. in section 23, held by a
similar name to this company.
Property shows an extensive series of sedimentary rocks
ocks of various ages, intercalated with the sedimentaries, or more
urring as intrusives. Ores occur as sulphide deposits in contact
es, the latter flat-lying, with chalcopyrite disseminated in pyrite,
ariably containing gold and silver, but low in copper tenor.
ent: by 10 tunnels varying from 50' to 380' in length. Lates'
reserves is the "whole mountain, would pay to run through a
nent plant on the premises." Shipping ore assaying 5 to 12½%
to $25 gold, and $2 to $15 per ton silver is estimated to be 50,000
is no power equipment.
1917, the main Lipton tunnel was being retimbered and a motor
nstructed to rail at Cool or Auburn, the latter 12 miles from the
ipments were then to commence from the tunnel; in 1919 man-
es "measures are under way for shipping facilities." At 1917
lue of the ore reserves above the tunnel were figured by company

e describing company's holdings and possibilities is, in our opinion,
c.

E MINES CO. **CALIFORNIA**

401 First Nat'l Bank Bldg., Riverside, Cal. Mine near Purdy,
ino county, Cal. Norman P. Sloan, pres. and mgr.
y was originally the Sagamore Mining Co., and had offices at 3rd
t Sts., Philadelphia; this company was merged into the Sagamore
Milling Co., and this into the Sagamore Mines Co., incorporated
of Delaware.
P: 8 claims, 160 acres, known as the New York mine, 5 miles

S. E. of Manvel, in the New York mountains, an extension of the Provid range, shows limestone, quartzite and schist, with intrusive dikes of rh and felsite along which the principal veins are found. Ores found in quartzite are gold bearing, the silver and copper ores being in limestone.

Development: by shafts of 30', 45', 100' and 150' and several tun longest being 454', showing a number of veins ranging from 18" to 4' in w A complete report on the property was made, 1902, by Carl Andersen.

Equipment: includes gasoline power and a 50-ton mill.

SAINT JOHNS MINES CO. CALIFOR

Address: Box F, Vallejo, Cal.

Officers: C. G. Dennis, pres. and mgr.; John Martin, v. p.; R. V. H sec.

Inc. May, 1914, in California. **Cap.**, $150,000; shares $1 par; outstan $90,000. Transfer office: 1022 Crocker Bldg., San Francisco. Annual me first Monday in May.

Condensed balance sheet for 1918 shows: assets, $102,131. Liabilties incl capital stock, $90,000; surplus, $10,293; other liabilities, $1,838. Gross earn 1918, reported as $57,125, with operating expenses of $57,198.

Property: 713 acres on Soscol ranch, 6 miles N. E. of Vallejo, Sol Co., is said to show cinnabar ore occurring as bunches in sandstone and s over a width of 2' to 30'. Developed by 320' shaft and tunnels; greatest d of workings, 320'. Management reports 12,000 tons ore blocked out, aver assay 0.27% quicksilver.

Equipment: includes a 25-h. p. gasoline hoist, two 7½-ton Neate one 15-ton Scott furnace, capacity 30 tons daily and a 25 h. p. oil engine 15 k. w. generator.

Production: 1916, 9,068 tons ore, yielding 48,675 lb. quicksilver; lb. recovered per ton of ore; cost per 75 lb. flask, $62.11. No yields repo since.

SALT LAKE-CALIFORNIA COPPER CO. CALIFORN

Mail returned from former office, and company inactive several ye Described in Vol. XIII.

SANTA ROSA MINING CO. CALIFORN

Subsidiary of West End Cons. Mining Co. of Nevada, which is repo to own 350,000 shares.

Property: the Santa Rosa lead-silver mine in the Lee district E Cerro Gordo and 26 miles from Keeler, said to show ore in veins along contacts of limestone intruded by porphyry dikes. There are two system veins whose average width is 4'. The fine outcrops would indicate a h degree of mineralization, but the orebodies are apparently superficial.

Development: shallow shafts and tunnels said to show that rich ore in all cases found close to the surface. The mine was reopened in 1916 a having been idle for several years. No recent information.

SARITA MINES CO. CALIFORN

Address: F. W. and G. E. Stall, mgr.; Masonic, Mono county, Cal. a share corporation.

Property: mine near Masonic, Cal., said to show a quartz vein in p phyry, dipping 45° W. and pitching W. Orebody is from 4' to 20' wide shoots are from 50' to 200' long. Ore said to contain gold and silver, av $20 per ton.

Development: by 700' tunnel to 200' depth.

Equip electric power, aerial tram, and 75-ton cyanide plant. C centrate per ton; extr was 90%. Production, if any, available.

SELBY LEAD Co. CALIFORN

In 191 was discontinued and plan

CALIFORN

which company was Securities Co. assumed

ties of that company and property is now known as Selby

hants' Exchange Bldg., San Francisco, Cal. **Works office:** ta county, Calif.
gene B. Braden, gen. mgr.; C. A. Thomas, mgr.
at Selby, on San Pablo Bay, near Carquinez Strait, receives ater, from all of the Pacific states, principally from Idaho and rks include a 400-ton smelter having lead stacks, a refinery and silver, a plant for the manufacture of bluestone, a shot ead rolls. At San Francisco a plant is operated for the manu- ad traps and mixed metals.
includes steam, electric and air power. The plant includes also a special chamber having the Cottrell process for precipi- fumes, before passing to the main stacks.
perhaps the largest smelter producing gold in the United in the world. The plant and improvements were described Rickard in the "Mining and Scientific Press."

S. GOLD MINES CO. **CALIFORNIA**
J. Reilly, supt., Seneca, Plumas county, Cal.
ne White Lily mine and claims a mile above Seneca on ner River, driving 1,000′ tunnel, and planned to build a cyanide o reports since.

MONT MINING CO. **CALIFORNIA**
on City, Nev. **Mine office:** Winthrop, Shasta county, Cal.
ll E. Casson, pres.; W. Brougher, v. p.; Jas. T. Davis, sec.- Lee, W. H. Cavell, directors.
000; shares $1 par; 730,000 issued, and 50,000 offered at 25c 6.
claims, unpatented, 120 acres, known as the Graham group, ty district and in the west central part of the Shasta copper is about 3 miles east of the Bully Hill mine and smelter, and Mammoth mine. The property is said to have a surface outcrop f the Bully Hill mine.
t: by a 75′ shaft, 4 short tunnels and several opencuts, all nd bunches of high-grade copper ore. Company has made one f ore to the Mammoth smelter, which ran 7.21% copper and . Driving lower tunnel to reach the main orebody. No report

PER EXPLORATION CO. **CALIFORNIA**
dding, Shasta county, Cal. M. E. Dittmar, mgr.; O. Scrib- Wheelock, supt.
bout 650 acres, lying between the Balaklala and Iron Moun- Kennett, is developed by 8 tunnels, of about 3,000′ aggregate nnel cut 3 small stringers of copper ore. Company did a large ration and development work, 1915, but no recent report has spite repeated requests mailed them.

NETT COPPER CO. **CALIFORNIA**
ennett, Shasta county, Cal.
n Colorado. **Cap.**, $2,500,000. W. R. Girdner, M. J. Jordan d, organizers.
ear Kennett, has a 600′ tunnel, said to show bodies carrying grade copper ore.

BLOSSOM COPPER CO., CONS. **CALIFORNIA**
Mills Bldg., San Francisco, Cal. **Mine office:** Winthrop, al.
rank J. Blake, pres.; Simon Peter, v. p.; Kingsley W. Can- Henrich, treas.; Mrs. M. B. Lindley, directors.
n Arizona, as a reconstruction of the Shasta May Blossom ting Co. **Cap.**, $10,000,000; shares $1 par.
known as the Keith group, has 22 claims, about 300 acres,

½ mile N. of De La Mar, in the Pittsburgh or Copper City district. The cla show prominent outcrops and have several deposits between granite porph footwalls and slate hangings. The East vein outcrop, said to be 30′ wide traceable for about 1,500′, shows copper ore with gold and silver values. T middle vein, 5′ to 40′ wide and said to be traceable, 1,900′, carries sulphide o and is opened by tunnels of 200′, 300′ and 650′, with about 1,500′ of workin said to show a considerable tonnage of chalcopyrite ore. The West vein ported to be upwards of 100′ in width, has a 100′ shaft and 780′ tunnel wh show ore giving assays of 2 to 7% copper and $2 to $2,000 per ton in combin gold and silver values. The mine, as a whole, is reported to have about 4,0 of workings.

In 1918, company reported that the Compressor, or lower tunnel, had b driven farther toward the 7 outcropping lodes.

Equipment: includes a hoist, air compressor, electric light and pow station and machine-shop.

SHASTA MONARCH MINING CO. **CALIFORNI**

Address: M. P. Fries & Co., 1635 Broadway, New York. **Mine offic** Kennett, Calif.

Property: 80 acres at Stella (Whiskeytown), Shasta county, has be worked for many years; credited with a production of $127,000 from 1870-19 There are 4 parallel veins, strike N. 50° W., dip 50° N., in alaskite porph near the contact with meta-andesite; pay shoot averages 18″ in width; ore free milling.

Development: by tunnels.

Equipment: includes a 10-stamp mill, erected 1914, at which time men were employed. (For geology, see U. S. G. S. Bull. 540, pp. 38, 39, 50, 51.)

SHASTA NATIONAL COPPER CO. **CALIFORNI**

Address: M. P. Fries & Co., 1635 Broadway, New York. **Mine offic** Kennett, Calif.

Officers: W. H. McEwen, pres.; M. P. Fries, v. p. and gen. mgr.; H atio Alling, sec.-treas., with S. S. Norton and A. Kennedy, directors.

Inc. in 1917. **Cap.**, $5,000,000; shares $1 par. Company was organiz to develop 1,000 acres of copper bearing land adjoining property of Mamm Copper Co., Shasta Co., Cal. Reported in 1918 that the company had m final payment of $40,000 on some of its claims. Mine developing 1919, m shut down in December.

SHENANDOAH MINES CO. **CALIFORN**

Letters returned from former address, Clunie Bldg., 519 California San Francisco. A. Tisher was mgr.

Property: 3 claims and 2 mill sites, 63 acres, on Jesus Maria Creek miles N. W. of Eldorado, described in Vol. XIII.

SHIPSEY MINING CO. **CALIFORN**

Address: John Shipsey, Randsburg, Kern County, Cal.

Property: King Solomon group of 7 claims near Randsburg, Cal., s to have yielded gold worth about $2,000,000 in past 20 years, from depth of 5 Five-stamp mill reported to be crushing $35 ore in July, 1917. No report su

SIERRA ALASKA MINING CO. **CALIFORN**

W. S. Schuyler, pres.-mgr., Pike Cal. J. F. Dickson, v. p.; O. Crook,

Inc. Jan. 22, 1912, in California. **Cap.**, $2,000,000; $1 par; changed 1918 to $200,000, $1 par; all issued.

Property: near Pike, Sierra county, carries a quartz vein with gold pyrite, without base sulphides. Developed by 900′ shaft and 1,700′ of workin Has a 40-stamp mill with 10-ton cyanide annex. The president writes work was being done on a deep drainage adit, 1919.

SIERRA RANGE COPPER CO. **CALIFORN**

Address: A. I. Beardsley, [illegible] Iowa. **Mine office:** Genes Plumas county, Calif.

Property: [illegible] gold-silver-cop developed [illegible] acres.

yke was under bond to the U. S. S. M. & E. Co. Main tunnel was
ned high-grade ore.

YNDICATE **CALIFORNIA**

pres., 618 2nd Ave., Seattle, Wash. Mine office: Etna Mills,

row, v. p.; Alex. Parker, sec.; Jos. Stephens, treas.
n Washington. **Cap.**, $750,000; 25c par; $700,000 outstanding.
3 separate groups of unpatented quartz mining claims in
, said to show veins up to 3′ in width. Developed by several
ver 300′ in length. Management states that development work
st $2,000, and receipts from sale of chrome ore were $1,750.

) ONE MINING CO. **CALIFORNIA**

van, supt.
situated ¾ of a mile south of Alleghany, Sierra county, Cal.,
1908 and is credited with a production of $150,000 to $300,000 in
Company was in the limelight during 1919, and for some time
count of litigation with the Twenty-One Mining Co. over extra-
and in Oct., 1919, company was awarded $93,000 damages.
tz in a vein ranging from a narrow streak up to 4′ in width.
amphibolite.
ent: by tunnels, main tunnel 900′ long. Twenty men em-
ccounts. A 35-ton 10-stamp mill started operating early in 1919.
made public.

NES CO. **CALIFORNIA**

iquidated. Described in Vol. XIII.

GE MINERALS CO. **CALIFORNIA**

Parker, supt., Bakersfield, Cal.
located in Inyo county, 8 miles N. E. of Trona, shows lead
Company is erecting a 50-ton mill, for which there is said to be
supply blocked out.
n: in 1918, 1,331,440 lb. of lead, 1,786 oz. gold, 64,389 oz. sil-
124 lbs. copper, with gross receipts of $142,822.

REKA MINING & MILLING CO. **CALIFORNIA**

in 1918 that its property was closed down due to lack of paying
onditions favored resumption. Described in Vol. XIII.

RK GOLD GRAVEL CO. **CALIFORNIA**

Robert Edgar, supt., Lindsay, Tulare county, Cal.
: placer claims near La Porte, in Plumas county. Drilling has
annel 1,500′ wide, and mining was to be started late in 1919.

YSTONE CONS. MINING CO. **CALIFORNIA**

rned from former address, Amador City, Cal.
W. Virges, pres.; C. H. Colper, v. p.; F. F. Wood, sec.-treas.,
clntire and C. Huth, directors.
000,000; shares $1 par.
: several well known gold claims between Amador City and
Cal.
ment: ground was unwatered in March, 1917, and exploration
e 600′ and 1,000′ depth in North Star claim. A 10′ vein was cut
nothing has since been reported. This is another of the old Cali-
s being reopened under modern conditions.

JBA MINING & SMELTING CO. **CALIFORNIA**

r, pres.; C. D. Tregoning, supt. Cap., $50,000.
at French Corral, Nevada Co., idle for 2 years. Described in

N CALIFORNIA GOLD DREDGING CO. **CALIFORNIA**

rmed from former address, M. L. Brackett & Co., 334 Citizens Natl.
Los Angeles, Cal.
: A. S. Maynard, pres. and mgr.; Lyman Farwell, sec.-treas.;
Pratt, F. S. Owens, and W. W. Benson, trustees. O. S. Williams,

Cap., 1,000,000 shares of no par value; non-assessable; 898,000 issue
Property: 15 claims, 2,528 acres, in Palomas district, Los Angel
Co., Cal.
Development: drilling started in Jan., 1917. Gravel said to average
per yard.
Extracts from reports given in prospectus are: "An average of 36c. p
cu. yd."; "It will be a Klondyke"; "Sufficient gold . . . to pay all of t
National debt"; "Will yield $14,435,559"; "Reasonably expect $30,000 to $40,00
month"; "Most promising I have ever seen"; "A good and profitable dredgi
proposition." Five engineers gave gold contents as 45c., 22c., $1, 40c., and
per yard.
The above quotations show that the company was not in conservative han
and as mail is returned to writer, company is probably defunct. Is unfavoral
regarded.

SOUTHERN EUREKA MINING CO. **CALIFORNI**

Address: 411 Hyde Bldg., Spokane, Wash., and Greenville, Plum
county, Calif.
Inc. in Washington by George D. Needy, E. F. Yeager, M. A. DeH
Hal. J. Cole and H. R. Van Dreathen, all of Spokane. Cap., $2,000,000.
Property: the South Eureka, Hibernia, McClellan and Wardlaw min
12 claims, 450 acres, traversed by half a mile of the Crescent-Indian Valley a
other lodes, near Greenville.
Work was resumed late in 1916 and a mill was proposed, but property w
idle 1918 and 1919.

SPENCE MINERAL CO. **CALIFORNI**

Idle.
Office: 1061 Mills Bldg., San Francisco, Cal., Mine near Spencevil
Nevada county, Calif. D. M. Kent, sec.
Property: an old mine, operated 1875-1903, the shaft caving in the lat
year. Fully described Vol. XI, Copper Handbook.
Property was bonded in 1917 for 2 years to McLain & Hales, who have
watered shaft and recovered a fair quantity of copper from the water, maki
2 shipments to New York.

STANDARD AMALGAMATED EXPLOR'N CORP. **CALIFORNI**

Office: Gahm Bldg., Boston, Mass. Mine near Esmeralda, Calave
county, Calif.
Officers: Frank E. Bramhall, pres.; W. F. Dwyer, v. p.; A. E. Reid
sec.; H. H. Brown, treas., with Alfred Grover, E. Koessler, E. F. Curtis, G
Clark and J. L. Whitten, directors. Louis Robin, mgr.; Chas. Cuneo, su
Esmeralda, Cal.
Inc. Jan. 2, 1909, in Nevada. **Cap.**, $1,587,000; shares, $1 par; n
assessable; outstanding April 23, 1916, 2,264,223 shares.
Bonds: authorized and outstanding, $40,000. Company is successor
a corporation of same name, but greater capitalization.
Property: the Economic mine, 2 patented claims, 36 acres, near Esm
alda, is said to have a steeply dipping 6' quartz vein of slate.
Development: by a 700' tunnel, with total workings of 5,000'. Manag
ment claims ore blocked out sufficient to run the mill 4 years; assay $18 to
while "actual mill returns on try-outs to Selby smelter show better than $6
per ton."
Equipment: includes a 20-stamp mill, 100 h. p. compressor and elec
power. Planned to build a cyanide plant in 1918, but nothing has since b
reported.

STANDARD TUNGSTEN CO. **CALIFORN**

Ore reserves exhausted and property closed down, Nov., 1918. Plant
been dismantled and sold. Property was described in Vol. XIII.

STARR KING MINE, INC. **CALIFORN**

Office: 58 Sutter St., San Francisco, Cal.
Officers: R. C. Kennedy, pres.; M. J. Lindsay, v. p.; W. H. Young, s
treas. Wm. George J. Pressley, directors. George S. Dean, supt.

1917, in California. Cap., $150,000; $1 par; 90,000 issued
edy, in payment.
rr King and Sherman patented lode claims; American
de claim, and two mill sites, situated in Sec. 15, Twp. 1 N,
, also certain water-rights. Property is located above the
Tuolumne river, two miles southeast of town of Tuolumne,
rra Railway, in Tuolumne county. Total is 75 acres, giving
tance of 3,500′ on the lode.
tract shows the typical features of the east belt of the
vein-system is in highly-tilted beds of Calaveras slates in-
ists and occasional occurrence of limestone, the whole in-
dikes of grano-diorite and diabase. Orebodies are said to
of $12 free-milling gold ore.
consists of an incline shaft, 565′ in depth, with 5 levels
300′ of work.
ectric hoist, compressor plant, 5-stamp mill and Wilfley
smission line, blacksmith shop, office, boarding-house, and
wer is furnished by the Tuolumne Light & Power Co.
om 1886 to 1900 the mine was worked at irregular inter-
ers, producing $300,000. Later test mill-runs produced $11,500.
ost of labor and supplies, operations were suspended in 1918.
med shortly (Nov., 1919.)

IG CO., P. B. **CALIFORNIA**

ee Vol. XIII of this work.

S MINING CO. **CALIFORNIA**

Franklin St., Boston, Mass. **Mine office:** Hodson, Cala-

Brett, pres.; J. M. Whitcomb, treas.; E. F. Baxter, sec.;
T. L. Wiles, E. S. Hilton, and W. A. Mosman, directors.
ness mgr.; Haines Gridley, mine mgr.
917, in Maine, successor to the Royal Gold Mines Co.,
ountain King Co. Cap., $2,000,000; shares $1 par, $1,500,000
and financing. Transfer agent: Commonwealth Trust Co.,
eeting, first Monday in May.
laims, 14 patented, 180 acres on the Mother Lode, Cala-
., containing low-grade gold ore. The ore-zone is said to
00′ wide.
ned by W. E. Farish, W. P. Miller, J. H. Finlay, William
nings, and William Foster, who all reported favorably.
tz veins in slates, which are traversed by dikes of diabase
often form one of the vein walls.
3 shafts, one 1,000′ deep, and 5,000′ of workings.
oist, crusher, tramway, 2 mills with 130 stamps, cottages,

e suspended in 1918, due to high cost of mining, and interest
ary, 1919, was not paid. It is understood that operations will
as general conditions improve.

PPER CO. **CALIFORNIA**

e Wardlow, Taylorsville, Plumas county, Cal.
r the Engels mines. Development has been carried on
d machinery and buildings were erected in October, 1919.

C MINING CO. **CALIFORNIA**

See Vol. XIII.

INING CO. **CALIFORNIA**

Union Savings Bank Bldg., Oakland, Cal. **Mine address:**
county, Calif.
Hartley, pres.-mgr., 2432 Webster St, Berkeley, Cal. T.
W Whitton, sec.-treas., with E. L. Oliver and Eula Sandow,

Inc. Sept., 1915, in Nevada. **Cap.,** $500,000; $1 par; non-assessable; sued 307,899 shares.

Property: 12 unpatented claims at Table Rock, Sierra county, 25 m S. of Quincy and 14 miles from La Porte, Plumas county. An old gravel c nel is being explored and developed. Management states that $26,000 was on development in 1918 and $1,500 monthly in 1919. Gravel is said to assay and over in gold per ton. Property is claimed to have produced $3,000,000.

TECOPA CONS. MINING CO. **CALIFORN**

Address: Tecopa, Cal.

Officers: Nelson Z. Graves, pres., 22 S. 3rd St., Philadelphia; L. Godshall, v. p.-gen. mgr., Los Angeles; J. S. Sullivan, sec.

Inc. in No. Dakota. **Cap.,** $3,000,000; $1 par.

Property: 17 patented claims at Tecopa, Inyo county, has veins carry lead, silver and gold, average assays being 12% lead, 9 oz. silver, 0.1 oz. per ton.

Development: by incline shafts 300' to 400' deep, and by 2 tunn 1,500' and 4,000' long.

Management states that ore sales in 1918 were $232,426, and that divide of $30,000 were paid.

TEDOC MINING CO. **CALIFORN**

Address: 268 Market St., San Francisco, Cal., or J. H. Hart, supt., Bluff, Tehama county, Calif.

Owns chrome mines on Tedoc Mountain, 51 miles from Red Bluff, Eureka road.

THREE BUTTES & CONSUMNES COPPER MINES **CALIFORN**

Address: S. L. Watkins and associates, owners, Grizzly Flats, Cal.

Property: 30 sq. miles in Eldorado county, Cal., said to be heavily eralized, carrying gold, silver, copper, molybdenum, etc.

Over 2,500 assays are said to show from 1 to 24% copper, with 50c to $2 ton in gold for a large part of the deposit. No news recently.

TIGHTNER MINE **CALIFORN**

Address: Fred Searles, Jr., First National Bank Bldg., San Franci

Property: near Alleghany, Sierra county, Cal., formerly owned by L. Johnson, and sold to Grass Valley men for $500,000, the last payment b made in June, 1917.

Dividends: not published; but from $100 to $1,000 per share has paid at various times, totaling fully $1,000,000 in 5 years up to 1918.

Geology: quartz vein in amphibolite schist, which is much altered sheared near the walls of the vein. Faulting is frequent, and the sh irregular.

Ore: carries gold, often in large, coarse particles and masses, a ciated with arsenopyrite and galena.

Development: in early days a bedrock tunnel in a drift-gravel mine a vein, but no attention was paid to it until 1907, when the tunnel was reope and about $400,000 extracted up to time of selling to present owners in The lower tunnel is over 4,000' long.

Equipment: complete, with 20-stamp mill.

Production: not published, but $1,000,000 to June, 1913, and fully much since. Property closed down in 1918, owing to high costs and l shortage. In 1919, Fred Searles, Jr., obtained an option on the mine, will be unwatered and development resumed. New York capital is sai have acquired it for about $250,000 in August, 1919.

TITANIC COPPER MOUNTAIN MNG. CO. **CALIFORN**

Address: temporary office, Jan., 1919, given as 18 Ironmonger L London, E. C., England.

Officers: H. F. Melville; Maurice K. Exham, sec.; Soledad, Cal.

Inc. Jan., 1914, in Arizona. **Cap.,** $1,000,000; $1 par; issued shares.

Property: about 500 acres, 10 miles from Soledad, a station on the Pac. R. R. and 40 mi Monterey, San Benito county. The "private

ation issued by the company bears the earmarks of a pro-
ompt investigation by the Postoffice authorities.
e mine is 1½ miles long by ½ mile wide on the average,
on 500 acres. As compared with other celebrated copper
to 4 times the size of the famous Rio Tinto mine in Spain,
t of the Anaconda mine proper. The Titanic company's
eaching and milling ore similar to those of Rio Tinto, but
le, i. e., 3½% metallic copper fine to the ton, whereas, Rio
about 2% to the ton. . . . The life of the mine is
ing engineers and Mr. H. F. Melville to run into 3-4 cen-
strippings constitute a fertilizer of nitrous potash which
and can be sold locally at a handsome profit, which, how-
t is not taken into consideration. . . . The company
20 Huntington stamp-mills, these taking an average of 30
y, should treat 180,000 tons of ore-bodies, which at 3½%
n, would equal 6,300 tons of pure copper. At the present
n, a gross profit of £756,000 would be earned by the com-
expenses at 6 cents per lb., these would amount to about
profit would be £556,000, i. e., over 275% on the total
uarterly dividends will be paid and yearly balance sheets
June. . . . Three drifts of large cuts have been made,
nnelling between them through the sulphide ore-bodies and
en laid bare for immediate working, which can be produced
. . It should be added that numerous large corporations,
n Pacific Ry. Co., the Amalgamated Copper Co., Henry K.
ave endeavored to buy up the whole property, but all offers
ave been wisely refused. The president of the company,
has told all prospective buyers that there is not a corpora-
ho is in a position to offer sufficient money to tempt the
of their property. . . . The subscription list is now
vill be closed in a few days."

described under name of Copper Mt. Mng. Co. In Mines
s of San Benito county, 1917, issued by Cal. State Mng.
er known to us states that beyond a few hundred feet of
thing to indicate that property is anything but a prospect.
ht to look into this matter.

INING CO. **CALIFORNIA**

an, Cal. G. A. Foster, pres. and supt.; G. Hart, sec.
acres in Trail Creek, Siskiyou county, reached by trail
issure vein occurring between schist walls, with dip 60° N.
., is said to carry an ore shoot 300′ long and 2′ wide. Work-
unnel, drifts and a stope 200′ long.
cludes two Huntington mills, run by water power, and
wners claimed 3,000 tons ore reserves. Production to July,
ter report.

NG CO. **CALIFORNIA**

s Bldg., San Francisco. **Mine office:** Amador City, Cal.
thchild, pres.; E. J. McCutcheon, v. p.; E. S. McCurdy,
G. Stevenson, G. W. McEnerney, directors. O. H. Rohlfs,

claim, near Amador City, Amador county, said to show
schist with dip 45° to 55° and N. W. strike.
winze 700′ deep; 50° incline shaft, with levels at 1,800′,
0′. In 1918, reported good ore in lower levels, but nothing

R CO. **CALIFORNIA**

St., Boston, Mass. **Mine office:** Kennett, Shasta county,
W. Lawson, pres.; Arnold Lawson, v. p.; John M.
n Arnold, treas.; preceding with Arthur P. French, John
. Turner, E. A. McSweeney, directors.

Inc. Oct. 18, 1900, in New Jersey. **Cap.**, $6,000,000; shares $25 pa 240,000 shares outstanding. International Trust Co., Boston, registrar; Feder Trust Co., Boston, transfer agent. Shares listed on Boston Stock Exchange an on the New York Curb. Federal Trust Co., Boston, transfer office. Annu meeting, October 7, 1919.

Trial balance as of September 1, 1916, showed assets totaling $6,188,744, i cluding $5,221,000 for property, $711,980 for development and construction, $21 799 for expenses through Eastern office, $56,500 for railway and power compan and $464 cash. Liabilities included A. S. & R. smelting contract payable f ore, $28,548; ore account, $39,471; and accounts payable, $120,725.

Property: 1,700 acres, also a patented town site, near Kennett, so total holdings of 3,233 acres. Property includes the Shasta King, which is t principal mine, the Lost Desert and King Copper groups.

The **Shasta King** group, 12 claims, adjoins the Balaklala mine, on t southern fork of Squaw Creek, 4 miles east of Iron Mountain. The main dow track tunnel is 1,145′ long; there is another tunnel driven 175′ vertically lowe The mine has 15,000′ of workings and property has been tested by 5,119′ diamond-drill borings.

The orebody is a lens, claimed to be approximately 150′ wide by 1,000′ lon but apparently the ore does not go to great depth, and it is possible that it bottom limits have been reached. The property is said to have ore reserv of 400,000 tons, with fair chances of 750,000 tons, and possibilities of a great tonnage. The crosscut tunnels, driven in from the sides of the mountai connect with drifts on the orebody, which is low-grade pyritic ore containi disseminated chalcopyrite, and holding 1 to 2½% copper, with combined gol and silver values of about $1 per ton. The ore carries small quantities of zi and an excess of iron, and probably averages around 2½% copper and 1 silver per ton, with small gold values. The Trinity also has an orebody, undetermined size, on the opposite side of the gulch from the Shasta King.

The Shasta King mine has ore bins, and a 2,000′ incline tram, of abou 500 tons daily capacity, leading to the head house of the Balaklala tramway The Copper King group of 22 claims, on Motion Creek, about 2½ miles of the Shasta King mine, has about 1,000′ of exploratory workings, but apparentl no ore has been found in place. The Statesman group has been partially ex plored, in an effort to locate and develop silicious ore required for fluxing th heavy sulphide ores of the Shasta King mine. The Uncle Sam group, he under bond and lease at last accounts, also has been exploring for fluxing ore the Shasta King having large bodies of low-grade copper sulphide, but lacki the silicious ores required to make free-smelting furnace mixtures. The Unc Sam group shows some oxidized ore, at and near surface, of 3 to 8% copp tenor.

Equipment: includes a steam plant with a 6-drill air compressor an power drills; also a diamond drill, with which considerable boring has be done. Buildings include a laboratory, warehouse, shops, hospital and about houses for employes.

The company was reported to be ready for production September, 1907, the rate of about 150 tons daily. It started production October, 1908, a shipped ore to the Balaklala smelter, but closed down early, 1909, and no rep of the actual production of copper can be secured. The Trinity Co. claim to have a contract with the Balaklala smelter calling for the treatment of 30 tons of ore for the first year and 360,000 yearly for the 9 succeeding years, a minimum of 300 and m[illegible] of 1,000 tons dail[illegible]ich was to have be matted for $3 per ton, but [illegible]ract was not ca[illegible] and the mine h been clo[illegible]n since [illegible]909, waiting [illegible] copper and s for th[illegible] of the [illegible] see W[illegible]

Pr[illegible] come [illegible] ignoran[illegible] awaiting [illegible]

uccessful, the unbroken chain of Trinity's misfortunes should

1917, T. W. Lawson told shareholders that the mine was again he entire property to be diamond-drilled; also that an advan- ear contract had been made with the U. S. S. Co. for 200 tons Furthermore, that even if no additional ore is discovered the deposit will supply 3% ore for many years. He added that a ial statement would soon be made. He advises: hold on to tips on Butte, Chino and Copper Range were all correct.
18, the company issued a report saying since operations were er. 1917, production amounted to 51,455 tons ore, yielding , also $1.04 per ton in gold and silver. Up to February, 1919, o the Mammoth smelter ceased, the output approximated

)19 that Shasta King mine was closed down, the lease to the Co. having expired.
1919, T. W. Lawson, is reported to have advised share- resent company is in debt, and getting deeper in debt instead Ie recommended that the property be sold to a new company, aws of Virginia, "where the taxation is less severe." The be 1,000,000 shares, par $5, compared with Trinity Copper's . Each shareholder is to receive one new share for each nders, while he may purchase new shares at $2 each. Another acquired, and part of its earnings can be used "to make a on of all Trinity's enormous ground." Lawson also said that compelled, as president of Trinity Copper, "to so radically of its future. At the start-off, I made large profits. Since stock market campaigns, which were started because of favor- the property, I have lost heavily." If Trinity cannot make r above 20 cents, as it was when operations were under way, erty was closed down for all time.

GOLD MINING SYNDICATE **CALIFORNIA**

Grant Bldg., Los Angeles.
.. Mullholand, v. p., El Monte, Cal.; V. E. Stockwell, sec., Harris Trenholm, supt., Trona, Cal.
1917. Cap., 1,000,000 shares. Company reports operating nths, $3,413, and gross earnings for same period, $2,940.
claims, unpatented, 8 miles N. E. of Trona, Cal., said to n in granite and porphyry. Ore is gold, silver assaying about

: by tunnels, total workings about 1,000'.
ncludes a 25 h. p. hoist and a 35-ton cyanide mill.
Dec., 1919, reports that mine has been operating about 3

) MINING & REDUCTION CO. **CALIFORNIA**

unct for years. See Vol. XIII.

NES CO. **CALIFORNIA**

: 58 Sutter St., San Francisco, Cal. **Mine office:** W. R. op. Inyo county, Cal.
. Townsend, pres.; R. A. Orrett, sec., with R. A. Kinzie, Thompson, F. W. Griffin and J. C. McKinstry, directors.
): shares $10 par.
oup of claims, purchased 1915 from A. J. Clark, situated own as Deep Canyon, 7 miles west of Bishop. The scheelite- ccurs in granite. (U. S. Geological Survey Bulletin 640-L, escribes the district.)
2 tunnels, one on each side of the new mill and con- tram line.
1916, is equipped with Allis-Chalmers rolls, trom-

available.

TUOLUMNE GIANT GOLD MINES CO. CALIFORN

Address and names of officers not available. In August, 1919, stock advertised by Jas. H. Blagge, 332 Security Bldg., Los Angeles.

Cap., $1,000,000; $1 par.

Property: two groups of claims, Tarantula and Gold Ridge, in T umne county, said to adjoin the Eagle Shawmut on the north. Tarantula g has 7 claims and a mill-site; Gold Ridge group has 3 claims and 4/8 sectio patented agricultural land; total area about 300 acres. The Tarantula has a l tunnel and 700′ winze with levels at 100′ intervals. The Gold Ridge has a s 118′ deep, and samples from vein said to average $5.25 gold per ton.

Equipment: 20-stamp mill on Tarantula and 10-stamp mill on G Ridge, hoists, compressors, etc.

Evidently plans to reopen properties. Said to have been examined by T A. Wetzel and F. W. Royer.

TWENTY-ONE MINING CO. CALIFORN

Address: Allegheny, Sierra county, Calif.

Property: a gold quartz mine in the Alleghany district that has prominent in recent years on account of apex litigation with the Sixteen-to- Mining Co. In October, 1919, the latter was awarded $93,000 for trespass.

UBEHEBE COPPER MINES & SMELTER CO. CALIFORN

Mail returned from former office at 956 Rockefeller Bldg., Cleve Ohio. **Operating office**: Tonopah, Nev. **Mine office**: Lone Pine, county, Calif.

Officers: At last accounts, John Salisbury, pres., St. Francis Hotel, Francisco, Calif.; Henry G. Merry, v. p. and cons. engr.; J. J. Griffith, sec.-t

Inc. 1907 in Nevada. **Cap.**, $3,000,000; shares $1 par.

Property: 50 claims, 1,000 acres in the Butte Range, 48 miles Thorpe on the Bullfrog & Goldfield railway, said to show vein of 8 to 50′ in granite and limestone, carrying copper ore with gold-silver values. Pro advertised 1907 as a mountain of gold-silver-copper ore nearly 2,000′ high.

Development: by an 80′ shaft and 145′ tunnel, with some work on holdings. The company has done annual assessment work, but contemp no further extensive development until the financial situation improves, means of transportation are devised. Was a promotion in 1907 of Pearce & Co. of Baltimore, Md. Property said to have merit if systematic dev ment carried out. Idle for years.

UNION DEVELOPMENT CO. CALIFOR

Address: 713 Iowa Loan & Trust Bldg., Des Moines, Iowa.

Property: the Blazing Star mine ½ mile E. of West Point, Cala county. A 2′ quartz vein was developed by a 400′ shaft, which was bein opened in 1917; no recent news available.

UNION HILL MINES CALIFOR

Company disincorporated and property taken over by Idaho-Maryland Co., which see.

UNITED GREENWATER COPPER CO. CALIFOR

Office: Tonopah, Nev. **Mine office**: Dale, via Amboy, San Bernar county, Calif.

Property: Company was operating the Supply mine and owned th K. mine. This group is developed by shafts of 800′ and 1,100′. Had a 3 cyanide plant which was enlarged in 1915. Reported to have treated 60 to ore daily in 1915, averaging $14 per ton. Milling costs were 75c per ton.

No returns since

UNITED STATES ORATION CO. CALIFOR

Office: 617 Pa San Francisco ine office: Granite R unty, Calif

s: O. P. K. Mille mgr.

000; r; promotion

engineer

for 240' of ore-shoot. Vein said to average 2' wide. Machinery
5-ton mill, including crusher, rolls, jigs, concentrators.
a received for several years.

NGSTEN COPPER MINES **CALIFORNIA**

01 Bradbury Bldg., Los Angeles, Cal.
rank F. Peard, pres.-mgr., Hotel Maryland, Pasadena, Cal.;
e. v. p.; Wm. K. Weaver, sec.-treas. Jos. Zanini, supt., Victor-

n Arizona. **Cap.**, $2,000,000; $1 par: issued 1,527,201.
18 claims, 360 acres, in Morongo mining district, San Ber-
ains, 47 miles from Victorville. San Bernardino county, has been
elopment, by tunnels for past two years.
nt reports ore reserves of 10,000 tons and that a 25 to 50-ton
ilt.

XPLORATION CO. **CALIFORNIA**

Morris P. Kirk, pres.-mgr., Salt Lake City.; Geo. H. Ryan,

a zinc mine 9 miles from Darwin, Inyo county, and 34 miles
the nearest railroad point, said to have the largest known deposit
te, averaging over 40% zinc and 12% moisture. The greatest
re so far disclosed is over 25'. A small calcining plant, 10 to 12
pacity, reduces the moisture to 1½%, thus making a saving in
road freights. Rate of shrinkage in calcining averages 22%.

LD MINING CO. **CALIFORNIA**

ne closed permanently in 1918; see Vol. XIII for full description;
Cliff at Angels, Calaveras county, is being worked to depth of 1,900'.
tons of good ore daily for the 40-stamp mill.

DREDGING CO. **CALIFORNIA**

R. H. Elliott, Hobart Bldg., San Francisco. **Mine office:** Milan
ipt., Junction City, Cal.
: Bulkeley Wells, pres.; R. H. Elliott, v. p.; A. D. Snodgrass,
ith T. D. Harris and Jafet Lindeberg, directors.
rch, 1916, in California. **Cap.**, $200,000; shares $100 par; all
ual meeting, third Tuesday in February.
y: placer claims, near Junction City, Trinity county, Cal. Gravel
and metals of the platinum group.
ent: one 7 cu. ft. close connected, electric driven dredge.
ion: 1917, 1,494,860 cu. yds. at cost of 5.01 cents per cu. yd.; 1918,
yds. at cost of 5.89 cents per cu. yd.
started late in 1916. Costs are low.

AND & MINERAL CO. **CALIFORNIA**

: Angels Camp, Calaveras county, Cal. Company received a
California State Corp. Commission to sell 200,000 shares at 50c
anagement states that it has a gold mine, with 410 acres of ground
with machinery, etc.

WER & MINING CO. **CALIFORNIA**

H. Sharpe, 1025 Hearst Bldg., San Francisco. **Mine office:**

L. H. Sharpe, pres.; A. Bonick, v. p.; A. A. Barber, sec.-treas.;
ite, directors.
1907, in California. **Cap.**, $500,000; shares $1 par.
3,400 acres in Harrison Gulch, Shasta county, Cal., including
Hill, Bonanza, Bull Moose, and other mines. The first-named
a gold yield of $4,000,000.
uartz vein in diabase and slate,, dipping 74° and pitching
body is 12" wide and 200' long, ore averaging $22 per ton.
t: by 1,200' vertical shaft, and tunnels. Workings total
late in 1919 were said to be very good.
includes 250-h. p. Diesel engine, 70-h. p. electric hoist, 90-

h. p. compressor, three 20 h. p. pumps, and reduction plant using 4 Gibson mi and concentrators.

Ore reserves are given, June, 1919, as 30,000 tons of $15 ore. The manag ment in the past has done too little development work, pursuing a "day to da policy and not maintaining sufficient ore reserves. The company was unfortuna in having had its stock promotion handled by an "investment securities" fi on Broad St., New York, which ran the stock up to $5.25, when one of t firm skipped.

WALKER CONS. MINING CO. CALIFORNI

Address: J. R. Walker, pres., Salt Lake City.

Property: paralleling that of the Walker Mining Co., said to have e tensive orebodies shown by an 800' tunnel and numerous surface workin Diamond-drilling was to be started in October, 1919.

WALKER MINING CO. CALIFORNI

Subsidiary of the Anaconda Copper Mining Co., through the Internatio Smelting Co.

Office: 618 Kearns Bldg., Salt Lake City, Utah. Mine near Portola, P mas county, Calif.

Officers: J. R. Walker, pres.; O. M. Kucks, v. p.; J. B. Whitehill, se treas., with C. A. Walker and B. R. Howell, directors. V. A. Hart, mgr.

Inc. 1913, in Arizona. **Cap.**, $1,250,0000; $1 par; all issued. Also 100,0 $1 pfd. shares issued. Stock listed on the Salt Lake Exchange. In 1918, Anaconda Mng. Co., through its subsidiary, the International Smelting Co. exe cised its option on control of the company. As reported, the deal called f 630,000 shares at $1 per share.

Property: 38 patented lode claims, 2 placer claims, heavily timbere elevation, 7,100', in an unorganized district, 19 miles N. W. of Portola, on t Western Pacific Railroad.

Geology: the claims show diorite largely overlain by volcanic tuff; t diorite showing fissuring and alteration for length of several claims.

Development: the property has been explored to a depth of 346' by shafts, and drifts from these shafts have opened an orebody 800' long, averag width 16', and averaging 4% copper. Diamond-drill holes indicate an ad tional length of vein of 900'. A 3,500' crosscut tunnel is being driven to cut vein, then follow the vein 1,200' to the shaft, developing property to a dep of 800'. The tunnel was 2,250' long in August, 1919.

Equipment: the mine has a 120-h. p. steam plant, large hoist, co pressors, etc. An aerial tram, 8.2 miles long, carries supplies from, and c centrates to the railroad. Auto-trucks are also used.

The mill capacity was doubled in 1917, and now treats 200 tons daily. employs ball-mills and flotation machines. Recovery is well over 90%. November, 1917, electric power from the Great Western Power Co. supersed steam. Employs 200 men.

Gradually this is becoming one of the most interesting of California co mines.

WERINGER MINES CO. CALIFORN

Officers: Jos. Weringer, pres. and mgr., Woody, Kern, Cal. F. J. W inger, v. p.; Erwin W. Owens, sec., Nat'l Bank Bldg., Bakersfield, Calif.; C Kamproth, treas., with E. H. Woody, Paul Fox and Amasa P. Peak, direct

Inc. Dec. 17, 1914, in California. **Cap.**, $500,000; $1 par; 293,543 iss Secretary is transfer agent. California Corporation Commission grante thority to sell 100,000 shares at 50c in 1915.

Property: the Greenback mines, 68 claims on R. R. land, with 2,200 a mineral and water rights in sections 1, 2, 3, 10, T. 28 S., R. 29 E., situated 22 m from railroad at [illegible]. Mine said to [illegible] contact metamorphic de [illegible] lime in gr[illegible] porphyry, runni[illegible] and S. W. and dipping [illegible] [illegible]ne, wolframite, wit[illegible] [illegible] silver and $1.50 [illegible] [illegible] H. W. Turner, D[illegible]

ent: aggregating 1,600′ by 200 and 230′ incline shafts, con-
depth. Latest work on 140′ level. Ore reserves: 10,000 tons
ons on dump valued at $150,000.
t: 20-h. p. gasoline hoist, 75-h. p. engine, compressor, etc.
l was started in April, 1917. It includes jaw crusher, 6″x22″,
mill, Dorr classifier, K. & K. flotation machine, and Oliver filter.
plied to requests for information.

MERCURY CO., INC. **CALIFORNIA**

68 Post St., San Francisco and Cloverdale, Cal.
Andrew Rocca, Jr., pres.-treas.-supt., Cloverdale; J. G. De
L. B. O'Farrell, sec., with C. A. Shurdtleff, H. L. Johnston, E. C.
Schorr, directors. Annual meeting, second Monday in May.
, 1919, in Cal. Cap., $300,000; $1 par; assessable; outstanding

ings for past year reported as $142,401, with operating expenses

: 13 claims, one patented, 260 acres, in Macaymas mining dis-
E. of Cloverdale, Sonoma Co. The orebody is characterized by
ly stratified chert, inclosed by sandstone. Chert strata vary from
hickness; ore averages ½% mercury.
nent: tunnels with 2,000′ of workings. Ore reserves reported
, with 20,000 of this blocked out.
nt: includes gravity tram from mine to mill, and a furnace with
of 85 tons.
on: in 1918 amounted to 1,267 flasks of mercury, and more than

83, Quicksilver Resources of Cal., Bull. 78 of Calif. State Mng.

MINES CORPORATION **CALIFORNIA**

d in Vol. XIII as operating the Gwin mine, but company was
ing organization and did not operate the mine, which has been idle
ars past. Unable to get recent information on company; probably
Gwin Mine & Development Co.

D CHEMICAL CO. **CALIFORNIA**

ry of West End Mining Co. of Nevada.
20. Cap., $3,000,000; shares $1 par.
y: 2,300 acres leased from the Federal Government and 680 acres
Searles Lake, San Bernardino county. Townsite is known as
the Trona railroad. Brine from the lake is to be treated for
potash, borax, and other salts.
ent: 5-mile narrow-gauge railroad, telephone, telegraph, power,
s, road, pumping plant on lake, testing plant at Westend, laboratory,
p. office, bunk and boarding houses, and camp fully equipped with
ater, and lighting system.

JUDKINS CO. **CALIFORNIA**

: Mariposa, Cal. P. W. Judkins, C. H. Weston and I. L. Dear-
of a gold mine in the Colorado mining district, near Mariposa.
worked by lease. Ore is said to average $8 per ton. Developed
Equipment includes a 10-stamp mill.

LCH MINING CO. **CALIFORNIA**

3 12th St., Oakland; C. C. Powning, supt., Bagby, Cal.
the Virginia quartz mine, 8 miles from Bagby, Mariposa
ein varies from a seam to many feet in width with serpentine
abase hanging-wall.
nt: 750′ shaft, with 5 levels.
includes a Fairbanks-Morse hoist and 35-h. p. motor, 50-h.
compressor; 3 miles of power line; track, cars, pipe, buildings,
amp with crusher and amalgamating plates and 50-h. p.
17. Pelton were employed and the mill was treating 30 tons

WHITE KNOB COPPER & DEVEL. CO., LTD. CALI

Address: 42 Cedar St., New York.

Officers: John P. Smith, pres.; A. H. Carlisle, v. p.; Arthur sec.; E. H. Kelly, treas., with W. W. Cohen, directors.

Cap., $6,000,000; $4,000,000 common and $2,000,000 7% cumula ferred stock. Company is a holding company controlling through of $1,200,000 of the capital stock, the Argonaut Consolidated Mining C dend payer, which controls the Argonaut Mining Co., at Jackson, Amad Calif., which see.

Dividends: were resumed in 1914, with payments of 25c per preferred stock, November, 1914; 10c in February, May, August and N 1915; 10c, February, May, August and November, 1916; 25c in 1917 a 1918.

WHITE PINE MINING CO. CALI

Address: F. A. Crampton, 207 Oregon Ave., Santa Monica, C

Officers: F. A. Crampton, pres.; D. M. Hewey, v. p.; C. H. sec.-treas.; also directors.

Inc. Aug. 5, 1915, in Nevada. **Cap.,** $1,000,000; shares $1 p assessable. 725,000 issued. Annual meeting, first Wednesday in Jan

Income from ore sales in 1916 was $18,000 and expenses $47,000.

Property: the Green Monster Extension at Goodsprings, Nev present. Mine examined by J. N. Nevius, O. B. Suhr and F. A. Cram

Production: in 1915, 10 tons of copper and 35 tons zinc ores.

WHITE ROCK MINE CALI

Address: Frank R. Sweasey, principal owner, Humboldt Ba Market St., San Francisco.

Property: one of the largest magnesite mines in the State, in N ley, 20 miles E. of rail at Rutherford, Napa county. The mine is at an of 1,200', and 500' above the works. The main vein, 15' wide, in serpe distinct walls, dips 35°, and ore carries 45% MgO and 1.5% FeO an in demand for refractory purposes, as it is low in lime.

Development: by a main 500' tunnel and 5 levels above it, sho of backs. Ore persists below the tunnel-level. Some open-cut work Reserves are considerable.

Equipment: distillate engines, Chicago Pneumatic compress chine-drills, smithy and screening plant at mine, 5,000' aerial tram hourly capacity, 11 vertical calcining kilns using coke, of 6 to 7 tons dail of roasted ore, crusher, bins, motor-trucks, and camp for all employe

Production: normally 3,500 tons of crude, or 1,700 tons of calci nesite per month.

WILLOW VALLEY MINING CO. CALI

Office: 443 Holbrook Bldg., San Francisco. **Mine office:** Nev Calif.

Officers: M. Dozier, pres.; J. L. M. Shetterley, v. p.; C. E. Ba treas.; A. W. Hoge, C. F. Kinsey, R. W. Bender, directors. A. W. H

Inc. May 18, 1915, in California. **Cap.,** $1,000,000; shares P nual meeting in May.

Property: 9 claims, 4 patented, 125 acres, in Nevada Co vada county, has several veins, containing gold and silver granodiorite and slate and dip from 20° to 70°. Developed to depth of 800'.

Equipment: includes electric power, compressor, pu mill, etc. Developing only, 1916-19. No later returns and letters sent them.

WILSHIRE BISHOP CREEK CO.

Bishop, Kern county, Calif. Operates a mine formerly Point Cons. Mines Co., now absorbed by Cons. Wilshire

YANKEE JOHN DEVELOPMENT CO.

Address: 501 Peoples Bank Bldg., Pittsburg, Pa.

L. Clark, pres.; G. B. Preston, v. p.; W. T. Drill, sec.-treas.,
an, A. M. Host and H. T. Morris, directors.
Delaware. **Cap.**, $1,000,000; $1 par. Listed on New York

laims, 6 miles W. of Redding, Shasta county, said to show
desite and rhyolite.
; by 2 shafts, 50′ and 200′ deep, with 1,500′ of workings.
ncludes a gasoline hoist, compressor, and a 40-ton mill.
ore reserves as 6,300 tons of $20 ore.

R MINING & MILLING CO. **CALIFORNIA**

se L. Burcham, sec., 839 Citizens Bank Bldg., Los Angeles.
sburg, Kern county, Cal.
rt Ancker, pres.; Arthur Asher, v. p.; Rose L. Burcham,
ti, treas.; H. L. Bennett, asst. sec., with R. H. Raphael and
ors.
1897, in Nevada. **Cap.**, $1,000,000; shares $10 par; 86,761
l. April 30, 1917, in Nevada, with capital of $1,500,000; shares
sued. Annual meeting, May 16.
1916 shows a revenue of $437,197, less $313,970 for operations,
rovements.
October 31, 1917, revenue totaled $8,725,588, of which $1,245,789

ve been irregular for many years. Paid $38,000 in 1916;
1917.
patented and 6 unpatented claims, water rights and placer
acres, mostly at Randsburg, Kern county, Cal., and one mile
on the Santa Fe Railroad.
occurs in granite, schist, and porphyry. Main orebody
ide, with schist hanging-wall. Ore is low grade, averaging
20 years. Gold is easily extracted.
is extensive, aggregating about 27 miles of tunnels,
ncl other workings to depth of 750′. Open cut work has
he ore in the past. Reserves estimated in December, 1916,
at 6,278,529 tons of $1.77 ore.
sed down November and December, 1917, but in 1918 treated
grade and recovery not given.
-h. p. and smaller hoists, 150-h. p. compressor, machine
, pumping stations and several miles of water pipelines,
screening plant, 100-stamp mill (back to back design, each
150-h. p. motor), copper plates, steam boilers and engines, 3
aty 3-ton side-dump steel cars, machine shops, assay office
ile store. Recent additions are costing $250,000. A cyanide
to treat 1,000,000 tons of tailing stored. Power is supplied
ra Power Co. So far $747,972 has been spent in plant on

n 189[illegible] to Oct. 31, 1917, there was mined 2,713,384
588, [illegible] The cost was $2.44 per ton.

	Cost per ton
[illegible]	$1.80
	2.08
	1.83
	1.96
	2.22
	2.00
	1.41

Yellow Aster has passed through much litigation in the past, but is no clear of further trouble in that respect. The secretary reported August, 1919, th the mine was so badly handled during 1917 and 1918, that the company do not wish to give any details. Work was stopped on January 18, 1919, except for development by 10 or 12 men under direction of the secretary, and some wo on a silver vein.

YOSEMITE DREDGING & MINING CO. CALIFORNI

Address: J. W. Neill, Snelling, Cal.; or 159 Pierpont St., Salt Lake Ci Utah.

Property: 400 acres along the Merced river, near Snelling, Merc county, Cal. Gravel is up to 20' deep, and is easily dug.

Equipment: a dredge with 3¾-cu. ft. buckets, screen, Hungarian riffle 10 Neill jigs, and tailing elevator. Electric power is used throughout. A featu on this boat is the recovery of platinum.

Production: gravel is reported to yield up to 16c per yard, extracte at a cost up to 7c per yard. According to J. W. Neill in the Min. and Sci. Pre of December 8, 1917, in the 22½ months preceding July 1 of this year, the bo dug 1,534,750 cu. yd. Besides the gold, there was recovered 41 oz. of platinu and nearly 1 oz. of osmiridium, valued at $3,438 and $25, respectively.

Property has been highly profitable for several years, and is in the han of a capable metallurgist.

YUBA CONSOLIDATED GOLD FIELDS CALIFORNI

Offices: 50 Congress St., Boston, Mass.; Insurance Exchange, Californ St., San Francisco, and Hammonton, Yuba county, Calif.

Property: extensive dredging areas on the Yuba river, California which 14 large dredges are operating. No. 16 and 17 have 18-cu. ft. buckets.

Production: years ending February 28:

Year	Yardage	Average, Cents	Total Yield	Cost, Cents	Profi
1918-19.....	.....	....	.....	...	.....
1917-18.....	15,460,000	18.42	$2,849,220	4.90	$2,090,6
1916-17.....	18,490,000	14.86	2,748,197	3.99	2,009,5
1915-16.....	17,750,000	12.02	2,133,528	4.27	1,374,8

Company maintains a large machine-shop, wherein its dredges are made a repaired, and also makes them for other companies. The engineering concern known as Yuba Manufacturing Co., with works near Marysville, Calif. Yu Consolidated, the largest gold producer in California, is a pioneer in l dredging practice, yet little or no information is obtainable.

ZENDA MINING CO. CALIFORNI

Address: C. H. Clausen, Amalie district, Kern county, Calif.

Property: the old Zenda gold mine being reopened late in 1919, a said to contain a large tonnage of payable gold ore.

COLORADO

The description of mining companies and mines of this State are arrang alphabetically, since outside of the Leadville and Cripple Creek districts, t mines are scattered over many counties and many small districts. Leadville a Cripple Creek companies can be identified by the index, where the titles a grouped under these locality names.

The mineral production of the State shows a general decrease of output all metals during 1919, as compared with 1918, when the yield was as follow Copper, 6,190,000 lb.; gold, $12,705,000; lead, 66,000,000 lb.; silver, 6,900,000 and zinc, 86,550,000

ACCORD MIN[illegible] & MILLING CO. COLORAD

Idle. No [illegible] from Georgetown, Colo., for 4 years.

[illegible], 3 miles from Georgetown, Co

[illegible] company intended

,100′ with expectation of cutting the American Sisters and of veins on the East and the Capital Prize system on the

romising, but company not in good financial condition at y related to the Alco Mining & Milling Co.

O. **COLORADO**

ne, Colo. Jas. E. Dick, mgr.; Donald Dyrenforth, supt. ims, 29 patented, 250 acres, in Tomichi mining district, miles north of Sargent. There are three fault fissure veins stone and granite, course N.-S., dip 45° E., containing ore oz. silver, 14% lead and 14% zinc.

y 360′ shaft, and 4,200′ of tunnels, etc., totaling 8,000′

udes compressor, hoist, and electric power. An 80-ton ilt in 1919.

ast three years reported as 129,853 lb. copper; 1,373,506 lb. ; 43,141 oz. silver.

ON M. & M. CO. **COLORADO**

Colo. O. H. Shaffer and Chas. Swanson, lessees.

bro mountain, near Dumont, Clear Creek county.

orkings said to show an 8 to 12″ band of smelting ore nilling ore. A crosscut tunnel was driven 260′ to drain the ng had progressed 500′ at last accounts. Early in 1920 an erected to connect the Heliotrope mine with the Colorado

MILLING CO. **COLORADO**

etown, Ohio.

ame officials as Accord Mining Co.

of lode claims on Saxon mountain, near Idaho Springs,

uded hoisting plant.

LLS CORPORATION **COLORADO**

lear Creek county, Colo.

clared defunct and inoperative on October 3, 1913. Mine d at Sheriff's sale, April, 1914.

M. CO. **COLORADO**

claimed, March 18, 1918, from Cardinal, Colo.

Hunt: pres.-gen. mgr.; Hudson T. Morton, v. p.; G. W. Operated a lease on the properties of the Pine Grove M. & n group, about 200 acres, 1 mile above Nederland, Boulder

00′ shaft with 2,000′ of levels, and the 2,400′ Alton tun- ed the bottom of the shaft. The Alton mill, remodeled in ips, a Monel slimer, Wilfley and Card tables, crusher and a it.

INING CO. **COLORADO**

rl St., Boulder, Colo.

Corfield, pres.-gen. mgr.; W. H. Jones, v. p.; H. C.

hares 25c par.

ns, the Congo Chief mine, on Idaho mountain, N. E. of nty. Company also developing the Buenaventura, a gold strict, consisting of 4 patented and 2 unpatented claims.

d on the Congo in 1917. The property is said to be an ex- me lode and carries galena, native silver and chlorides in wide. Ore at depth of 10′ said to assay $225 to $400 in shipments to have returned 36 to 490 oz. silver, 18% lead

y 370′ shaft and some drifting.

Equipment: includes 35-h. p. electric hoist and 3-drill c
Company reports having enough money to last until May, 1920.

ALMADEN MINES CO. CC

Property of the company, in the Lower Fall mining district, Springs, Clear Creek county, sold in November, 1915, to satisfy a j $27,596. Purchased by Geo. Neill, of Topeka, Kan., and J. A. G Bellaire, Ohio, principal bondholders and stockholders, who planne operations in 1917, but apparently did not. The property is said to good producer of silver ore in its day.

ALTA MINES CO. CC

Office: Telluride, San Miguel county, Cal. Operations rep porarily suspended owing to fire and shortage of labor.

ALTEZUMA GOLD M. & M. CO. CC

A. L. Miller, mgr., Central Savings Bank Bldg., Denver, Colo.
Inc. in Arizona. **Cap.,** $5,000,000; $1 par; 2,500,000 shares i
Property: 4 claims, 2½ miles from Montezuma.
Ore: lead-silver.
Development: 4 tunnels, longest 190′ known as the Fra Plans included the re-financing of company and driving the Franc additional 200′, but have not been carried out. Idle.

AMERICAN DREDGING CO. CC

Address: S. L. Bright, Breckenridge, Summit county, Colo.
Company has acquired several properties in the Breckenridge was doing preparatory work in August, 1919.

AMERICAN METALS PRODUCING CO. CC

Office: Central City, Colo. E. S. Moulton, pres.-mgr.; C Adams, supt.-treas.
Cap., $100,000; $1 par, in 30,000 preferred and 70,000 commo
At last accounts operated a reduction plant at Blackhawk, Gi equipped with Moulton-Adams system to handle low-grade refr Plant treated custom ores.

AMERICAN MINES CO. CC

Mail returned unclaimed, September 17, 1918, from Foster Bl Colorado.
Officers: A. E. Blakesley, pres.; E. M. Howell, v. p.; J. N sec.-treas., with W. A. Burke, L. M. Beck, directors. J. W. Kirkbrid
Inc. in Wyoming. **Cap.,** $1,500,000; $1 par; issued $1,300,00
Property: one claim in the Gold Hill district, 12 miles north Boulder county, said to have an orebody 200′ wide, proven for a le and assaying $4 in gold per ton.
Development: by 300′ tunnel. A 25-ton stamp mill instal 1916. Idle.

AMERICAN MINING CO. CC

Property: American Nettie mine, near Ouray, Ouray count
Ore: gold in broad, flat shoots, in quartzite, about 7′ thick for 700′ in length. These orebodies are believed to be the northerly or downward faults of the Wanakah orebodies, which intersect the zonite porphyry dike running due east through the Nettie ground.
Development: 700′ tunnel and upraise.
Equipment: compressor, drills, and machinery.
Production: in gold since 1889, $1,500,000.
No late information available.

AMERICAN MINING & POWER CO. CC

Name now Martin M. & P. Co., holding company of Martin M. New York, which see.
Officers: S. G. Martin, pres., 40 Exchange Place, New York. tin, v. p.; W. B. Jones, sec., 9 Park Place, New Rochelle, N. Y.
Inc. in Delaware. **Cap.,** $6,000,000; $1 par.

RS MINES COLORADO

Colo. Robert Christenson, mgr.
tented and 14 unpatented claims, closed since 1904 on
Credited with a total production of about $1,000,000, in

d by Denver investors, in 1918.

GROUP COLORADO

Gulch, Silverton, San Juan county, owned by Galena Mt.
Co., which see.

CO. COLORADO

ohnson, Mgr., Silverton, Colo.
-leased the Emerald Lode property and is operating the
Sapphire mines.

O. COLORADO

rado Ave., Colorado Springs, Colo.
riscoll, pres.; Cab Johns, v. p.; A. T. Driscoll, sec.; J.
Dr. J. L. Lewis, directors.
. **Cap.**, $2,000,000; $1 par; issued $1,200,000. Annual
ransfer office, that of company.
ns, 6 patented, 80 acres, at Hayman, Park county.
vein in granite. Ore consists of gold, silver, and cop-
hoots 25′ long.
250′ vertical shaft and 800′ of tunnels.
n hoist and 3-drill compressor. Building a 50-ton flo-
ounts.

NG & MILLING CO. COLORADO

orado Bldg., Denver, Colo.
. Everett, pres., treas.-gen. mgr.; Chas. J. Jordan, v. p.;
; Will McLeod, mgr.
Cap., $1,000,000; $1 par. Treasury stock offered to the
blocks of 300 shares with a bonus of 20% and guarantee
l earnings.
ted of 4 mining claims near Idaho Springs, 2 millsites
Visconsin mining district, Gilpin county; a contract with
district for daily supply of 50 tons of ore at $3 per ton and
Mountain 75-ton concentrating mill at Blackhawk, Gilpin
claimed it would "take no chances in the mining business,"
ng mining claims and doing only a custom-milling busi-
earnings of $150 per day, to be divided among the stock-
heir confidence in the management.
ation.

MINE CO. COLORADO

7, Georgetown, Colo.
ley, pres.-treas.; J. S. Armstrong, v. p.; W. G. Bell, sec.
ms, about 215 acres, in Clear Creek county, reported to
values in a fissure vein, in granite, with dip of 30°, and
Company reports assays between $10 and $30 per ton.

AGE TRANSP. & TUNNEL CO. COLORADO

St., Boston, Mass. **Mine office:** Idaho Springs, Clear

. Parsons, pres.; H. W. Robinson, sec.; R. E. Schirmer,
Stewart, supt.
orado. **Cap.**, $100,000. Is controlled through ownership
y Argo Mining & Tunnel Co., Ltd., and property described

fiscal year ending August 31, 1916, showed an operating
ed with a net profit of $1,112 in 1915, the decrease being
eral properties and subsequent slackening of transportation

vailable.

ARGO MINING & TUNNEL CO. **COLORA**

Office: 79 Milk St., Boston, Mass. **Mine office:** Idaho Springs, C Creek county, Colo.

Officers: F. A. Schirmer, pres.; Chas. C. Parsons, v. p.; Chas. G. Sc mer, sec.-treas., with F. Hargreaves, C. P. Woodbury, J. A. Caldwell and H. Davis, directors; R. E. Schirmer, mgr.

Inc. 1909, in Delaware. Cap., $1,250,000; $5 par; issued, $952,325. D entures, $150,000 authorized; $135,000 issued. Company succeeded Argo Tr portation & Tunnel Co., Ltd., which succeeded Argo Tunnel & Mining Co., L which succeeded Newhouse Tunnel Co., Ltd. Owns the entire stock issue of A Mining, Drainage, Transportation & Tunnel Co., which holds direct title to tunnel.

Property: the Argo or Newhouse tunnel, 21,968′ long, with nearly miles of workings, is perhaps the most celebrated mining tunnel in existence. starts at Idaho Springs and passes under Russell gulch and Quartz hill, terminus in the Gunnell vein. The tunnel has double tracks, of 18″ gauge, with 30-lb. rails. For the first 12,000′ the tunnel is 9′ high and 10′ wide, bala being 8′ high and 6′ wide. Grade is 5″ per 100′. The tunnel was begun Janu 1894, and completed November 18, 1910, and provides drainage, transportat ventilation and air service for drilling operations.

The mines under which this tunnel passes are estimated to have produ about $75,000,000 in metallic values, and the tunnel cuts sundry veins of carrying gold, silver, lead and copper, and several laterals have opened vari orebodies of greater or less promise. The tunnel connects with the Concr Tremont, Prize, Burroughs, Kansas, Golden Edge, Gem, Sun & Moon, Old To Pozo, Saratoga and Gunnell shafts at depth of 1,600′.

During 1916, the Tremont, Burroughs and Gem mines were the sole shipp Development work by lessees on the Concrete and Pozo-Gilpin proved di pointing and was discontinued.

Equipment: includes 5 locomotives, handling 53-ton cars each. Tra portation charge for waste work through the tunnel is 17c per ton, and ores from 40c to $1.25, according to values. Ore is turned over to the Argo whose charges are from $3.50 up, including sampling and treatment.

During 1918 company was reported to have handled 19,700 tons of cr ore, paying producers $328,347, but later was forced to close down owing the increased cost of power and mine supplies.

ARGO REDUCTION & ORE PURCHASING CO. **COLORA**

Office: Idaho Springs, Clear Creek county, Colo. Chas. G. Schirm pres.; R. E. Schirmer, treas.-gen. mgr; G. H. Seibird, mill supt.

Inc. July, 1912, in Colorado. **Cap.**, $150,000; $100 par; issued $112,00

Property: a 100-ton custom mill at the portal of the Newhouse, or A tunnel. All ore is purchased outright on the weight and assay value. Tr ment consists of stamps, followed by tables, tube-mills, and flotation machi No production figures are available.

ASPEN MINE CO. **COLORA**

Property: the old Aspen mine at Silverton, Colo. Controlled by Am can Smelting & Refining Co. Operated by lessees who made small but ste shipments to the Silver Lake mill in 1917.

ASPEN SILVER-LEAD MINES CO. **COLORA**

Office: J. J. Yeckle, pres.-gen. mgr., Commonwealth Bldg., Den Colorado.

Property: 8 claims, about 150 acres, at Aspen and Alma, Park cou The Alma property, known as the Border Ruffian mine, is located near Mt. E and adjoins the Dolly Varden mines. Samples taken from old workings reported to give a silver content of 50-to 100 oz. and 50 to 70% lead.

ATLAS MINING & MILLING CO. **COLORA**

Office: Ouray, Colo.

Officers: C. H. Austin, pres.; C. C. Carson, v. p.-sec.; A. B. S treas., with C. H. Wagner, Wm. Story, Jr., and Chas. D. Loper, director A. Lannon, supt., Sneffels, Colo.

1904, in Colorado. **Cap,** $2,000,000; $1 par; 1,921,000 out-orized bond issue $50,000; all outstanding. Annual meeting in

8 claims, patented, 204 acres in Mt. Sneffels district, Ouray the Atlas & Crown Point mines. Ore, which occurs in 3' fissure is a complex sulphide, carrying grey copper, gold, silver and ssays are reported to run 9 oz. silver and 0.05 oz. gold per ton. nt: by a 2-mile tunnel to depth of 1,500' with a total of gs.

includes electric power, air compressor, tramway and 150-ll with table and flotation concentration, giving a 90% recovery. pects to solve further treatment of complex ores and increase . Employs 75 men.

30,000 tons in 1913, 35,000 tons in 1914, 40,000 tons in 1915, 16. Management estimates 50,000 tons of ore blocked out. In it was reported that the operating profit for the previous year largest in its history.

shortage of men, all available labor was used in developing the 8, while the mill was busy retreating tailings. Additions to excellent ore developed are said to insure a profitable return.

ETAL MINING CO. **COLORADO**

L. Arzeno, 9 E. 5th St., Covington, Ky.

L. Arzeno, pres.; Harry Levi, v. p.; Alf. E. Reinauer, sec.-. McDuffie, C. R. Farbach, Chas. H. Adams and B. S. Oppen-.

orado. **Cap.,** $100,000; par $1; reduced April 30, 1918, from ; $1 par.

bout 130 acres, patented, on Augusta mountain, 10 miles l Butte, Gunnison county, at an elevation of 12,625', shows a aining gold, silver, lead and zinc, with general average said to Vein is in diorite. Course, S. W.-N. E., with dip 70° S. E.. Has smodically since 1880.

nt: by 320' vertical shaft and several tunnels, longest over erty is idle since 1908 and surface equipment, including a 60-ton stroyed by snowslides. Output to date, $200,000.

S CO. **COLORADO**

ie O. K. mine at Central City, Colo. A. H. Frost, pres., gs, sec., Winona, Ont., Canada. Operated in a small way, by n, lessee, in 1915-16. Mine showed narrow fissure vein, carry-per. No recent information.

G CO. **COLORADO**

wn as the Baca Land grant, originally belonged to Senor Don s a gift from a King of Spain. The present owners opened the s in July, 1914. B. T. Tipton, mgr., Crestone, Saguache county,

,000 acres of mineral land, including 23 partly prospected ne, on the D. & R. G. R. R. The largest mines of the group Star, Sunset, Julia D., Queen Esther, Von Moltke, Great ependent, the latter being the only one developed by the

occurs in 8 well-defined contact veins, along dikes and in eins, in pockets and shoots; country rock is altered granite ss, cut by intrusive dikes of porphyry, phonolite and iron-taining gold, silver, lead, copper and zinc. Mother Lode said 12 miles on surface. Smelter assays ran $18 gold, 500 oz.

[illegible] of old workings, shafts and cross-Shipments made to the Pueblo smelter. [illegible] lessees under 2 to 5 year leases.

Miners receive free timber, water and assay services and pay 10-15% roy on ore extracted.

BACHELOR KHEDIVE MINES CO. COLORA

Address: Box 1,139, Denver, Colo.

Officers: Henry A. Dubbs, pres.; Henry Lyne, v. p.; J. S. Williams, s M. E. Austin, treas., with W. J. Kirsher, T. J. Hyland and W. B. McDo directors. C. A. H. de Saulles, gen. mgr., Denver.

Inc. in Colorado. **Cap.**, $1,000,000; $1 par, all oustanding. Annual m ing, first Monday in October.

Property: 11 claims, patented, 83 acres at Ouray, is a silver produ Operated by lessees. Ore sales, 1916, totaled $9,365, with net receipts of $3 and in 1918 were $27,735, with net receipts of $5,281.

BALD EAGLE MINING & MILLING CO. COLORA

Office: 307 Guardian Trust Co., Denver, Colo.

Officers: W. M. McGaugh, pres.; Clement Crowley, sec.; Chas. Scheuerman, treas.

Inc. Sept. 20, 1916, in Colorado. **Cap.**, $100,000; $1 par.

Company offered 10,000 shares, December, 1916, at 25 cents a share, st that the next 15,000 shares would be sold at 50 cents. The company's prospe stated that it held an option on the claims, but did not give bond price, w the president, in a letter, stated the Bosser interests were owned.

Property: 3 claims, a millsite and placer claim, totaling 40 acres in Ward district, Boulder county. Claims said to have two veins, one of t opened in five places and uncovered for a width of 22', the other 4' wide. is refractory and carries sulphides with gold.

Development: a 75' shaft with a drift at 30' depth and another 28' d at the 75' level.

Company claimed to have 1,000 tons of $40 milling ore on the dump an be able to treat same at a total cost of $4 a ton, if a 50-ton mill had been erec

The development on the property is, in our opinion, insufficient to prov disprove its value and the stock represents an equity in a blind pool, wit option to purchase unproven claims at a price not named.

No recent information available.

BALD MOUNTAIN MINES CO. COLORA

Office: Breckenridge, Colo.

Officers: C. A. Quist, pres.; J. F. Mall, sec.; L. L. Jones, treas.

Inc. in Colorado. Company holds lease and bond and is operating Carbonate, Golden Edge, Little Tommy and New Era properties on Mt. Ba Besides running high in lead, the ore is reported to assay from 18 to 30 oz. s and 1 to 3 oz. gold per ton.

BANNER STATE GOLD, SILVER & COPPER MINING CO. COLORA

Office: 45 E. 42nd St., New York City. A. G. Sullivan, pres.

Inc. 1908, in Colorado. **Cap.**, $500,000; $1 par; none outstanding.

Property: one patented claim in Bobtail Hill Lake district, Gi county. Not operating, but 300' vertical shaft planned.

BARSTOW MINE COLORA

Office: 42 Broadway, New York. **Mine office:** Ouray, Ouray co Colo. Works at Ironton, Ouray county, Colo. J. H. Fennessy, trustee. Pro under bond and lease to C. R. Wilfley in 1917.

Property: 27 claims, patented, 199 acres mineral land with 5-acre site in Red Mountain district, 11 miles from D. & R. G. R. R. and the Silve R. R., operating in the summer, is 1 mile away. Ore found in fissure vei andesite with N. W. strike and dipping 75°, is reported as 8' wide and co 0.75% copper, 2.5% lead, 4% zinc.

Developed: by 2 shafts, 425' and 145' deep, and 2 tunnels, 3,300' 3,300' long. Total length of underground workings, 10,300', reported as developed 17,000 tons of ore with 8,000 tons in sight. High-grade gold ore found in July, 1919, and [illegible] sent to Durango by September, yielded net each to the lessees [illegible] & Curtis.

th 2 hoists, electric compressor, 6-drill compressor, frame
ncentrator with 2 Blake crushers, 9x15", 40 stamps, 20 Wilfley
les and buddles.
n of this property was leased September, 1916, to Engineers
oulder, Colo., who work it for fluorspar. This vein, carrying 3'
across the Barstow vein. The deposit was struck at 1,100' in
ported to widen out to nearly 10' of almost pure grade.

ING & REDUCTION CO. **COLORADO**

ida, via Westcliffe, Custer county, Colo. Harry S. Thayer,
the old Bassick mine under a long-term lease. The mine was
7 and worked continuously until 1904, when fire halted opera-
ents between the owners prevented further development up to
curs as pipes and bands of sulphides in an andesitic agglomerate.
n plant has been planned.
famous one geologically, described in many text books and

NG CO. **COLORADO**

ntral City, Colo. Is not incorporated.
ates mine in Chase Gulch, Gilpin county, which had been

in pyrite and chalcopyrite in shoots about 3' wide, carrying
copper. Milling concentrate averages 1.23 oz. gold and 7.80 oz.
eturns average 2.50 oz. gold, 14 oz. silver and 2.94% copper.
d at the Polar Star mill, at Blackhawk, leased by the company,
shipped to Globe smelter at Denver.
at: consists of 100' winze sunk from 400' level and drift-
ed down June 30, 1918.

P MINE **COLORADO**

tral City, Russel Gulch district, Gilpin county, colo.
ed by Old Town M., M. & T. Co. of Idaho Springs, Colo.
es & Treewit of Idaho Springs and sub-leased to John Mollard,
E. V. Ingels.
from 3 to 6' wide, with shoots from 6 to 12" wide, was found
rom a shaft of 400' depth. The ore averaged 4 oz. gold, 8 oz.
copper. Shipments to the Pueblo smelter in September, 1919,
to $80 per ton.

CHAMPION MINE **COLORADO**

G. Hamblin, Idaho Springs, Colo.
pper Clear Creek county, Colo. Early in 1919, it was reported
ion during the previous year averaged $2,500 a month. Three
are mining silver ores that average $100 per ton. Main tunnel

AGNER MINING CO. **COLORADO**

of Tonopah Belmont Development Co.
luride, Colo. J. K. Kitto, sec.-treas., 500 Bullitt Bldg., Phila-

lyde A. Heller, pres.; Wm. M. Potts, v. p.; F. Bradshaw,
rt Bldg., San Francisco; John M. Fox, supt., Telluride, Colo.,
er, J. C. Fraley, R. G. Park, S. D. Sinkler, T. W. Synnott, C. B.
d. Wagner, directors.
1917, in Delaware. **Cap.**, $1,000,000; $1 par. Annual meeting
May, at Philadelphia. Transfer office: 500 Bullitt Bldg., Phila-

consists of 81 claims, 26 of which are patented; 2,000 acres,
King and Turkey Creek basins, San Miguel county, Colo.
fissure vein, mineralized as a whole, running S. E.-N. W.
[illegible] San Juan tuff and breccia, and containing silver, lead,
[illegible] veins.
[illegible] mine is worked by tunnels totaling 20,000'. Overhand
[illegible] fill methods used.

Equipment: uses a 300-ton flotation mill with 7 units, 1,200 cu. ft. co pressor and three tramways. Electric power used. Owing to labor conditi mine was closed late in 1918, but reopened in 1919, and in October, 150 men w employed. No production figures for 1918 or 1919 available.

BELZORA-BASSICK MINING CO. COLORA

Office: Lansing, Mich., and Ohio City, Colo.

Officers: Geo. D. Wilcox, pres.; John T. Hall, v. p.; L. W. Toles, s with E. A. Richards, A. A. Stoddard and Mr. Morgan, directors.

Inc. in Colorado. **Cap.**, $1,500,000; $1 par.

Property: about 235 acres in the Gold Brick district, Ohio City, G nison county, Colo. There are two ore deposits, one averaging 170' by 3' by 4 the other 35' by 2' by 400', both of which consist of sulphide ore containing l and zinc. Mine is developed by tunnels almost 4,000' long. During 1917 and 1 only test runs were made yielding $1,500; operations temporarily suspended to labor conditions and high development costs.

BENACK MINING CO. COLORA

Address: M. Fleming, 700 Fleming Bldg., Des Moines, Iowa.

Company formed to operate the Ouray group of claims, 50 acres, 7 mi S. E. of Ouray, Colo.

Development: by tunnel, said to have opened up an orebody for 4 and to have developed 17,967 tons of shipping ore and a larger tonnage of m ing ore, ranging in value from $10 to $25 per ton.

Latest reports show that shipments totaled 29 cars sent to the Salida smelt which averaged 57 oz. silver, 13% lead, 2% copper, 5% zinc, and yielded $ per ton.

BENGAL TIGER-GORDON MINE COLORAD

Formerly operated by Twin Lake M. & M. Co., now dead.

BESSIE-CORA MINING CO. COLORAD

Address: Ralph Roseberry, supt. Owns a group of claims, includ Silver-Wave, at Montezuma, Summit county, Colo.

Ore: silver-lead, in paystreak, 2½' wide and proven for about 100' Silver-Wave ground.

Development: by tunnel, winze and drifts.

Equipment: aerial tram, air-compressor, and electric power. From l est reports employed about 15 men.

BEZANT GOLD MINING CO. COLORAD

Office: Central City, Colo.

Officers: O. J. Duffield, pres.-mgr.; G. H. Putman, v. p.; L. A. Duffie sec.; C. C. Hendrie, treas., directors.

Inc. August, 1908, in Colorado. **Cap.**, $500,000; shares $1 par; 435,0 outstanding. Dividends to date, 50c. per share.

Property: 3 claims, one patented, 14 acres, has a quartz fissure vein granite and porphyry.

Development: by a 500' shaft and about 6,000' of drifts and crosscu said to have cut 3 veins, all showing gold, silver and copper values. Equipme includes complete electrical plant, 50-h. p. electric hoist, etc. Plans build a mill. Management claims to have a large tonnage of pitchblende-uranium blocked out.

Unwatering of the mine was attempted October, 1917, but according later announcements, company expected to resume work May 1, 1919. It w reported that British capital was interested.

BIG FIVE MINING CO. COLORAD

Office: Majestic Bldg., Denver, Colo. Mine at Idaho Springs, Colo.

Officers: H. G. Sanderson, pres.; M. C. Daniels, v. p.; Wm. H. Smi sec.-treas.

Inc. in Wyoming, June 1, 1912, as a reorganization of the old Big Fi Tunnel Ore Reduction & Trans. Co. **Cap.**, $750,000; $1 par; issued 400,57 Bonds outstanding, Dec. 31, 1918, $207,000. Cash on hand, Dec. 31, 1918, $5,7

Property: company's principal enterprise is the Central tunnel, ov 9,000' long, at Idaho Springs, developing several claims. The Edgar ve

than the others under development; receipts from Edgar ore were $342,797. Also owns 1,500 acres in San Juan and Clear nd the Frances property, now idle, in Boulder county, Colo. includes storage battery locomotives capable of hauling 40 capacity from the mine to the mill, a distance of 4 miles.

INING & MILLING CO. **COLORADO**

First Nat'l Bank Bldg., Denver, Colo.
E. Chapman, pres.; W. J. H. Miller, v. p.; C. L. Dickinson, r, treas.-mgr., preceding with Victor Neuhaus and Emil Affolter, accounts.
2, 1916, in Colorado. Cap., $500,000; $1 par; 240,000 shares.

7 claims, 300 acres near Alma, Park county, held under 5 ease. Purchase price, $50,000, to be paid at the rate of $10,000 ment was due Sept., 1917. Claims are on the Eastern slope of are said to show 2 veins on the surface carrying gold, silver and 1918, Fred Cobb, operating the Dante mine on Bull Hill, Cripple sub-lease from the Big Toad Mining & Milling Co., reported that a new ore shoot, 2 to 6" wide of fluorite and quartz, showing ssaying as high as 20 oz. gold per ton. In Sept., 1919, company ons on its own account.
nt: consists of 250' tunnel to be driven 500' and an old shaft. : includes mill and 4,200' aerial tram. Treasury stock was equip a 100-ton mill. Reports received late in 1918 showed the een working to capacity.

M MINING CO. **COLORADO**

e: Empire, Clear Creek county, Colo.
918 this company was reported to have a bond and lease on the erty. The tunnel is near Empire in Clear Creek county.
orty combination has over 100 claims, and cuts several properties good producers. Edward L. Harris was said to be in charge s.

R MINING CO. **COLORADO**

e: Telluride, Colo.
1894. Ike Navala, supt.
30 claims, includes Black Bear mine in Ingraham basin, Telluuel county, showing gold, silver, lead and zinc values in an 8' ne ore is concentrated. Mill returns average about $5.50 per ton, ecovered running 30% of the total. Developed by shafts and electric plant and aerial tramway, connecting with the Smuggler a.
was idle for many years; operations resumed the latter part of 14. Announcements during 1918 showed that drifting on the ened a streak of free gold.
s: averaged 170 tons daily in 1916. Mining and milling costs er ton.

OUD MINING CO. **COLORADO**

R. H. B. Little, lessee, Salina, Colo.
Black Cloud mine and mill at Salina, Boulder county, Colo., gold-bearing quartz, developed by shaft and several levels. ludes air compressor, electric power and a 20-stamp mill.

TAL REDUCTION CO. **COLORADO**

09 13th St., Boulder, Colo. Is a private partnership, consisting ong, pres.; W. B. Stoddard, mgr., and John B. Ekeley.
a plant for the production of pure tungstic acid from the concentrates of the district. Reported in 1917, to have $35,000 nt; $25,000 in merchandise and stocks and $9,100 cash in bank.

TALS MINES CO. **COLORADO**

e: Rollinsville, Gilpin county, Colo. Nelson Franklin, mgr. the Tip Top mine, and a large custom mill at Rollinsville;

BOULDER TUNGSTEN PRODUCTION CO. **COLORA**

Office: Boulder, Colo.

Officers: J. G. Clark, pres.; N. H. Brown, v. p.; Fred N. Totman, s treas.; R. L. Alexander, supt.

Inc. Dec., 1911, in Colorado. **Cap.,** $1,500,000; $1 par. Commen operations Jan. 1, 1912. During 1916, company sold $400,000 worth of tungs March, 1918, a bond issue of $500,000 was reported authorized, presumably development and the purchase of crude tungsten ores to meet market dem

Property: 37 claims, 165 acres, in the Grand Island mining distric miles from Nederland, Boulder county, said to show 4 to 10% tungsten or veins, a few inches wide.

Development: by tunnels; main tunnel in over 1,400' and 400' be upper workings.

Equipment: 40-ton concentrating mill. In 1917, a refinery for treatment of tungsten ores was erected, said to be the largest and most comp of its kind in the United States. During 1919, mine was closed on accoun low price of tungsten.

BOWEN GROUP **COLORA**

E. T. Elliott, mgr., Del Norte, Colo.

Property: 7 patented claims, 200 acres, at Summitville, Rio Gra county, said to show fissure veins in porphyry; ore contains gold, silver copper, averaging about $10 per ton. Developed by drifts and tunnels; grea depth 350'. Property has been idle for years, but management planned to d a 300' tunnel in 1919.

BRANT INDEPENDENT MINING CO. **COLORA**

Office: Pitkin, Gunnison county, Colo.

In May, 1919, property reported sold at foreclosure sale to unknown inter through Senator Heterington.

Officers: R. B. Anderson, pres.; R. J. Edwards, v. p.; A. P. Nelson, s mgr.; M. J. Ostergard, treas., with M. Woolley, J. W. Hickman, A. T. Hamm G. E. Crowell and Geo. Zapf, directors.

Inc. April 12, 1906, in Arizona. **Cap.,** $5,000,000; $1 par; 4,635,000 sha issued. Bonds, $150,000, 8% authorized, $87,000 issued. Dividends to d $8,174. Annual meeting, second Tuesday in January.

Property: 96 claims, partly patented, of about 1,056 acres, in Box C yon and Quartz Creek districts of Gunnison county. Four mines, the C Bird, I. X. L., Gold Ridge and Roosevelt, opened up and proven by Camp B shaft 200' deep; I. X. L. shaft 60' and 90' crosscut and the Gold Ridge tun which follows vein for 130'. Ore occurs in fissure veins 6 to 20' wide in dio and granite, said to carry 8% copper and $20 gold per ton. The Camp B mine has been operated under lease by other parties.

Crosscut tunnel, started in April, 1911, to drain and open the entire terri at depth, had been driven 2,000' up to October 1, 1917, when litigation pu end to work. In May, 1919, arrangements were made to resume operati with A. P. Nelson in charge.

Equipment: includes hydro-electric plant of 400-h. p. capacity, co pleted in 1915, 4-drill air compressor, 50-h. p. motor and drills. Quartz cr runs through the property. Mine is only a few feet from D. & R. G. R. R. county road.

BRIGHT DIAMOND MINING & MILLING CO. **COLORA**

Office: Ouray, Colo.

Officers: G. H. Beebe, pres.; J. T. Roberts, Jr., sec.-treas., with J. Matthews, L. P. Smith, Samuel McCurdy, Stuart Hancock and J. T. Roberts S directors.

Company was organized to operate the properties formerly owned by Wa kah Mining Co.

Property: the Bright Diamond, Ironclad and Memphis groups, n of Ouray, Ouray county. Operations in past have been intermittent, the a ton matting furnace having a capacity far in excess of ore supply of the dist

New organization had not commenced development up to December, 1

AIN SMELTING CO. **COLORADO**
5, as the Ouray Smelting & Refining Co., which see.

MINING CO. **COLORADO**
Wagner, pres., West Cliff, Custer county, Colo.
organized in 1918. It has equipment from the old Geyser
king to a depth of 3,000'. Mine was a big producer years
er, lead and zinc. Reported to have leased the Bull Domingo
ora Co.

OULDER MINING CO. **COLORADO**
Lilleberger, sec., Ottawa, Iowa.
Farmer, pres.; A. D. Bly, v. p.; E. L. Lilleberger, sec.;
directors.
ulder county; reported under development in 1919.

IE **COLORADO**
oop, Telluride, San Miguel county, Colo. Paul Hardin,

Ophir Loop; is developed by drift tunnels. East drift
d 200', part of this distance being in pay ore.

CO. **COLORADO**
t Nat'l Bank Bldg., Denver, Colo.
Wood, pres.; B. H. Graves, v. p.; J. H. Bender, sec.;
-gen. mgr. Mines are at Rico, Ouray Co., and at Black

in Colorado **Cap.**, $100,000; par $1; 31,000 outstanding.
co, A. B. G., Sydney, D. V. G. groups and Wabash and
se 38 claims in all, aggregating 460 acres. It was reported
blocked out, ran 18% lead, 15% zinc and 15 oz. silver. At
county, the company has the Polly group, worked through
was reported to have cut veins of fair grade ore.
was reported that a lease and bond for $25,000 on the
laims at Rico, owned by G. W. Burns, was secured. In
perty of this section was also taken over.

INING & MILLING CO. **COLORADO**
n, San Juan county, Colo. G. A. MacKenzie, mgr.
ny commenced operations on the Peerless-San Juan mine,
verton. This property had been inactive for many years

sists of 75-ton mill, crusher, triplex rolls, ball-mill, flo-
four Wilfley tables.

OLIDATED MINES CO. **COLORADO**
See Vol. XII. Mine at Central City, Colo.

MINING CO. **COLORADO**
er Bldg., Denver. **Mine office:** P. O. Box 493, Ouray,

Schroeder, pres., 503 Downing St., Denver; L. J. Ford,
sec.-treas., Denver; preceding, C. F. Ogrem and A. A.
W. Davis, Jr., supt.
14, in Colorado. **Cap.**, $100,000; par $1; outstanding
onds. Annual meeting, February 9. On Feb. 9, 1920, it
ase the capital to $1,000,000; $1 par.
tented claims at Dexter Creek, Ouray, Colo. Devel-
. The ore deposit is a quartz vein carrying gold, silver,

hat company had installed a compressor, 75-h. p. trans-
s.

COLORADO
ondon Wall Bldgs., London, E. C. 2; and Ouray, Colo.
Baker, chairman; L. Clerc, F. A. Govett, F. H. Ham-
and O. de Rivaud. J. A. Agnew and L. Chevrillon, tech-
A. Kelsey, sec.

Inc. Sept. 8, 1900, in England. **Cap.** £1,100,000, increased to £1,35 in Dec., 1909, and in July, 1911, to £ 2,100,000, consisting of 750,000 7% c lative participating preference shares of £1 each, 649,625 issued, and 1,35 ordinary shares of £1 each; 1,100,051 issued.

Dividends: on pref. shares were paid semi-annually. On ordi shares the first dividend paid in 1902-03 was 20%, last one paid Nov. 30, 1915, total 210%. In July, 1919, a distribution of 9d (18 cents) was made.

Accounts for fiscal year ending June 30, 1918, showed a profit of £5 making, with balance forward, a sum of £74,745, of which dividends, on pfd. shares only, absorbed £45,473. Balance carried forward was £29,272. income of £67,394 was derived from Santa Gertrudis shares. Balance she June 30, 1918, showed assets of £1,831,863.

The year ended June 30, 1919, yielded a revenue of £87,864, of which £6 was from Santa Gertrudis dividends, and £15,276 from income tax recov The profit was £69,664, plus £29,272 brought forward, making £98,936 avail Two preference dividends absorbed £45,474, leaving £53,467 to be carried forw Current assets exceeded liabilities by £1,267,741, this including investment over £1,060,000.

Company's holdings in Santa Gertrudis, Ltd., Mexico, are 960,135 sh or 64% of the issued capital; and control of the Camp Bird Tunnel, Mine Transportation Co, which see. A large interest is also held in the Mex Corporation, Limited, which see.

Early in 1919, it was announced that Santa Gertrudis, Ltd., had acqu control in El Bordo mines of the Pachuca district, Mexico. It is estimated these mines have an assured reserve of 253,000 tons of ore, from which a p of $2,142,000 is anticipated.

Property: the company was formed in 1900 by F. W. Baker and J Hays Hammond to acquire from Thos. F. Walsh the Camp Bird gold mine, Telluride, Colo. Purchase price was $5,000,000. This property returned h some profits for 10 years, when the lower levels showed signs of impoverishm Other properties were then sought with the idea of making the company a m investment organization. The Santa Gertrudis silver mine was floated in way and holdings acquired in the Messina.

Geology: the Camp Bird mine is at an altitude of 11,000' and 8 m from rail, which necessitated hauling supplies and concentrates over a moun road, making operating costs comparatively high. The Camp Bird orebo occur in a fissure vein in andesite. The ore has for its base hematite an associated with iron, zinc and lead sulphides; it occurs in streaks, being persistent and narrower with depth, and less regular in its relation to the s Stoping width was 5 to 8'. The mine was exhausted by mid-1916, so mi was suspended until the exploration work under way opens more ore. Vol. XIII for other details.

Production: from April 30, 1903, to June 30, 1916, was 820,730 t treated, yielding £4,778,591, at an expenditure of £1,798,227, leaving a profi £2,980,363.

Until something is found in the mine, Camp Bird will have to depend u dividends from Santa Gertrudis for future revenue, also from The Mex Corporation, Ltd., and other interests. Investors wishing to study the finan results of the Camp Bird-Santa Gertrudis connection should read "A P Mortem," in the "Mining and Scientific Press" of Feb. 6 and May 24, 1 In part, it said: "The [Santa Gertrudis] mine has yielded dividends ag gating £731,250 on a capital of £1,500,000, of which the Camp Bird comp owns 81%. If we place 81% of the estimated remaining profit to the credi that company and add 81% to the dividends distributed, we get the sum of about $6,000,000 as the realizable money to be obtained by the Camp Bird com pany on the operation. On the other side, the Camp Bird company paid £92 or $4,481,550, for the 81% interest. Thus the principal will be returned about 25%. A silver mine should pay at least 10% per annum to warran risk incurred; in eight years the [illegible] should have received 80%; it take three years more to exhaust [illegible] ores; thus 30% more is

ld have yielded at the end of 11 years at least twice the amount for it, that is 200%, instead of 125%, disregarding the refinements . It was expected to do much more than it has done. The time of the flotation, stated that the ore in reserve amounted s, from which a profit of £1,650,000, or $7,019,999, was assured, prospects of finding more ore and winning more profit. Evi- will yield the amount of profit estimated as being assured when but no more. In short, the expectation of favorable develop- as not been fulfilled. It was likely to be falsified by reason of nder which the mine was appraised."

mp Bird Tunnel, Mining & Transportation Co.

(Subsidiary of Camp Bird, Ltd.)

ficials: W. J. Cox, gen. mgr.; T. H. Woods, supt.; J. B. Glasser, and accountant.

30, 1919, Camp Bird, Ltd., had invested in and advanced to this n of £110,862. Its business is the further development of the

t: the mine is opened by tunnels and shafts. No. 3, the ft. is 1,003' deep below No. 3 level, and opens the 9th level at Where cut on No. 9, the main vein was 14' wide, but only It was considered that good ore would be found below this, really reached its limit of economical operation, so it was an adit 10,700' long, to strike the lode 450' deeper than any and 800' below the main ore-bearing ground.

level adit tunnel by which systematic exploration in depth was he Camp Bird vein on June 1, 1918, at 11,000' from the portal. 2' west of the vein to confirm its identification. A drift, 2,043' east along the vein to a point beneath No. 3 shaft, permitting ith level, giving natural ventilation. This was completed by started at the 1,760' point. On this deep level the Camp Bird 1 to 8' in width, half quartz, carrying sulphide, including spots ne point of intersection there was no value in the vein, but No. 9 level several shoots of $25 to $35 ore were cut. These pped, and offer encouragement for opening a profitable pro- ich can be opened fast with good ventilation. According to the rt of Camp Bird, the situation might be termed as fairly en-

INING & TUNNEL CO. **COLORADO**

n, Clear Creek county, Colo.

: the Ætna mine, developed by 5,200' tunnels, said to show running up to 18 oz. gold, 35 oz. silver, 55% lead and 5% copper. ent: includes electric as well as steam power compressor, 200- rator. The mine is operated by lessees.

1917, extensive development was reported on the Aetna vein, the being extended 1,556', or a total length of 3,400'. In the Davenport vein is reported cut at 375' in the lower east drift. Bruce & Co., & Co., and Oklun Bros., were said to be the principal shippers.

ONATE GROUP **COLORADO**

ne office: Mt. Baldy, Breckenridge, Summit county, Colo. Mine by George E. Moon, Breckenridge, but operated under bond and lease ion capital, headed by Samuel Klous. The ore was reported to carry 40 lead, ½ to 3 oz. gold, and 15 to 20 oz. silver per ton. eveloped through tunnel 250' vertically above the timber-line. Several s of 25-oz. silver and 1-oz. gold ore were ready for shipment in July, 1919.

ONERO MINE **COLORADO**

erated under management of G. B. Pickett, of Carbonero Leasing Co., n, San Miguel county, Colo. Lower tunnel is in 2,700'. Part of mine sub- Smuggler-Brown Leasing Co. Late in 1918 the Tomboy Gold Mines Co. ... purchased a share in the mine.

CARIBOU METALS CO. COLORA

Address: T. J. Clark, Boulder, Colo.

A reorganization, 1918, of the Degge-Clark Mining, Milling & Refining Boulder, Boulder county, Colo. Cap., $2,000,000.

Property: 1,500 acres, including the Caribou silver mine, (form worked by the Caribou Mines & Mills Co.), at Caribou, S. of Nederland, Bou county, Colo, said to have produced $7,000,000. Due to the interlacing veins, with consequent inability to determine extra lateral rights, the No N Sherman, Columbia, Kalamazoo, Federal, Socorro and Spencer claims have combined to make the Caribou Metals group. Company is also said to title to 1,000 acres of patented timber and mineral lands north of Caribou carrying tungsten ore.

Geology: ore occurs in a fissure vein, varying from 3-12′ in wi with pay-ore 6 to 36″ wide, showing argentiferous galena and silver gl This vein dips to north and crosses veins to the northwest. The main cross is the No Name lode, intersecting the Caribou on angle of 42°.

Development: in original claim by 7 shafts, along the main lode, shaft being 1,040′ deep; also by a 700′ tunnel.

In 1919, 15 sets of lessees were said to be at work in the Caribou group.

CARIBOU MINES & MILLS CO. COLORA

Office: Cardinal, Boulder county, Colo.

Inc. in 1916. **Cap.**, $200,000. Company purchased from the truste bankruptcy the holdings of the Cariman Mining & Milling Co., in the Car district of Boulder county.

Property: the Caribou and Poorman groups of claims, former pro ers. Also the Boulder County tunnel, projected as a great development, d age and transportation tunnel from Cardinal toward the Caribou worki The tunnel is in about one mile. In the 80's the Caribou mine is said to been considered the best silver producer in Colorado.

Equipment: at last reports included the 100-ton Caribou mill, the ton Cardinal mill and a cyanide plant. Company not operating in 1919.

CARNOTITE REDUCTION CO. COLORA

Address: G. B. Pickett, mgr., Gateway, Mesa county, Colo.

Property: carnotite-bearing claims in the Gateway district. Ore shipped, and a reduction plant was to be erected in 1919.

CARRIBEAN TRUST CO. COLORA

Mine address: Ophir, San Miguel county, Colo. Geo. L. Bing mgr. A high copper concentrate is reported produced by treating the ore flotation plant.

CARTER MINING CO. COLORA

Mine office: Volunteer Mountain, Ohio, Gunnison county, Colo. W Murdie, mgr.

Property: 800 acres on Volunteer Mt., less than 4 miles from Gunnison county.

Equipment: 3 Pelton wheels driving compressor, dynamo, and stamps. Company is reported to have found the old Volunteer vein, which lost due to a fault. This big vein in granite carries a copper-iron-sulphide

CASHIER GOLD MINING & REDUCTION CO. COLORA

Office: P. O. Drawer 46, Warren, Pa. **Mine office:** Central City pin county, Colo.

Officers: Wm. Muir, pres.; F. M. Lockwood, sec.; E. E. Allen, tr mgr.; with H. P. Stone, M. A. Bliss, J. T. Meals, E. J. Lesser, W. P. V more and F. L. Bensinger, directors. Wm. Auger, supt.

Cap., $1,000,000; $1 par; 733,614 issued.

Property: includes the Pittsburgh, Meeker and Brooklyn mines, ing chalcopyrite and tetrahedrite, principal values being in silver, running 700 oz. per ton. The Pittsburgh mine is developed to depth of 1,000′, by drifts and upraises. Equipped with boiler, pump, hoist and drills. Early 1918 a 50-ton mill was converted erected for operation on the Pittsburgh Average assay [illegible] silver and 6.10% copper.

1,200' level for which purpose $30,000 was voted at directors' 8. Has been a small but steady producer for years.

MINE **COLORADO**

ulder Falls, Boulder, Colo. I. N. Blair, mgr. In March, g operated under bond and lease by I. N. Blair, G. M. New- Guiler. Reported that mine was producing ferberite ore tic oxide in 1918-19.

. TUNNEL MINING & MILLING CO. **COLORADO**

change Bldg., Denver, Colo.
C. Sievers, pres.; Dr. G. P. Howard, treas.; Frank E.

olorado, with 5,000,000 shares.
atented claims, 130 acres, and a bond and lease on the tunnel, Idaho Springs, Clear Creek county. In March, 1919, ed to have struck ore in surface workings averaging 2 oz.

ORE CO. **COLORADO**

e Sampling Co.
and Galapago Ave., Denver, Colo. W. J. Chamberlain,

oling mills at Georgetown, Breckenridge, Black Hawk, Denver. In March, 1918, the mills were closed, due, it was rating costs and scarcity of ore. The Boulder Ore Sampling Boulder plants.

ING CO. **COLORADO**

ented lode claims, covering 25 acres, on Campbell Moun- Mineral county, Colo.
the lower tunnel is 600' long, with a short drift on the gs consist of 250' crosscut tunnels with 200' drift on vein. 5 to 100 oz. silver. Operations were suspended in 1907, but 1918.

AIN MINING CO., THE **COLORADO**

jestic Bldg., Denver, Colo. F. G. Dinsmore, pres.; S.

8, in Colorado. Cap., $5,000,000; par 1 cent.
Old Square Deal group of 73 claims, on Chief Mountain, t county. Gold, silver, copper, lead, zinc are found in a ccurring in granite.
by 850' shaft and 2,300' tunnel. Until recently property n.

NG, MILLING & SMELTING CO. **COLORADO**

Zanett, pres., Ouray, Colo. Giacino Taller, v. p.; J. J. P. J. Bacca, William Rathwell, and J. Fecco, directors.
in Colorado. Fully capitalized by Sept., 1919.
e Bachelor district near Ouray, Ouray county. Ore in rries lead and silver. The vein is to be opened by further chinery erected.

LD MINING CO. **COLORADO**

Consolidated Gold Mining Co.

GILPIN ORE CO. **COLORADO**

prings, Clear Creek county, Colo. W. E. Passmore, W. . L. Regennitter were reported Dec., 1918, to have taken American sampler at Idaho Springs. The district has needed Chamberlain Ore Co. closed down.

BDENUM CO. **COLORADO**

merican Metal Co., Ltd.
artlett Mountain, Climax, Lake county, Colo. John H. er P. Cary, supt.
t 600 acres, on Bartlett Mountain, on the boundary line

between Park and Summit counties. Mine is about 16 miles N. E. of Leadv on South Park Branch of Colorado & Southern R. R.

Geology: lode formation is thickly foliated quartz-porphyry and composed granite or alaskite granite, with disseminated stringers of molybden and a little iron pyrite. Molybdite, the yellow oxide, appears in considera amount where oxidation has occurred.

Development: construction started July, 1917, and first shipment reported Feb., 1918. Mining is done through two tunnels, the upper one 12,1 above sea-level, was 830′ long in 1918. Near the portal crosscuts are driven right angles for 400′ both ways. Another adit, 300′ lower down, is to lengthened to 2,200′. In the lower one the E. W. contact dips 70° to the S. Mining is done by parallel shrinkage stopes 800′ by 25′ with pillars of the s width between. It is planned to carry stopes to surface and break down intervening pillars. Company has developed 25 acres of patented grou Purchase of property, development and erection of plant, called for expe ture of $600,000 to October, 1918.

Equipment: includes 4,700′ tramway and mill of 300 tons daily capac

Production: $500,000 worth of 70% molybdenite up to May, 1918.

In Dec., 1918, it was reported that company had taken over the entire pr erty of the Molybdenum Products Co., at Buffehrs Spur, 2 miles from Clim The Climax is the largest molybdenite mine in the world, its output being al 60% of the total production of molybdenum ore.

COLDWATER COPPER MINING CO. COLORA

Mail returned, unclaimed, March 11, 1919, from Encampment, Wyo. M near Pearl, Larimer county, Colo.

Officers: Z. L. Baldwin, pres.; H. N. Backus, v. p.; Walter Phipps, s Burr Lobdell, treas. and gen. mgr.

Inc. May 18, 1900, in Wyoming. **Cap.,** $1,000,000; shares $1 par.

Property: 5 claims, 52 acres, in the Pearl district of Larimer coun known as the Wolverine mine. Claims have 3 fissure veins in granite and dior of which 1, of 20′ estimated width, shows oxidized ores and native copper, s sulphides at a little depth, estimated to carry an average of 6% copper and oz. silver per ton, opened by shafts of 90′ and 170′, bottom of principal s showing massive chalcocite and a little disseminated chalcopyrite, of h average grade. Idle several years.

COLE MINING CO. COLORA

G. L. Cole, mgr., Springfield, Mo.

Reported in 1918, that company had commenced operations on the Bro gauge lode on Griffith mountain. Also said to be interested in the Sub-treas and other lodes on Brown mountain which have been dormant since the eight

COLOMA MINING CO. COLORA

Address: Central City, Gilpin county, Colo.

Property: adjoining that of the Square Deal Company, near Cen City. Ore carries gold, silver, copper and lead.

In 1915, litigation started between the Square Deal (which see) to deter title to the South Notaway vein. In the first trial the Coloma Co. won, bu appeal the Square Deal was adjudged the owner.

COLONEL SELLERS MINE COLORA

Controlled by Empire Zinc Company, which see.

COLORADO BLUE BELL MINING CO. COLORA

A promotion of W. M. Sheridan & Co., indicted by Federal authorities many fake promotions in July, 1919.

COLORADO-CARR MINING CO. COLORA

Mine office: Central City, Gilpin county, Colo. Harry L. Elmo Resumed operation in 1916, after many years of idleness. Mine was s to be worked out, but $2,000 shipments were reported in 1917.

COLORADO CENTRAL MINING CO. COLORA

Address: Georgetown, Colo.

Officers: Henry Kroger, pres.; [illegible] p.; E. S. Wi ik C. Dolbey, supt.

acres, represents a consolidation of all conflicting claims
n 1887-96. Edward S. Wiard and associates formed a private
red property on lease with purchase option.
s and operates a 450-ton mill, using flotation, and connected
to the old dumps and Equator tunnel of the Colorado Central

s of the Marshall Tunnel, Ocean Wave, and other mines,
ons, which they are handling at rate of 350 tons per day by
operations were started in 1918.
lena containing gray copper, polybasite, dark ruby silver, and
es.
a body of mill ore was reported opened in a drift in the
ore being 8' wide and averaging $40 per ton.

ONCENTRATING CO. **COLORADO**

Silver Mining & Reduction Co., which see.

CONNECTICUT GOLD MINING CO. **COLORADO**

ted turned over to National Finance and Holding Co., Toledo,

Lake City, Hinsdale county, Colo.
laims, 21 acres, known as the Dolly Varden mine, in the
rrying three 2' fissure veins, opened by a 150' shaft and a
1,900' of workings. Ore is chalcopyrite, tetrahedrite and
e, assaying 9 to 19% copper, with occasional silver values;
e given returns of 141 to 479 oz. silver and as high as $11 gold

JEL & IRON CO. **COLORADO**

e: Boston Bldg., Denver, Colo.
. Welborn, pres.; S. J. Murphy, v. p.; E. S. Cowdrick, asst.
g, v. p. and sales mgr.; S. G. Pierson, v. p. and gen. pur. agt.;
treas.; L. B. Rogers and E. V. Cary, asst. secs.; A. D. Moss,
Bently, and J. B. McKennan, gen. mgr.
1892, in Colorado. Cap., $44,200,000 com., and $2,000,000
4,235,500 and $2,000,000 are issued. Funded debt outstanding
35,000, general mortgage 50-year, $1,000 gold 5s., due Feb. 1,
tgage 6s, $40,000; Grand River Coal and Coke, 1st mortgage,
. Ind. Co. 1st mortgage 5s, $37,630,000. Total funded debt,

s for year ended Dec. 31, 1918, were $48,233,575, against
7. Net income was $8,101,111, against $9,473,578. After de-
est, taxes, sinking funds, depreciation, there was left $3,132,047.
was $400,000, and dividends, 3% common and 8% pfd. totaled
$1,545,172 net.
ended Sept. 30, 1919, gross receipts were $30,576,272, of which
. Other income made a total of $3,541,070. Interest, taxes,
33, so the surplus was $1,572,637. The gross was $6,500,000
riod of 1918.
n pfd. at the rate of 8% per annum have been paid in full
on common year ended July 1, 1902, 7%; July and Oct., 1917,
ar of 1918, 3%.
sides steel works and coal mines, company has iron mines
Mexico, and Wyoming.
rom the iron mines: 813,728 tons in 1912; 853,878 in 1913;
41,026 in 1915; 709,601 tons in 1916; 886,909 in 1917; 809,491

LPIN GOLD & RADIUM MINING CO. **COLORADO**

resel Bldg., Philadelphia, Pa.
Wright, pres.-gen. mgr.; Hon. Edw. Hart, v. p.; R. R.
at last accounts.
Wood mine, at Central City, Gilpin county, developed to
eported to carry a vein, from 18" to 2' thick, containing gold

COLORADO TUNGSTEN GOLD & SILVER CO. COLORA

Address: Morton & Co., 15 State St., Boston, fiscal agts. Mine o Nederland, Colo.

Developed by a 65' shaft which showed ore but not in paying quant Mine abandoned.

COLORADO-UTAH MINES OPERATING CO. COLORA

Mail returned unclaimed, June, 1919, from Lake City, Colo.

Officers: Arthur S. Larsen, pres.; A. B. Smith, supt.

Inc. in Utah. **Cap.,** $100,000 shares 5c. par; increased Sept. 15, from $30,000.

Property: the Golden Fleece mine, near Lake City, Hinsdale co Equipped with 100-ton mill. Company deepened shaft to 800' and cut station No. 6, 7 and 8 levels. Presumably idle.

COLORADO VANADIUM CO. COLORA

Address: F. G. Carpenter, pres., and Frank Gardner, mgr., Saw Colo. Mine near Fall Creek station, Telluride, San Miguel county, Colo.

Equipment: includes a compressor, pipe-lines for drills, and a 2-bu 2,300' aerial tram. In May, 1919, company reported shipping a car of ore to the Primos Chemical Co. at Vanadium, Colo.

Company also has claims on Bear Creek side of San Miguel river, leased the Summers mill at Sawpit, which was remodeled to treat vana ores, until the new mill to be erected at Fall Creek was completed in 1919.

COLUMBIA SILVER & GOLD MINING CO. COLORA

Office: Tabor Block, Denver, Colo.

Officers: S. B. Brigham, pres.; with L. S. Ordway, P. L. Hanson, Braiser, and C. B. Demarest, directors.

Cap., $25,000; $1 par.

Property: 25 acres, in Jackson mining district, Clear Creek co adjoining Little Mattie, Newton, and Black Eagle mines. In Sept., 1919 Star tunnel was being driven to cut the Columbia vein.

COLUMBUS MINES CO. COLORA

Office: 905 First Nat'l Bank Bldg., Denver, Colo. Jas. Doyle, pre

Inc. in Colorado. **Cap.,** $50,000.

Property: 3 claims in California district, La Plata county, Colo. velopment work was started in 1916; in 1918, work on crosscut tunnel being prosecuted.

COMBINATION MINING & MILLING CO. COLOR

Office: 520 Quincy Bldg., Denver, Colo. Frank Straub, sec.

Cap., $100,000; 1 cent par.

Property: in 1916 company took over the Gilpin Orion mines acres on Bob Tail hill, Gilpin county; also owns 147 acres in La Plata minin trict, Grand county, which is developed by a 700' tunnel. Ore carries silver, copper, and zinc. The company also has over 3,000 acres of oil under lease in Wyoming.

In July, 1919, company stated that an Eastern syndicate was about to write a block of shares, proceeds of which would be used in operating in county.

COMMONWEALTH MINING CO. COLOR

Louis G. Davis, mgr.

Property: in 1917, company secured the Magnolia mine and Eddy at Montgomery, six miles north of Alma, Park county, Colo. Also repor control the Lee Goss, Peru Extension, Populist, Prospect, Palmetto, Col Logansport, and Chicago mines.

Geology: Archean granite is overlain by cessive beds of Car quartzite, Silurian "white limestone," and C ous or "blue lime Quartzite is divided by intrusive flow of phyry. Orebodies and masses of these rocks the Magnolia $30 per to company

TH TUNGSTEN GOLD & SILVER CO. COLORADO

& Co., 15 State St., Boston, Mass., fiscal agents. **Mine** Colo.

er F. Howard, pres.; Geo. L. Wilson, sec.-treas. Both e M. Luiz and William H. Brown are **trustees.** Chas. E. and, Boulder county, Colo.

917, in Massachusetts, under declaration of trust. **Cap.,**

tungsten mines held under lease at Nederland, Colo., in-, with a 500′ tunnel; the Big Six, with a 150′ shaft, and the 265′ shaft. Silver mines leased at Beaver, Colo., are the shaft, and the Happy Home, with a tunnel 300′ long. All with extensive openings, and are reported to have pay ore. o be trying to raise money to develop its property and build t last accounts.

D & COPPER CO. COLORADO

. Ross, pres.; Guy W. Mallon, v. p.; Frank L. Ross, sec.-

1908, in Colorado. **Cap.,** $500,000; shares $10 par. Bonds, at 6%; all issued.

aims, 20 acres, the Congress and Arlington lodes at Red ian county, and the Midway lode in Ouray county. Property Ouray and 12 miles north of Silverton. The Congress is a orked 1884-93, said to have produced about $400,000 worth 8% copper and 11 oz. silver per ton, with small gold values. ome years, through litigation, has been leased since 1912. 400′ shaft with about 1,500′ of workings, showing chalco-mpany to average about 5 to 10% copper, 10 oz. silver, and n. Mine has electric equipment, including hoist and com-

perations were suspended, but company expected to resume copper reached a profitable figure.

E COLORADO

rise Mining district, Gilpin county. Operated by the Toronto , Colo., which see.

INING REDUCTION & POWER CO. COLORADO

. Hamblin, Worcester, Mass.

D COPPER M., M. & SM. CO. COLORADO

ldora, Boulder county, Colo.

Munson, pres.; W. H. Hoke, v. p.; M. P. Givens, sec., enver, Colo.; M. L. Ericson, treas.

99, in Colorado. **Cap.,** $2,000,000; shares $1 par. Annual uesday in September. Consolidation with Colorado Metals orted in 1914.

lode claims, partly patented, 150 acres known as the ip, 3 additional tunnel claims, a placer claim and a 160-acre total holdings of about 600 acres, at the southern base of the Grand Island district. Said to have 4 contact deposits, ie wall, of which 1, under development, was said to average id to carry up to 60′ of sulphides, of concentrating grade, in-copyrite, bornite and chalcocite, all auriferous and argenti-

at last reports was by 3 shafts, deepest 360′, and the nel, of 4,800′ length. Had steam power, a 6-drill Leyner or and necessary buildings. No recent returns received.

LEASING CO. COLORADO

C. E. Kohler, pres., Columbus, Ohio; William Harpel,

ises no holdings of the Swarthmore Cons. Mng. Co.

(which see), near Eldora, Boulder county. A 25-ton mill was erected la
1919.

CONSOLIDATED MINES DEVELOPMENT CO. COLORA

Office: 717 Majestic Bldg., Oklahoma City, Okla. Mine at Alice, C

Officers: L. T. Samuelson, pres.; J. A. Best, v. p.; W. C. Bickford, treas., with W. G. Harper and W. G. Luckenga, directors. W. G. Harper,

Inc. in Colorado. **Cap.**, $1,500,000; $1 par; 850,000 outstanding. nual meeting, second Monday in October.

Property: 10 claims, 2 patented, 102 acres, in Upper Clear Creek Argentine districts, Clear Creek county, said to show a quartz vein in gra 6' wide, running N. E.-S. W. and to assay $18 in gold, silver, and copper.

Development: by tunnels, 1,100' and 400' long, said to prove 200,000 of ore.

Equipment: 7-drill compressor, electric power and a flotation A 100-ton mill was planned. No recent reports.

CONSOLIDATED REALTY & INVESTMENT CO COLORA

Office: Boulder, Colo.

Officers: T. V. Wilson, pres.; D. A. Degge, sec., with M. Maury J. A. Webber, directors; W. W. Degge, mgr. Transfer office: Boulder.

Inc. Dec., 1909, in Colorado. **Cap.**, $1,000,000; $1 par; 866,700 outst ing.

Financial statement to December, 1916, showed total receipts of $25,672, disbursements of $25,336.

Reported to have a blanket deposit of gold running about $18 per ton No recent record of operations.

CONSOLIDATED SPECIE PAYMENT MINING CO. COLORA

See Specie Payment Gold Mining Co.

CONTINENTAL MINES, POWER & REDUCTION CO. COLORA

Office: 919 Equitable Bldg., Denver, Colo. **Mine office:** Lombard, Creek county, Colo.

Officers: Henry I. Seemann, pres.-gen. mgr.; Cyrus Locker, v. p.; H. Warinner, 2nd v. p.; A. W. Craig, sec.-treas.

Inc. Nov. 7, 1905, in Colorado. **Cap.**, $5,000,000; $1 par; issued $4,37 Annual meeting, first Wednesday in November.

Property: 182 claims, 70 patented, 2,000 acres, in the Lincoln district, said to show 75 fissure veins and contact deposits, ranging in width 2' to 75'. Country rock is gneiss, schist and granite, with porphyry dikes. system claimed to be proved to depth of 1,000' and traceable 4 miles. Ore sulphides, reported by management to carry 1 to 7% copper, 1 to 35% from a trace to 6% zinc, 1 to 200 oz. silver and $5 to $500 gold per ton.

Development: by shafts of 135', 150' and 200' and a number of tu of 100' to 2,000'. The Seemann tunnel, now idle, is about 4,000' long. mine has approximately 4 miles of workings, with about 1 mile in ore, esti by management to show 300,000 tons of ore in sight. Most of the work i being done on the Lombard vein and through 4 tunnels, 800', 1,500', 1,60 3,800' long.

Equipment: includes electric power, 150-h. p. at mine and 150-h. mill, 25-h. p. hoist and 7-drill air-compressor. There are about 20 buildings

The mill has 20 stamps, one 8x12" crusher, 3 Card tables, 3 Wilfley and 2 sizers, capacity 100 tons per day. Company planned continuous de ment and was to add an oil flotation plant to the mill, increasing its capac 200 tons per day, and selling commercial current. In July, 1919, the pre reports that nothing was being done on account of the lack of money.

CONTINENTAL MINING CO. COLOR

Office: Silverton, Colo.

Officers: Jos. Bordeleau, pres.-treas.-mgr.; F. B. Brown, v. p.; Way, sec., with M. J. Heller, supt. and J. H. Slattery, directors.

Inc. in Colorado. **Cap.**, $1,500,000; at $1 par; 23,000 shares in tr Transfer office: Silverton. Annual meeting in December.

Property: 18 claims, about 150 acres, located in the Eureka min

said to show quartz vein in fissure carrying gold and silver.
on development work in 1916.
vertical shaft and tunnels. Tunnels are 3,000′ long
nent, having a depth of 500′. Ore-shoot said to be 1,500′
s blocked out. Average assays were reported to be $18.
ric hoist and electric pump.

IINING CO. **COLORADO**
npa St., Denver, Colo.
ided into 1,000,000 shares at 10c par; 500,000 shares to

consist of 560 acres, 26 miles from Denver. Reported
54′ shaft, cutting a copper bearing dike.

NES PRODUCTS CO. **COLORADO**
e, 1919, from former address, Copperbow, via McCoy,

lly, pres., Hutchinson, Kan.; Andrew B. Crichton, v.
R. Wood, sec.-treas., 2140 S. University Ave., Denver,
and J. N. Wyman, directors; W. H. Wagner, mgr.

npany was using a 50-ton electrolytic mill to experiment
of copper oxide ore. Believed to be idle.

CS **COLORADO**
Plume, Clear Creek county, Colo. William Copper,

is reported that operations would be started driving the
perating the Neshotah mill.

IG CO. **COLORADO**
Prosser, supt. Mine located in Red Mountain dis-
1918, several large bodies of silver, lead and copper ores
Shipments were expected as soon as the Red mountain
thern R. R. was opened.
is the Genessee mine, and formerly leased by James
co.

TION CO. **COLORADO**
Hardy, mgr., Creede, Mineral county, Colo.
ease on most of the Amethyst vein below the Nelson
e, Reno, White Star and Consolidated mines are all on
company is reported to have unwatered the Berkshire
ring the Commodore. Vein carries "liberal" values in
.

O. **COLORADO**
Mineral county, Colo.
t company was extracting a small amount of milling ore
t mine and treating it at the Humphreys mill.

NSOLIDATED MINING CO. **COLORADO**
Electric Bldg., Denver, Colo. Mine office: Empire,
.
ck, pres.; J. E. Rinehart, v. p.; Thos. Williams, sec.;
treas., with Daniel Erickson, directors.
Arizona. Cap., $3,500,000; shares $1 par; outstand-

mine, 17 claims, 85 acres, near Empire. Gold-silver
claimed to average from $6 to $12 per ton.
shaft and tunnels, longest 1,025′, with total under-
. Equipment includes electric hoist.
have been $200,000 in the past. Operations in 1918
ifts on veins in which only low values were found as
ore-shoot.

CRUCIBLE STEEL CO. OF AMERICA **COLOR**

The company stated, in April, 1919, that it had disposed of all of its m properties in Colorado. It is believed that the Nederland tungsten mine being operated by D. Waren, J. J. Allen, B. Dawson, and A. V. Echternach leased the mines when owned by the Crucible Steel Co.

CUMBRE MINING CO. **COLOR**

Company has been dissolved.

Address: C. L. Colburn, 530 Equitable Bldg., Denver, Colo.

Had lease and bond on the Carpenter and 86 placers, consisting of 90 near Breckenridge, Summit county.

DANA MINING CO. **COLOR**

Office: Boulder, Colo.

Officers: Jas. B. Simpson, Boston, pres.; A. S. Coan, Boulder, M. McClure, sec-treas.

Property: the Hoosier group of mines at Summerville, Boulder c worked slightly in the past and having a 600′ tunnel at roadside leve June, 1918, present company is reported to have driven a 90′ crosscut, 300 portal, disclosing silver and gold ore.

DEGGE-CLARKE TUNGSTEN MILL **COLOR**

Boulder, Boulder county, Colo. W. W. Degge, v. p.-mgr. Operated ton concentrating mill in Boulder Canyon.

Reported succeeded in 1918 by the Caribou Metals Co., Colo., which s

DENBIGH SILVER-LEAD MINES CO. **COLOR**

Address: 85 Devonshire St., Boston, Mass.

Officers: W. Roch, pres.; J. F. Lindel, v. p.; G. A. Haskell, tre N. Reynolds, sec., all of Boston, Mass., with H. F. Wells and J. E. Be Boston, J. J. Mendell of Manchester, Mass., and W. H. Perry of Beverly, directors. H. S. Bushnelle, mgr.

Inc. in 1916, in Colorado. **Cap.**, $1,000,000; $1 par; all issued on Boston Curb. Indebtedness, $20,000.

Property: leases and bonds for $250,000 on the properties of the ing Mining & Milling Co. and of the Terrible Dunderberg Mining & Pow These mines are one mile from Silver Plume, Clear Creek county. Pro have been worked for 40 years and comprise 43 patented claims, about 300 The company controls a number of old-time producing mines, and the dum the Seven-Thirty, Mammoth, Brown and Dunderberg workings, known "Big Slide in Brown gulch."

Ore: silver, lead and zinc occurring in a fissure vein in granit schist. Vein dips 70° N. and strikes N. E. The sulphide pay-ore in eac occurs in shoots, each over 250′ long, and streaks of varying size.

Development: by a working tunnel with 7 levels above it and 7 it, reached by a 70° shaft, 600′ deep. Method of working is by shrinkage Total extent of workings is about 5 miles. A winze 70′ below deepest is in $50 ore for the entire length.

Equipment: includes hoist, pump, and 100-h p. compressor. Both power and electricity are used. The 75-ton mill contains crushers, roll and tables, and can, it is said, treat the ore at a cost of $1 per ton. The estimates $39,000 needed to complete the new shaft, repair mill, and d work.

Recent operations include a 3-compartment raise from the 14th to level, a distance of 490′, which when completed, will be the main workin A double drum, motor-driven hoist will be installed. For the first 7 m 1919, about 1,000′ of stoping had been done.

Owners claimed that the mine has a production record of $10,000,0 from high-grade ore, and that the property now has 100,000 tons of $10 During 1918, output was three cars per week. This ore came from de work only, as no actual mining had commenced. In October, 1919, were being sent to a mill at Idaho Springs.

H. C. Bonnevie has reported on both the mine and the treatment of

believed to have attractive possibilities in depth and in vir-
that funds are sufficient for the plans outlined.
lue of concentrates shipped in 1918, was $53.25 per ton, and
ton of shipping ore, averaging $106.21 per ton, to each 7

rket campaign of Thos. W. Lawson of "Frenzied Finance"
to $2¼ with a gradual decline to 20c in May, 1919, after
ended. In October, 1919, Mr. Lawson issued a statement
pped the stock because 400,000 shares that had been tied-up
were being unloaded in the form of receipts, and claimed
n the verge of bankruptcy, with $25,000 in debts. His re-
ttee formed the Denbigh Mining Corporation to take over
ck exchangeable for new on payment of 10c a share. This
proved by the stockholders, but a meeting of them was
Wells, for December 3, 1919, to consider the corporation
or claimed that the property has 300,000 tons of ore that
$1,000,000 net profit."

DER TUNGSTEN PROD. & DEV. CO. **COLORADO**

Mining Exchange Bldg., Denver, Colo.
Young, pres. and supt.; G. P. Howard, v. p. and treas.;

do. **Cap.**, $100,000; par 10c.
laims on Lee Hill, Boulder county, containing tungsten,
e. Early in 1919 the company closed down to await tariff
ement reported that it had lots of ore, but no market for it.

G & MILLING CO. **COLORADO**

Wortman, Lake county, Colo.
dale Smith, Springfield, Mass., pres.; D. A. Roller, Equit-
Colo., sec.
do. **Cap.**, $100,000; par 10c.
acres, patented, at Wortman, Lake county; held under
option.
a mill has been erected and is turning out lead and zinc
pany claims to have $200,000 worth of ore blocked out.

LORADO MINING CO. **COLORADO**

roperty foreclosed by its bondholders, 1918. Has been idle
litigation and has now lost its property. See Vol. XIII.

COPPER MNG. & DEV. CO. **COLORADO**

mmonwealth Bldg., Denver, Colo.
do.
sists of 13 adjoining claims and two millsites, 15 miles
las county.
by a 300' tunnel, and a second crosscut tunnel recently
g. Ore is a sulphide and reported to assay $75 to $100
plans extensive development.

SOLIDATED MINING CO. **COLORADO**

er Plume, Clear Creek county, Colo. Organized in 1919.
Diamond Tunnel, Carey City and Meshote mines, near
se production is said to total $1,000,000 in silver and lead.
200,000 tons said to assay up to 7 oz. silver per ton. The
en remodeled and in July, 1919, was making 40 to 50 tons of
ek.

NING & REDUCTION CO. (THE) **COLORADO**

wa Bldg., Sioux City, Iowa.
W. Harris, pres.; Fred H. Free, v. p.; H. R. Dealy, sec.-
y, mgr., with E. Lustfeld, directors.
Colorado. **Cap.**, $200,000; shares 20c par; 650,000 out-

claims, 200 acres in Eureka mining district on

Property: 5 acres, unpatented, at Springdale, Boulder county. Ore is said to contain lead, silver, gold, copper, also some platinum, pallad and germanium. Vein is in granite.

Development: by 2 tunnels, 80′ and 100′ long, and shaft 50′ deep. to have shipped good ore in past. Under a 30-day option to the Colo Pitchblende Co., of Denver, at last accounts.

EAGLE MINE COLORA

Address: C. M. Glasgow, St. Louis, Mo.

Property: on Kerber creek, 2 miles E. of Bonanza, in Saguache cou In August, 1919, the mine was to be unwatered to depth of 500′. An exam tion in 1918 revealed a fair tonnage of manganese-silver ore, assaying 10 per ton. A power line has been connected up, and a 50-ton mill was erected.

EAGLE MINING & MILLING CO. COLORA

Property sold to Empire Zinc Co., of Colorado, which see.

EAGLE PASS MINING & MILLING CO. COLORA

Address: M. S. MacCarthy, mgr., 628 First National Bank Bldg., ver, Colo. Mine 3 miles from La Plata, Colo.

Inc. May 6, 1913, in Colorado. **Cap.,** $250,000; shares $1 par.

Property: 3 claims, 1 patented, 30 acres, said to show ore carrying silver and lead in fissure veins in limestone and porphyry. Developed by tunnel. Only assessment work done for years. In October, 1919, the levels were leased for a year. A prospect.

EAGLE ROCK TUNGSTEN PRODUCTION CO. COLORA

Mail returned, March, 1919, from Eagle Rock, Colo. Operated, at las ports, by 40 sets of leases.

Property: 150 acres in the Boulder tungsten district; was reporte carry ore assaying 2-3% in tungsten.

Had a 75-ton mill and sampling plant, at last accounts.

EGYPTIAN MINING CORP. COLORA

Address: Sunshine, via Boulder, Colo.

Cap., $50,000.

Property: 6 claims, at Sunshine, 8 miles from Boulder, Boulder cou Colo.

Development: by 100′ shaft and considerable drifting; also by a tunnel with crosscuts to parallel veins. Three orebodies developed by t and crosscuts are 24″, 10″ and 36″ in width, respectively, the ore carrying and silver in sulphide, the values ranging from $20 to $40 per ton. There is a 24″ body of milling ore assaying 26 oz. gold per ton, and in addition, a s of high-grade sylvanite and a streak of medium value were reported. rich ore, if in commercial amount, will pay a good profit above mining c but no production figures are obtainable.

ELECTRO COPPER CO. COLORA

Address: W. H. Rathbun, pres., Minneapolis, Minn.

Property: the Bailey copper mine at Copper Spur, near McCoy, E county. Ore is malachite in granular sandstone. A leaching plant was posed in September, 1919.

ELK MINING & MILLING CO. COLORA

Address: Silverton, Colo. J. J. Cusick, v. p.-mgr.

Property: 325 acres on Red Mountain, near Gladstone, San Juan cou said to show several veins in andesite from 2′ to 7′ wide, the ore carrying copper, $2 gold and 4 oz. silver.

Development: by tunnel driven at a depth of 1,200′. Management stalled new machinery in 1917 and expected to drive tunnel 1,000′; also pla to erect a concentrating mill.

ELK MOUNTAIN MINING & MILLING CO. COLORA

Owns the Wilfley mine and mill in the Kokomo-Robinson district, nort Leadville, Summit county, Colo.

Ore occurs as replacements in limestone and carries silver, gold, lead zinc. In summer of 1917 it was reported that a vein 4′ to 10′ wide had

as high as 1,000 oz. silver per ton. No recent information is

E MINES & RED, CO. **COLORADO**
Eureka, Colo. William Akers, supt.
med in 1919, to develop holdings near Eureka, San Juan
ll for erection of a 50-ton mill to treat lead-zinc ores. Fred
n Gooch are associated with Mr. Akers.

CO. **COLORADO**
subsidiary of the New Jersey Zinc Co., 160 Front St., New
McMillan, pres.; John Davis, sec.-treas.
Symes Bldg., Denver, Colo. Owns and operates the fol-

s Mine, Leadville, Colo. Two operating shafts; the Em-
ie McCormick, 500' deep. Produces zinc, lead and iron sul-
zinc carbonate.

, Gilman, Colo. Two operating mines in Battle Mountain
owned by Eagle M. & M. Co. Ore is mainly zinc-iron
reated by a roasting and magnetic separation treatment. Mill
ity of 150 tons. Formation is considered similar to that at
ptember, 1919, there were 75 men employed on development.
nections mining costs will be reduced. Reserves are estimated
of 15% zinc ore, with lead and iron values.

Mill, Canon City, Colo. Combined magnetic and wet mill
complex sulphide ores. Ores for this mill are purchased from
. A complete ore-testing plant is also maintained. The treat-
ted steadily in 1919.

Kelly, New Mexico. Company reported to have added 45
ldings, purchasing same from the Tri-Bullion Sm. & Dev. Co.,
with steam power plant and 100-ton concentrator, in which is
zinc, iron, lead sulphide ore. This property has been a large
and lead carbonates. The ores occur in irregular replacements
it dipping limestones. The Linchburg group of claims, the
nes, and the Grey Eagle group, are all being developed.

ine, 10 miles north of Silver City, New Mexico, in Pinos
Equipment consists of mill using raw magnetic separation of
pacity and 400-h. p. power plant equipped with Diesel type of
. The mine is connected with the railroad at Silver City by a
uge mule tram. Ore is zinc sulphide, occurring in metamor-
cut by intrusive dikes.

nes, Hanover, New Mexico. Equipment consists of mill
capacity using raw magnetic separation and 400-h. p. power
ith Diesel type of crude oil engines. Ore is principally zinc
ed with hornblende, serpentine and other metamorphic min-
s irregular-shaped masses in limestone near igneous contacts.

c mine, Hanover, N. M., was bought for $500.000, Jan., 1920.

mine, 20 miles south of Tucson, Ariz. Is idle, though camp
t in order. The oxidized zone has produced a considerable ton-
ead and zinc carbonates. The sulphide zone shows a large ton-
e zinc ore of a very complex nature.

, 20 miles west of Arden, Nev. Equipment consists of sort-
leiner. Ore is zinc carbonate occurring in a crushed limestone
gular replacements. The calcined ore is hauled 20 miles to the
trucks. In 1918, it was reported that development work had
grade of silver ore.

l Sellers mine, in California Gulch, near Leadville, Lake
worked out, and operations were discontinued in 1917. No
s are available.

EDE MINING CO. **COLORADO**
W. 3rd St., Pueblo, Colo. **Mine office:** Charles Hollister,
lo.

Officers: Frank Taylor, pres.; Geo. D. Weston, v. p.; B. E. Watki sec.; E. E. Withers, treas., with Chas. A. Ballreich and E. H. Morse, direct Reorganized March 6, 1915, in Colorado. **Cap.,** $1,200,000; $1 par; o standing, 600,000. Annual meeting, second Wednesday in March.

Property: 20 claims, 9 patented, 323 acres, 7 miles N. W. of Creede the King Solomon mining district, Pueblo county. Claims are on the Ameth lode and on two other contact veins, all carrying gold and silver. Shipme for 1918 averaged $20.17 per ton.

Development: by tunnels, 860′, drifts, 400′ and 225′ and 100′ shaft; gre est depth of workings is 800′; total workings are 1,585′.

Equipment: compressor, 100-h. p. semi-Diesel engine. Company pla ning to erect a mill.

Production: to 1918 totaled 33 cars, netting $22,611.

EUREKA MINE **COLORAD**

George Grabmaier, mgr. Mine is located near Central City, Gilpin coun Colo. Company planned the installation of a flotation mill. A 3′ body of is reported opened.

EVANS-WINN SYNDICATE **COLORAD**

Address: Mark G. Evans, Breckenridge, Summit county, Colo.

Property: the Emile placer claims, on which a lead-zinc vein was posed by dredging operations. The syndicate is sinking a shaft to develop vein.

EVERGREEN GOLD & COPPER MINES CO. **COLORAD**

Reorganized as the Evergreen Mines Co., which see.

EVERGREEN MINES CO. **COLORAD**

Office: 408 Empire Bldg., Denver, Colo. **Mine office:** Apex, Gilp county, Colo.

Officers: J. L. Tapp, pres.; Geo. E. Bell,, v. p.; Wm. C. Hollister, sec treas.; preceding with W. J. Tapp, E. F. Krewinghaus, M. C. Shaffer, Edw Ettinger, J. C. West and A. M. Roth, directors. Etienne A. Ritter, cons. engr Shad Reid, supt.

Inc. Sept. 17, 1914, in Colorado. **Cap.,** $2,000,000; $1 par; outstandin a little over 1,000,000 shares. Notes authorized and outstanding, $75,000. Annu meeting, third Tuesday in August. Company is a reorganization of the Ev green Gold & Copper Mines Co.

Property: the Evergreen mine with 11 claims, 3 patented, 70 acres, the Pine mining district.

Geology: the property shows Archæn gneiss and crystalline schis cut by pegmatite, with an eruptive rock called "evergreenite." This dike is to 12′ in width, bounded on either side by ore-bearing contact zones of abo 50 to 80′ width. The ore deposit is unusual, carrying secondary bornite dissemi ated irregularly through monzonite.

Development: by tunnel and 350′ shaft, which was being sunk , 191 to 550′. Two ore-shoots were found on the 100′ level, 1 on the 200′ and a new o south of this on the 350′ level. Main orebody is 15′ to 18′ thick. There are known ore shoots, carrying chalcopyrite, bornite and covellite, estimated b management to average 3.5% copper, 2 to 8 oz. silver and 50c to $4 gold p ton. The upper workings show some malachite and tetrahedrite. Undergrou work amounts to over 4,000′. A shoot of bornite ore 5′ thick was cut on 2 level in 1919.

Equipment: includes electric power with a 45-h. p. hoist and 4-drill compressor. A 100-ton mill has one No. 4 Telsmith gyratory crusher, Marcy mi Dorr classifier, and 2 Card tables.

Flotation plant installed and began operations August, 1916. Concentrate gave average value of $110 a ton from $5 crude ore.

No production figures are available.

FAIRFIELD MINE **COLORADO**

G. H. Thowenell, mgr. Property situated at head of Russell gulch, nea Central City, Gilpin county. Mine was idle for ten years, until taken over by

1919. A quartz streak carrying free gold is reported to development work.

L GOLD DREDGING CO. **COLORADO**

ridge, Colo.

Foote, pres.; Harvey Riddell, sec.; C. M. Snider, treas.

ge acreage in Swan Valley, near base of Farncomb Hill, holdings are being operated under lease by the Tonopah ge, capable of digging 4,000 cu. yd. every 24 hours, is at

rted to have paid $84,000 in dividends during 1918, which on the capital.

ITAIN COPPER CO. **COLORADO**

Described in Vol. XII. Mine in Routt county, Colo.

NES CORPORATION **COLORADO**

was in the bankruptcy court at Denver since 1910. In as recorded at Gilpin, conveying from G. A. Bierbaum to s, all the holdings of the Fifty Corporation. This included pment. The Fuller-MacCulloch Co. is said to be backing s Co.

ented claims, including the Gregory, Bobtail, and other awk, Gilpin county.

GROUP **COLORADO**

roup was secured, 1918, by the Mogollon Mines Co., New

MINING CO. **COLORADO**

table Bldg., Denver, Colo. **Mine:** Lake City, Hinsdale

lorado.

gineer mountain, has a 2,500' tunnel, developing a large hides, including bornite, with assays up to 27% copper, gold per ton. Mine shipped several hundred tons of high- re, under former ownership.

ades 800-ton shipping bins.

mated at 250,000 lb. fine copper in 1909, and 600,000 lb. nsidered promising, but was closed down in 1912 because of its surface equipment. Presumably idle, 1916-19.

NG & MILLING CO. **COLORADO**

Wittich, gen. mgr., 1148 California St., Denver, Colo.

ims, 780 acres, near Westcliffe, Custer county, Colo.

1919 to incorporate in Colorado, with 1,600,000 shares, $1 that mine has a tunnel run on a true fissure vein 30' wide, dike that will cut 30 contact fissures. Mine said to contain latinum, tin, nickel, and cobalt, which makes one wonder etals were not included.

DREDGING CO. **COLORADO**

ver, Colo., mgr.; F. Z. Hund, supt. Company has a dredge ulch, about 2 miles east of Breckenridge, Summit county. ng on a channel 400 to 500' wide and digging 38' deep. l in bullion per day.

LOCH CO. **COLORADO**

l City, Colo.

ecky Sharp, Iron, and Old Town mines, near Central

uarry secured a 3-year lease on the U. P. R. mill at Central capacity of 120 tons per day, but was to be enlarged to o unit added. About 34 men employed. Reported to be old Mines, which acquired the property of the Fifty Gold

GALENA MT. GOLD & SILVER CO. **COLORA**

Address: Silverton, Colo.

Officers: H. Lazarus, pres.; A. S. Popper, v. p.; N. S. Lazarus, treas.

Inc. 1907, in Colorado. **Cap.,** 120,000 shares; 111,000 outstanding

Property: the Anti-Periodic group of 7 claims, 6 patented, about acres, near Galena Mountain, San Juan county. Has a gold and copper-bea fissure vein in porphyry and trachyte. Ore is a sulphide said to assay from $ $100 per ton.

Development: by about 1,800' of underground workings. Company produced $18,000 worth of ore.

GARFIELD MINING CO. **COLORA**

Office: Garfield, Colo., and 503 K. of P. Bldg., Indianapolis, Ind.

Officers: C. O. Patten, pres.; Walter Johnson, v. p.; Fletcher John sec.-treas., with C. A. Chambers, C. W. Means, E. J. Chambers, and John court, directors. E. W. Fisher, mgr.

Inc. April 1, 1918, in Colorado. **Cap.,** $10,000; 1 cent par; 775,000 is

Property: 19 claims, 17 patented, in Garfield county, Colo. Mine a 10' vein, dipping at 70°, said to be in limestone and carrying 20% zinc. most of the ore carries zinc, it will have to be milled. Reserves are give 1,000,000 tons.

Development: by tunnels, 1,000' and 2,000' long, and 6,000' of work Greatest depth is 1,600'.

Company has expended $20,000 on development, and received $10,000 sale of ore. Plan installing a 50-ton concentrator and flotation mill. A to connect upper and lower tunnels was being sunk at last reports.

Production: total output 900 tons, average grade $20 per ton. S ments are made to Ohio Smelting Co. at Salida, Colo. Prior to present pany's purchase, the property was idle for 12 years. Management is develo property, but shipping only easily mined ore.

GEM CONSOLIDATED MINES CO. **COLORA**

Address: W. E. Renshaw, or Richard White (Receiver), at Springs, Clear Creek county, Colo.

Inc. Jan. 1, 1907, in Colorado. **Cap.,** $5,000,000; shares $1 par.

Property: a millsite and 10 patented claims, showing a vein trace 3 miles, carrying sulphide ores said to assay 10 oz. silver and $18 gold per with a little copper. Mine has about 5 miles of workings.

Equipment: includes 550-h. p. hydro-electric plant, 4 hoists, good 3,000' depth, and an 18-drill compressor. Buildings include a machine carpenter shop, smithy, etc., and a 100-ton stamp mill. Several sets of le reported developing and producing at a profit. Ore is treated at the Ne mill, Idaho Springs, operated by W. E. Renshaw. No recent returns.

GEORGETOWN TUNNEL TRANSPORTATION CO. **COLORA**

Offices: Transportation Bldg., 608 South Dearborn St., Chicago, and Georgetown, Colo.

Officers: C. G. Breitenbach, pres.-treas.; E. H. Pratt, v. p.; C. A. Ba sec.; J. H. Robeson, cons. engr., Denver, with M. B. Dittenhoefer, L. F. S and C. G. Earnest, directors.

Inc. in Colorado. **Cap.,** $5,000,000, divided into 600,000 shares com 400,000 pfd.; par $5; fully paid.

The company is a transportation project, whose purpose is to provide po drainage, light, ventilation, as well as an outlet for the ore and waste rock of many mines within working distance of its course. The project is simila Argo, or Newhouse tunnel at Idaho Springs, Colo. The tunnel will cut at depth the veins and ore deposits that traverse Democrat, Columbia, Repub Brown, and Sherman mountains at Georgetown.

Property: company owns the following properties free from debt mortgages and all patented: Georgetown tunnel, right-of-way, 3,000' wide 16,000' long; Bard Creek, U. S. water rights; Century Pipe-Line & Power P Royal Tunnel millsite; Royal mining claims; Georgetown Tunnel sites No.

mill site; the Chicago, Mayfield and Clara B., lode mining
nterest in the Cliff mining claim; and 76 thirty-year con-
ompanies, switching yards, etc.
ower-plant, 4-drill air compressor, and 20-ton mill in
919.
in March, 1919, tunnel was 2,000′ long, and had entered
l, on which the vein showed ore 4 to 8″ wide, reported to
. silver, 50% lead, 22% zinc, and traces of gold and copper.
a B. was under way early in 1920.

CONSOLIDATED MINES CO. **COLORADO**

Box 488, Salida, Chaffee county, Colo. Clyde H. Jay.
F. L. Ream, sec.-treas.
909, in Colorado. **Cap.**, $800,000; $10 par; 72,000 issued.
rd Friday in January.
claims, 101 acres, in Monarch district, Chaffee county,
posits of lead-iron, copper, and zinc ores between granite,
ite. Deposit runs N.-S. and dips at 45°. Orebody developed
, 1,400′ length and 1,400′ depth, claimed to carry 12 to 35%
1 to 3 oz. silver and 80c to several dollars per ton in gold.
and as clean zinc carbonate. Mine has tunnels aggregating
et. Company claims to have developed 10,000 tons of low-
a large body of limestone.
cludes electric hoist, compressor, and two trams, one
e other, 800′ long, for lime rock, to carry from mine direct

,000,000 production since 1878; 500 tons zinc carbonate
per ton, shipped from July, 1916, to March, 1917. Company
nents of limestone to begin in 1919.

INING CO. **COLORADO**

nclaimed, 1919, from former address: Pueblo, Colo.
by B. M. Gill and C. R. Morris, of Pueblo, to operate
Lambert, and L. C. Owens claims near Breckenridge, Sum-

by tunnels. New York group said to contain large veins
lead ore. Idle.

COLORADO

Valker and M. L. Thomas were reported to have taken over
d and lease. Mine was worked in 1870-72. In 1884, a 1,600′
d, cutting the vein 1,100′ from portal and at 600′ depth on
wide, strikes E.-W., and dips steeply to the north. It tra-
mentary rocks, quartzites, and shales, dipping 45° N. W.
to be persistent in quartzite.
s are reported to have re-opened and repaired the old tun-
ore averaging 25 oz. silver per ton.

G CO. **COLORADO**

uitable Bldg., Denver, Colo. **Mine address:** Harry T.
l City, Gilpin county, Colo.
s Rickard, pres.; Armory Eliot, v. p.; S. May, Jr., sec.
ley, A. N. Burbank, directors.
olorado. **Cap.**, originally $250,000, increased to $500,000;
ng.
se mine, 5 patented claims, about 20 acres, in Central
show a fissure vein in granitoid gneiss. Ore is a silver-
ide, with gold values occurring in shoots 18″ to 24″ thick,
to 4 oz. gold and 13 oz. silver per ton.
by a 570′ shaft and about 5,000′ of underground work-

cludes a compressor and steam hoist.
5, company resumed work, unwatering the Running Lode

mine below Blackhawk. In 1918, $15,000 was spent on development. No rec of shipments since 1917.

GILPIN-EUREKA MINES CO. COLORA

Address: Central City, Gilpin county, Colo. Is a reorganization of Gilpin-Eureka Mining & Milling Co. E. L. Clark, gen. mgr., and N. E. Is cons. metallurgist.

Development: main shaft 720' deep to be sunk to 1,000'. In reopen old workings good gold-silver-lead ore was encountered. The property is c sidered to be well situated.

Equipment: includes 10-stamp mill and concentrators, motor driven.

During 1918 it was reported that a bond issue of $40,000 was to be finan for the company by Platt Bros. Co. of Cincinnati, Ohio. The money was to used for a flotation plant.

GILPIN GIANT MINES COLORA

Address: G. A. Bierbaum, Gilpin, Colo.

Property: the 55 claims and equipment of the Fifty Gold Mines C poration in Gilpin county. The Fuller-MacCulloch Co. is backing the new c pany. Mines were to be unwatered and the mill overhauled.

GILPIN MILLING & REDUCTION CO. COLORA

Address: Central City, Gilpin county, Colo.

Officers: V. R. Jones, pres.; E. E. Jones, sec.; L. H. Guthrie, treas.

Inc. Nov., 1919, in Colorado.

Property: 5-acre millsite, water-right on North creek, and the 100- remodeled Hidden Treasure mill at Black Hawk. A patented process of American Continuous Retort Co., claimed to extract all values, no matter refractory the ore, will be used.

GILPIN MINES & REDUCTION CO. COLORA

Officers: Albert Wagner, pres.; F. McLaughlin, v. p.; C. H. Yar sec.-treas.; C. T. West, asst. sec.

Inc. in Arizona. **Cap.**, 2,500,000 shares.

Property: 100 acres in Pine Creek district, northern Gilpin county.

Development: to a depth of 700' by shaft.

Owing to lack of funds, mine has not been worked for some years.

GILPIN-ORION GOLD MINING CO. COLORA

Merged with Combination Mining & Milling Co., of Denver, which has pr erty in Grand county, Colo.

The Gilpin-Orion operated 40 acres on Bob Tail hill, Gilpin county.

GILPIN TUNGSTEN PRODUCTION CO. COLORA

Address: 1712 Champa St., Denver. C. M. Kittredge, mgr.

Cap., 1,000,000 shares, 800,000 unissued.

Property: the Empress claims in Idaho Springs district, Colorado, Sternberger tract in Gilpin county.

The Empress is opened by a 500' tunnel to depth of 300', showing good g silver-copper ore. Near the Sternberger the company has claims that con silver and tungsten ore.

No recent information.

GILT EDGE MINES & SMELTING CO. COLORA

Office: 919-920 Equitable Bldg., Denver, Colo.

Officers: Henry I. Seemann, pres.-gen. mgr., Box 1375, Denver, Co Wm. H. Warinner, v. p.; A. W. Craig, sec.-treas., with E. M. Kirton, direc

Inc. July 24, 1913, in Colorado. Cap., $1,500,000, to be increased to to $2,500,000; $1 par; outstanding, March 15, 1919, 1,011,253 shares. Ann meeting, fourth Thursday in July.

Property: 40 claims, about 300 acres, mostly patented, in Lincoln G ing district, Clear Creek county.

Ore: gold-silver-copper in fissure veins in schist and porphyry, sam assay from $9 to $200 per ton. The Gilt Edge mine is said to have produced ri rich gold ore.

the Aurora tunnel driven at a depth of 1,000′; in Dec., as in 500′. Total underground workings, 2,000′.
assay over $200 per ton.

ING & REFINING CO. **COLORADO**
Controlled by American Smelting & Refining Co., and de-

INING CO. **COLORADO**
ado, February, 1919, by J. T. Cook, sec.; Wm. Mitchell, nver, and Louise Tressler, of Breckenridge. **Cap.**, $50,000.
ed to operate the six claims known as Tressler's group, about e gulch of Farncomb hill, five miles from Breckenridge, Sum- of the mine is leased to Harriman Brothers, who are shipping gold and up to 70 oz. silver. An air-compressor was to be

XPLORATION CO. **COLORADO**
L. Harraman, pres.; C. R. Cushman, sec., 417 Colorado lo.
ing of shareholders was held on January 13, 1920.

MINING CO. **COLORADO**
C. Ingersoll, mgr., Ouray, Colo.; B. G. Brinkman, owner Bank, St. Louis, Mo.
claims, 40 patented, 450 acres, at Ouray, Ouray county, er option.
xture of quartz, calcite and ferro-manganese silicates, car- vith gold and copper, mainly as chalcopyrite.
: by 1,400′ shaft with 4,000′ of workings.
ncludes 300-ton mill with flotation plant.

NING CO. **COLORADO**
ngress St., Boston, Mass. H. J. Stahl, supt., Central City,

L. Winchester, pres.; W. D. Drake, v. p.; M. M. Cairnes, treas, with W. J. Troth, S. H. Hayden, L. M. Forbes, Seth A. Littlefield, directors.
1914, in Colorado. **Cap.**, $500,000; $1 par; 357,864 outstand- ston Curb.
) claims, 6 patented, in Quartz Valley district, Gilpin from Central City. Developments show a fissure vein in . dip and E.-W. course. Ore occurs as shoots from 2 to 6′ es 2 oz. gold, 10 oz. silver, 50% lead, 4% copper.
: by shaft following vein down to 300′ level. Workings erty worked in 1918, but with small force, on account of war opment in 1919 increased the shipments of high-grade ore.
steam hoist, electric compressor and air drills; shaft-house, ctric power throughout.

INING CO. **COLORADO**
ler, Colo.
A. Jackson, pres.; U. S. De Moulin, v. p.; J. M. Page, sec.; eas., with A. W. Glessener, G. W. Meser, C. A. Neal and W. H.

ado. **Cap.**, $2,000,000; $1 par; 1,000,000 issued Bonds au- outstanding in 1917, $83,000.
claims, 43 patented, in Gold Hill and Central mining dis- nty, said to carry gold-silver ore in a fissure vein in granite. s ore reserves.
: by 4,660′ of tunnels and total of 25,000′ underground work

ncludes 100-ton cyanide mill and 7 drill compressor. No

NITED MINES CO. **COLORADO**
Bldg., 1218 Chestnut St., Philadelphia, Pa.

Inc. June 1, 1910, in Delaware. **Cap.**, $2,000,000; shares $1 par. Reg
trar & Transfer Co., New York, transfer agent. Listed on New York Curb.
Properties: in the Kerber Creek, Manitou and Hull mining distric
Saguache county. Doing assessment work only.

GOLD KING EXTENSION MINES CO. COLORAD

Offices: Gladstone, via Silverton, Colo.; or 701 Cooper Bldg., Den
Colo. Is a reorganization of New Gold King mines.
Officers: H. S. Hadley, pres.; J. N. Nicholson and R. G. Gentry, v. p
G. W. Kinney, treas.; G. D. Blound, sec.; W. Z. Kinney, mgr.
Property: Gold King group at Gladstone, San Juan county, about
acres, and six other claims, totaling 55 acres, between the Gold King group
Sunnyside mine. Company also purchased the Gold King mill and tramw
Mine under lease to Gold King Leasing Co.
Geology: fissure veins in andesite carrying irregular stringers of le
copper ore with gold and silver values. Gold occurs free in white quartz a
ciated with iron pyrite, galena, or blende.
Development: by 600′ shaft and 3,000′ tunnel.
Equipment: compressor, tramway, and 300-ton flotation mill which
in operation.
Production: mine credited with $6,081,279 net from 1895 to 1919,
which $1,750,000 was paid in dividends.

GOLD KING LEASING CO. COLORAD

At last report was operating under lease, the Gold King mine at Gladsto
San Juan county. Property was formerly owned by Gold King Cons. Mi
Co., reorganized as New Gold King Mines. Late in 1918, property was sold
Gold King Extension Mines Co., which see.

GOLD QUEEN MINING CO. COLORAD

Idle. Considered a wild cat of the worst type. Claims on Barren m
tain (so called for good cause), Chaffee county, Colo. For further informati
see Vol. XII.

GOLDEN AGE MINING & RED. CO. COLORAD

Idle since 1897, when fire destroyed buildings. Mine was reported reope
1918.
Property: the Golden Age mine at Springdale, Boulder county, sho
several parallel fissure veins traversing mineralized prophyry, and carrying lo
grade, gold-bearing sulphide ore. Equipment includes a 120-ton flotation m

GOLDEN EAGLE GROUP COLORAD

Address: Salina, Colo.
Property: 5 claims, near Salina, about 8 miles northwest of Boul
Boulder county, shows a network of fissure and contact veins with ore sai
contain gold and silver tellurides.
Development: by 480′ shaft and 3,000′ of tunnels. Mine idle for so
time.

GOLDEN EDGES MINE COLORAD

Patrick Magill, owner, Columbine, Colo. Mine located on Hahns P
Routt county, Colo.
Development: by 900′ tunnel. Developing in the expectation of
ting ore.

GOLDEN EMPIRE MINING CO. COLORAD

Address: Empire, Colo.
Officers: B. F. Richards, pres.; J. H. Cook, v. p.; E. D. Payne, s
treas. and gen. mgr.
Is a reorganization of an Arizona corporation, with Colorado holding co
pany. Cap., $300,000; shares, 10c par; outstanding, Dec., 1918, $238,057; 61
shares in treasury. Transfer office: Empire, Colo. Annual meeting, first Thu
day in October.
Report for year 1918 shows: Receipts from stock sales, $3,116; special
sessment, $5,086; other income, $1,578; total, $9,780. Expenses were $9,
Balance on hand was $128.
Property: 31 claims, 12 patented, comprising several groups in

ining district, Clear Creek county. Also has 3 mill-sites and

ns the Denver City group outright and has a 10-year lease on
the Tennessee M. & M. Co., with an additional 10-year privi-
919, that it would purchase the Harrison and Conqueror groups
any was planning in 1919 to secure the Marshall-Russell Tunnel
rshall-Russell Gold M. M. & T. Co.) Practically idle, 1918.
principally produce copper-iron sulphides, but the Denver
aid to have produced lead, silver, gold, and zinc ore in 1919.
were estimated to be 20,000 tons available. Development, by 12

includes a compressor, with electric and gasoline power, 3
tamp amalgamation-concentration mill with capacity of 40 to 60
s; extraction is 85 to 92%. The second mill has about the same
equipped with crusher and rolls. Another mill, completed 1919,
ard ball mill, with flotation unit, having a capacity of 75 to 100

ANGLE MINING CO. **COLORADO**

ed unclaimed, March, 1918, from Jamestown, Colo.
M. McGonigle, pres.; J. F. Schofield, sec.; H. F. Linnen-

1916, in Colorado. Cap., $250,000; $1 par; $125,000 outstand-

2 unpatented claims on Porphyry mountain, Jamestown,
said to show a deposit described as a junction of 20 fissures in
, dipping S. and E. Ore composed of quartz and fluorite, con-
s with gold, silver, copper, and molybdenum, assaying $22 gold

nt: by 300' tunnel. Assessment work only done, 1916-1919.

NING GOLD MINING & INVEST. CO. **COLORADO**

214 Elizabeth St., Denver, Colo. J. E. Bailey, pres.
ıber, 1904. Cap., $2,000,000; 10c par.
9 claims in Sugar Loaf district, Boulder county. Company
ransportation tunnel to connect with Livingston mines of U. S.
cording to the president's report, it will be the largest transporta-
he district when completed.
nt: by tunnel. Veins said to carry telluride of gold. Plan to
ant.

MINE **COLORADO**

Stauffer, Breckenridge, owner.
about 7 miles south of Breckenridge, Summit county, leased
ern believed to be represented by William Mitchell, Breckenridge,
said to have produced rich silver ore in the 80's. A winze, down
ık from main tunnel. Workings cut a vein of sulphide ore car-
er, zinc, but it was not treated profitably owing to the zinc and

UNNEL CO. **COLORADO**

ed unclaimed, 1919, from former address, Granite, Chaffee county,
day, supt., at last accounts.
about 20 patented claims known as the Yankee Blade and

nt: by 1,815' tunnel. Ore is heavily mineralized, carrying
1.5 oz. silver per ton. A 50-ton mill is on the ground. Property

NE **COLORADO**

the Graphic mine at Magnolia, Boulder county.
it was reported that O. A. Johnson and George Bermont, lessees,
' thick, averaging 3.04 oz. gold per ton.

GREAT WESTERN MINE CO

Armstrong and Vanetta, lessees. Mine near Lake George, Pa Colorado.

Property: shows vein with gold-copper ore, developed by 2 shaft, 800′ of crosscuts and drifts. Equipped with steam power an pressor. Small shipments of sulphide ore have been made in past. returns available.

GREAT WESTERN MINES SYNDICATE CO

Address: Ward, Boulder county, Colo.

Company contemplated erecting a custom mill, using flotation, in

GUNNISON COPPER CO. CO

Mine located at Whitepine, Gunnison county, Colo. John Robi Reported to have cut low-grade copper ore in new work in crosscu last accounts.

HAHN'S PEAK GOLD MINING & MILLING CO. CO

Office: Room 3, Algoma Bldg., Oshkosh, Wis. Mine at Hal Routt county, Colo.

Inc. Jan. 29, 1905, in Colorado. **Cap.,** $1,000,000; $1 par; 996,2 outstanding.

Officers: H. O. Granberg, pres.; C. A. Spencer, v. p.; Chas. Ol E. E. Meeleus, sec.-treas., with Dr. H. A. Wolter, M. A. Rasmussen, Brown, directors.

Receipts for year ended December 31, 1918, were $1,559, comp $17,000 in 1917.

Property: 25 claims, 248 acres, patented. **Development:** 4(shaft and a 950′ tunnel in Royal Flush claim, said to cut 5 veins; also Conundrum tunnel 430′ lower, cutting 12 veins, whose values are in silver. Underground workings total 15,000′. Vein is in porphyry and dip.

Equipment: includes gasoline engines, compressor, air drill and 400-ton concentrating mill. Experiments with oil flotation process favorable. Development work has been going on since September, 1 to connect mill and mine by rail, the locomotive to run for 1,540′ into Ore shipped in 1918, averaged $61 per ton.

Reported on by Arthur Lakes, Etienne Ritter, H. C. Beeler and o

HAMLET MINING & MILLING CO. COI

Address: C. T. Singleton, supt., Silverton, Colo.

Officers: J. S. Tucker, pres.; H. W. Fox, cons. engr.

Bonds: $150,000 issued in 1911.

Property: 19 claims, about 200 acres, known as the Hamle miles from Silverton, in the Howardsville mining district, San Juan co

Development: by tunnels, longest known as Mill tunnel, 500′ level of old mine workings, connected by raises with tunnel.

Ore: a complex mixture of copper-lead and zinc sulphides good gold and some silver.

Equipment: includes steam power plant, compressor and co with flotation unit, latter destroyed by fire, December, 1915. New and fully equipped, 1917, was said to be making an 80% extraction. report.

HAMPTON CONSOLIDATED MINES CO. COI

Address: Russell Gulch, near Central City, Gilpin county, Co Hamlin, mgr.

Inc. in Colorado. **Cap.,** $3,000,000; $1 par. Company reporte funds and indebted to Chittenden estate for taxes, etc. The widow Chittenden, organizer and moving spirit of the company, is practically

Property: 4 claims, patented, very close to the War Dance g and believed to carry an extension of the ore-shoot of that mine. has bornite, tetrahedrite, pyrargyrite, pyrite and marcasite, said to av 35% copper, 6 to 35 oz. silver and 0.16 to 5.4 oz. gold per ton.

Development: by tunnels, shafts, and over 3,000′ of workings.

pened on the 600′ level, with shipments from that and the

ludes a 16-h. p. gasoline engine, electric hoist, com-
Property believed to have merit.

& MILLING CO. **COLORADO**

from former address: Capitol City, Hinsdale county, Colo.
: equipped with steam and electric power and a 100-ton
ly dead.

DEVELOPMENT CO. **COLORADO**

917, to Calliope Cons. M. Co., which see.

PER MINING CO. **COLORADO**

fornia St., Denver, Colo.
Moodie, pres.; N. M. Abbott, sec.-treas.
Cap., $3,000,000; $1 par.
er the holdings of the Henrietta M. & M. Co., formerly
n S. & R.
6 miles N. of Silverton, San Juan county; developed by
e main or No. 7 tunnel being 2,200′ long, and carrying auri-
ous copper ore. Work started May, 1917. First shipments
e of ore containing gold, silver and copper and reported
n.

ING & MILLING CO. **COLORADO**

suffered from a complication of bad luck and similar
Succeeded, 1916, by Henrietta Copper Mining Co., which

property, near Silverton, Colo., are fully described Vol. X,

RE MINING & LEASING CO. **COLORADO**

hos. E. Sample, sec., Omaha, Neb. C. W. Crawford,
: Salida, Chaffee county, Colo.
lease on the Sedalia mine of the Sedalia Copper Co.,
See Sedalia C. Co.

Y MINES CO. **COLORADO**

n Mining Co.
Colo. Wm. Parsons, mgr.; J. D. McAlpine, engr.
w several bodies of silver ore of milling grade. Flotation
. Mine reported leased to J. H. Slattery at last accounts.

NEL & REDUCTION CO. **COLORADO**

n made in 1907 of the Henson Creek Lead Mines Co.
ke City, Hinsdale county, known as the Bonanza group,
lead and copper ores. Has water and electric power and a
Letters neither answered nor returned. Presumably mori-

R MINING & MILLING CO. **COLORADO**

son Hill, Breckenridge, Colo.
Meffley, pres.; R. L. Gore, v. p.; J. F. Meffley, sec.-treas.;
engr.; George Williams, supt.
lorado. Cap., $1,000,000.
New York group of mines on Gibson Hill, one mile
e, Summit county, operated under lease and bond. Mine is
anket vein of lead-zinc ore and two vertical veins of high-
ment: by long crosscut tunnel.

L & MINING CO. **COLORADO**

5, as New Life Tunnel & Mining Co., which see. Company
vers for years.

ILLING & LEASING CO. **COLORADO**

, Colo.

Officers: Chas. O'Kane, pres.; J. W. Hetherly, v. p.; H. W. Clark, s
J. B. Stitzer, treas.

Capital stock increased from 100,000 to 150,000 shares in 1917.

Property: a group of claims, about 400 acres, includes the Little An
mine in the Roaring Fork mining district. Ore is a sulphide of lead, carry
silver and zinc, with a considerable quantity of barite.

Development: by Hope tunnel, being driven to reach the Little An
vein at 9,500'. Seven years have been devoted to the advancement of this
Work in 1917 amounted to 1,047' at a cost of $14.58 per foot; in 1918, 915'
a cost of $17.16 per foot. The tunnel is to be 9,500' long, 4x7' wide and 2
below surface.

Several of the company's claims have been leased to others on a roy
basis. Examined by Geo. W. Tower, Jr., and Fred. W. Foote.

HORSE MOUNTAIN M. & M. CO. **COLORA**

Address: J. O. Kempf, pres., Eagle, Eagle county, Colo.

Inc. in May, 1919.

Property: the Lady Bell group of 22 claims in the Fulford distric
miles from Eagle, on which silver ore was discovered in 1913, and from w
about 175 cars of ore were shipped up to 1916. A mill is to be erected.

HORSFAL MINE **COLORA**

Mine office: Gold Hill district, Boulder, Colo. Walter McCaslin, L
mont, Colo., operator and reported owner. Chas. P. Oliver, supt.

Mine was opened in 1917, after an idleness of 30 years. Said to have
a big producer from 1859-'87. Late in 1918 shaft was sunk from 300' to
Ore reported to carry gold, with a little silver and some lead. 10 men empl
at last report.

Equipment: includes electric hoist, and a flotation mill planned.

HUMBOLDT MINES CO. **COLORA**

Controlled by Smuggler Union Mining Co.

Address: Telluride, Colo.

Officers: Bulkeley Wells, pres.-gen. mgr.; F. N. Watriss, v. p.; T
J. Regan, sec.-treas., 120 Broadway, New York, with C. N. Bell and
Adams, directors. C. N. Bell, supt., at last accounts.

Inc. 1915, in Colorado. **Cap.**, $500,000; $100 par; outstanding, $38

Property: 25 patented claims, 180 acres, in Mt. Sneffels mining
trict, Ouray county.

Ore: gold, silver, lead and iron, in a 2' quartz fissure vein in sha
with N. W.-S. E. strike and dip of 76°.

Development: 680' vertical Humboldt shaft with 7 levels and the
long Sheridan tunnel connecting with lowest level of the Humboldt shaft. G
est depth of workings, 840'.

Equipment: includes a 50-h.p. electric hoist, compressor and a tra

Production: started January 1, 1916. In 1916, 47,900 tons; 1917, 4
tons; 1918, 36,300 tons. No information as to grade obtainable. Ore is
by Smuggler Union Mining Co.

HYATT SYNDICATE **COLORA**

Late in 1918, T. T. Hyatt of Shawnee, Okla., and his associates, we
ported to have taken over the Prussian mine at Rowena, Boulder county.
L. A. Tarbett, Boulder, supt.

Equipment: includes 50-ton quartz mill and 25-ton flotation unit.

IDAHO BRIDE MINING & MILLING CO. **COLORA**

Officers: E. D. Payne, sec.-gen. mgr., 227 Temple Court Bldg., D
Colo. H. A. Miller, pres.; R. A. Kramer, v. p.; A. A. Ancoin and H. Arg
directors.

Cap., $100,000; $1 par.

Property: about 150 acres near Idaho Springs. Company organ
take a lease on the Bride vein, worked through the Idaho tunnel, and sup
has lease and bond on the Seaton mine, opened at depth by 300' drift in the
house, or Argo, tunnel, 800' lower than the Idaho. Company took over
property, 1914. Work was resumed on Bride vein in March, 1917.

lena with silver-gold content, from 1,300′ level, said to
ton.
ludes a concentrator. Recovery on $4.65 ore is given

ed that upward of $500,000 has been expended in develop-

sed for custom business to E. J. Jones. Company said to
er some lead-silver-gold mines in the upper Union district
. No recent returns.

REDUCTION & TRANS. CO. COLORADO

E. Renshaw, mgr., Idaho Springs, Clear Creek county,

ilver Age, Gem and Freightons Friend mines (formerly
s Co.), showing veins with gold-copper ores.
y several shafts and extensive tunnel workings. Is
ssees.
ludes electric-driven compressor and hoist, and a 200-
20 stamps.
y added another 50-ton mill with two flotation units,
e capacity of the Newton mill.

OLIDATED MINING CO. COLORADO

rado Bldg., Denver, Colo. **Mine office:** Georgetown,
Colo. Edw. J. Wilcox, pres.-mgr.; Henry Butler, supt.
truction of the Waldorf Cons. Moning Co. Is a Law-

cres, patented, including the Tobin mine, in the East
hows a strong fissure vein with 3′ paystreak of gold-

ncludes the Tobin and Wilcox tunnels, with 7 miles of
n of high-grade copper was intersected, April, 1915, at

udes a 125-ton mill at the portal of the Wilcox tunnel.
several years, operations were resumed in 1915. Re-
the mill capacity was to be doubled.
ipment said to have averaged 10% copper, 8% lead, 1.53
. silver per ton. No reports obtainable direct from

Thomas W. Lawson, of Boston, Mass., was boosting
is reputed to have yielded millions of dollars when
an ounce. A one-mile drainage tunnel was driven,
e deposits at a depth of 1,000′. The main deposits are
ardly scratched, which seems strange, if true, because
had an output of several millions before it shut down.
ture put out, about this company, capitalization, officers,
opment and sampling, are omitted—preventing an esti-
risk" in buying shares.

COLORADO

y Copper Gulch, Ironton, Ouray county, Colo.
show a 5-inch vein assaying 30 to 60 oz. silver and 12
aging $40 per ton.
A. B. Eiseman, of New Orleans, had taken a lease on

NG CO. COLORADO

galls mine on Quartz hill, Gilpin county, showing gold-
veins. Developed to depth of 430′ by shaft and cross-

made to Chamberlain Ore Co., Blackhawk, Colo., in
.8 oz. gold, 10 to 20 oz. silver, and 9 to 11.83% copper
and has no officers.
unts.

property, reported cutting 4" of ore assaying 10 oz. gold and 44 oz. silver. developed by 70' shaft.

LACKAWANNA MINING & REDUCTION CO. COLOR

Address: Silverton, San Juan county, Colo. Believed to be idle

Inc. 1917, to operate the Lackawanna properties now being ope by D. L. & W. Mng. & Red. Co., which see.

LAKE GEORGE DEVELOPMENT CO. COLOR

Office: 22 E. Columbia St., Colorado Springs, Colo. A. J. Kiser, treas. Property sold in 1917 and company in receiver's hands. Fully des Vol. XII.

LAKE MINE COLOR

Owned by Hal and Robt. H. Sayre. Robt. H. Sayre, Central City, mgr.

Property: 5 patented claims, in Virginia mining district, Clear county, shows pyrite, chalcopyrite, gray copper, zinc and lead. Ore occ fissure vein running N. 80° E. with dip 65°, in granite-gneiss formation.

Development: by 2 tunnels, 600' and 2,000' long to vertical dep 2,400', with a total of 15,500' of workings.

Dividend distributed among the owners for the fiscal year ending Aug 1916, was $10,000. Produced 10,848 tons averaging $8 per ton.

Mine operated in 1917-18 by W. T. Hireen of Idaho Springs. Reporte concentrates produced ran between $40 and $60 per ton.

LAKE SUPERIOR OPHIR MINING CO. COLOR

Address: Ophir, Colo. Believed to be out of business. Mail ret unclaimed.

Inc. Sept., 1911, in Arizona. **Cap.**, $1,000,000; $2 par. Is reorgani of the Calumet-Telluride Mng. Co.

Property: in Chapman gulch above Ophir, San Miguel county, s carry free gold ore.

Equipment: includes aerial tram, electric power and 20-stamp which handled about 100 tons of $15 ore daily at last accounts.

LA PLAISANCE MINING & MILLING CO. COLOR

Mine office: Crisman, Boulder county, Colo.

Inc. 1918, by E. V. Grant, A. Dawson, and F. A. Fair, to operat New Enterprise and La Plaisance mines. **Cap.**, $50,000. Both prop were producers of high-grade gold and silver ores, but had been aband

Equipment: includes hoisting and compressor plants.

LA SAL COPPER-SILVER MINING CO. COLOR

Now owned by Michigan-Colorado Mining Co., which see.

LAURA LEE MINING & LEASING CO. COLOR

Out of business in 1918. See Volume XIII for a sample of adve literature.

LEADVILLE & MOSQUITO RANGE MINING & MILLING CO. COLOR

Office: Geo. J. Ermlich, pres., 92 Eighteenth St., Denver, Colo.

Operating the Walter Scott property, located 1½ miles from Worm west side of Mosquito range, Lake county.

LEWIS MINE CO. COLOR

Telluride, San Miguel county, Colo. Taken over by Lewis Mng. & L Co., which see.

LEWIS MINING & LEASING CO. COLOR

Address: Telluride, San Miguel county, Colo. H. G. McClain, supt.

Property: a long-term lease on the Lewis mine, Bridal Veil bas luride, idle since 1912. Mine has fissure veins with shoots of complex-le copper ores.

Development: by 500' shaft, and equipped with flotation mill installed and mine unwatered in 1918. Employs 30 men.

AIN MINING & MILLING CO. **COLORADO**

Plata, Colo.

'erini, pres.; J. Orocchi, v. p.; T. R. Lilyard, sec.; C. M. . Warnecke, mgr.

Colo. **Cap.**, $1,000,000; $1 par. 600,000 shares outstanding laims, 7 patented, in Lewis mountain, 3 miles north of La nty, includes the Parole, Ten Broeck, Highland and Sylvan d and silver telluride in quartz vein in diorite and limestone, on.

by 400' and 700' tunnels. Has 4,700' of workings, greatest Company drove a 3,000' crosscut tunnel in 1919.

cludes compressor and drills. An aerial tram and 50-ton additions proposed.

rly 1919, 800 tons averaging about $60 per ton.

GOLD MINING CO. **COLORADO**

ite St., Boston, Mass. **Mine office:** Telluride, San Miguel

ur Winslow, pres.; J. J. Cairnes, v. p.; Henry L. Rand, erbert Kean, Geo. R. Fearing, Jr., directors. Charles A. McClain, supt.

ri. **Cap.**, $700,000; $5 par; $667,800 outstanding.

1915 amounted to 16%; in 1916, 28%.; 1917, 34%; 1918, taling $2,594,181.

Liberty Bell mine at Telluride, shows gold and silver- fissure vein averaging 3' to 4' in width. The main orebody nd dips 57° W. For geology of the district, see U. S. G. S. 57. Reported, 1918, to have leased part of Humboldt Claim rom the Smuggler-Union Co. Shipments in 1918, averaged 0.529 oz. gold. Mine and mill expected to shut down, 1920.

by 2,600' tunnel and 1,000' raise from tunnel level to orkings. Ore is mined by open stopes on stulls or by shrink- penings amount to about 16 miles of workings.

ncludes hoist of 50 tons hourly capacity, electric power, Norwalk compressor, 1.5 miles tram, a 500-ton concentrator Extraction averaged 96%, and total cost per ton amounted

	Tons Ore Treated	Oz. Silver Produced	Oz. Gold Produced
.....	90,700	198,591	46,861
.....	143,100	261,294	31,170
.....	165,300	256,711	30,580
.....	173,700	314,432	24,054
.....	173,840	315,919	33,150
.....	179,216	288,602	36,693
.....	175,340	313,845	48,993

rom mine amounts to about 2,144,612 tons. Reserves are tons. Total production since 1899 said to be $14,043,893.

NG & MILLING CO. **COLORADO**

eenridge, Summit county, Colo. Frank Peabody, mgr. 3 to be operating the Monte Cristo mine, in the upper Blue ody is a blanket deposit, 4 to 7' thick, carrying gold, silver, ing plant has been remodeled and electrified to bring it up

G & RED. CO. **COLORADO**

e Dorr Co., Denver, Colo. Owen Johnson, mgr.

ing the Pennsylvania Mine group at Montezuma, Summit

LINCOLN GROUP MINES CO.

Office: 1816 California St., Denver, Colo.

Officers: H. A. Wimbush, pres.; Peyton Hugh, v. p.; H. treas.; R. R. Moodie, sec., with Harry J. Newton, directors.

Inc. 1914, in Arizona.

Property: 10 claims at Idaho Springs, Clear Creek cou carry streaks of ore assaying 7.8 oz. gold and 8.1 oz. silver. tunnels, crosscuts and drifts. Lessees at work in 1916; idle since th recently that the mine will be sold to a New York syndicate.

LITTLE FOUR LEASING CO.

Leasing on the 1,600′ level of the Gem mine at Idaho Springs, by the Gem Cons. Mines Co., and reported to have struck a vein ore running $40 per ton. The lessees are Dr. A. Fraser, W. E. F. Renshaw and S. Smith.

LITTLE GIANT GOLD M. & M. CO.

Lawson, Colo.

Officers: F. L. Collom, pres.; F. F. Chady, v. p.; H. E. treas.-mgr.; F. P. Koontz, supt., with R. L. Dear and Ira Spen

Inc. in Colorado. **Cap.,** $500,000; $2 par.

Property: 58 patented claims, 350 acres, in Downieville mi Clear Creek county, carries gold-silver-lead ores in quartz veins, with dip 60°. Country rock is granite.

Development: to depth of 900′ by 2 tunnels, 3,500′ and 1,

Equipment: includes steam hoist, compressor, drills an tion mill.

The Little Giant is credited with a past production of $4,000,0

LITTLE KINGDOM MINING CO.

Address: L. H. Flanders, sec., Kittredge Bldg., Denver,

Inc. in Arizona with original capital of 10,000,000 shares 1c to 1,000,000, $1 par, and later to 500,000 shares, $1 par.

Property: a number of patented claims in the Enterpri Gulch district, Gilpin county. Ore is reported to carry lead sulph ing amounts of silver. Company has not operated property in three claims are worked on lease. Company's flat rate taxes we arrears, at last accounts.

LITTLE MONTANA MINING CO.

Office: Colorado Springs, Colo.

Officers: C. M. MacNeill, pres.; C. C. Hamlin, v. p.; C. B. treas.

Inc. 1912, in Wyoming. **Cap.,** $150,000; $1 par.

Gross earnings, 1917, were $3,210; expenses, $4,167.

All stock, except three shares, owned by Granite Gold Mn company operates mine. Property described under Granite Gold Cripple Creek district.

LOGAN METAL CO.

Office: 5 Fonda Block Bldg., Boulder, Colo.

Officers: J. R. Woll, pres.; S. H. Blakesley, v. p.; W. T. M F. W. Kobler, treas.

Inc. 1918, in Colorado. **Cap.,** $300,000, shares $1 par; outs 000 shares. A close corporation.

Property: 12 patented claims, about 50 acres, at Cris county, has gold, silver, and tungsten in fissure veins in granite, s N., S., with 25° dip N. E.

Development: by 4 tunnels totaling two miles. Greatest

Equipment: includes hoist, compressor, pump, and electric worked mainly by lessees.

LONDON MINES & MILLING CO.

Controlled by the Story, Jewett and Packard estates. Mine Park Co., Colo. Chas. Aicher, mgr.

London mine on London mountain, 7 miles W. of Alma, ie distance from Leadville, opened in 1875, is an old-time

its are fissure veins in gray and white porphyry. The main ges 18" thick, runs N. 37° W., with dip of 65° W., while the llel fissure is 16" thick. Assays reported to average 4 oz. % lead. The main London vein has been the principal pro- Company reports both veins to be making equal production nber, $50 to $100 ore was being shipped.
by 2 adits, one 300' below the other, opening the London exposing backs of 150' to 650'. Company is driving a tunnel 780' below present workings, giving new stoping ground, 780' ong. Machine-drills are used. Company planning a 200-ton

LORADO MINING CO. **COLORADO**
Park county, Colo.
Trone, pres.; E. A. Ritter, v. p.; A. J. Brand, sec.-treas., antin, J. W. Lepine, W. H. Price, and Dr. T. Stark, directors. Dolly Varden mine, about 18 claims, 150 acres on Mt. reported to have purchased the Moose properties adjoining on the north, from the estate of Ludlow Patton, N. Y., con- is, 300 acres. The rocks are lime and porphyry; veins are id contain galena and antimonial silver. The first carloads re said to have returned 0.02 gold, 177 oz. silver, and 4½%

by tunnel and drifts, 2,000' long.
ncludes 200-ton mill with flotation unit, and an 8,000' n Sept., 1919, the mill was treating 150 tons daily, producing 0% lead concentrates. There were 40 men employed.

IINING CO. **COLORADO**
town, Colo.
. Hunt, pres.; T. Johnson, v. p.; Joseph Lloyd, sec.-treas.;

ado. Cap., 1,000,000 shares, par 10c, outstanding, 151,175

laims, 1 patented, comprising 39 acres, in Central mining , Boulder county. Ore is in a fissure vein in gray granite, car- lead, copper, and zinc. Developed by shaft 36' deep. A

INES CO. OF COLORADO. **COLORADO**
Elizabeth St., Denver, Colo.
. Kapps, pres.; J. E. Bailey, principal owner, sec.-treas.,

Colorado.
cky Girl and National (patented) lode claims in Sugar Boulder county. Veins carry gold, silver, and fluorspar. Good Morning tunnel with major development being done

with 3-drill compressor and machine-drills.

G & MILLING CO. **COLORADO**
8 that C. W. Brandenburg as manager, and Eastern interests any of this name with capital of $25,000, to operate property k, Brainerd camp, near Nederland, Boulder county, Colo. l to carry pyritic ore assaying 6 to 30% copper. Shipping d and 90 oz. silver per ton.

CO. **COLORADO**
dead. Breckenridge, Colo. A reorganization of the O'Reilly

rizona. Cap., $1,500,000. Owned by Haverhill, Mass.,

Property: 51 acres on North Star mountain, 10 miles S. of Brecke Summit county, said to show Witch Hazel and other veins of gold ore.

Development: by 763′ adit.

MARION MINES & MILLS CO. COLO

Office: 850 Equitable Bldg., Denver, Colo. **Mine office:** Rye, Co

Officers: Henry E. McElwain, pres.; John H. McElwain, Frank B S. McElwain, Frank Bulkley and Clarence A. Brandenburg, Denver, di Jos. Giedlartz, sec.-treas.

Cap., $300,000, increased from $200,000, fully paid by $100,000 balance in property. Outstanding debts, Feb., 1917, $118,389. No fi information received since.

Property: the Greenhorn group, 19 claims, 6 patented, together wi millsite claim, total 65 acres; also 120 acres held by location, making 18 mineral land in the Hardscrabble district, Custer county, Colo.

Development: by tunnel showing a vein of zinciferous copper an ore with small gold and silver values. Has water power, compressor and concentrating mill. Erected a 100-ton flotation plant to treat tailings i Is a small producer, but no figures available.

MARMATITE MINING & LEASING CO. COLO

Office: Rico, Colo. E. H. Snyder, mgr.

Operating under lease the Blackhawk mine, owned by the Rico-Argenti also the Pro Patria mine of the Syndicate M. & M. Co., and the Silver mine. The Enterprise vein of the Silver Swan is being opened. Ore c iron pyrite, zinc, and a little silver. Reported shipping at rate of two c day in 1919, to the Durango smelter. An assay office has been built a Pro Patria tram and mill are also operated under lease.

MARSHALL & RUSSELL GOLD M. M. & T. CO. COLO

Out of business; property at Empire, Clear Creek county, sold at re sale July 9, 1917. See full description in 1916 edition of this book.

MARTIN MINING AND POWER CO. COLO

Martin M. & P. Co. of Delaware, is the holding company.

Address: S. G. Martin, mgr., 40 Exchange Place, New York, N. Y

Officers: S. G. Martin, pres.; S. L. Martin, v. p.; W. B. Jones with E. F. Nolan and C. W. Wright, directors.

Inc. in New York. **Cap.,** $100,000. Registrar, Empire Trust C Broadway, New York. Transfer agent, Security Transfer Reg. Co., 66 way, New York.

Property: 24 claims, 378 acres, 215 lots, 13 acres; other property by agreement and lien, option, etc., 1,296 acres, located in Silverton quad and Eureka mining district, San Juan county.

Geology: Eruptive porphyry cut by 20 fissure veins. Compan scribes three vein zones: first, 10 to 100′ wide, carrying gold with some pyrite; second, 25 to 100′ wide, a copper-silver vein; third, several zin silver veins, the ore being complex and refractory, but milling to 40% zi 65% lead product, with silver in the latter.

Development: 15,000′ of tunnels, the lowest or Martin tunne with portal at side of railroad, will, according to company, cut 15 known with 8,000′. Management reports 3,000,000 tons of partly-developed ore w average gross value of $12 per ton. About $500,000 has been spent in deve exploration work, and in opening ore.

Equipment: plan includes a 1,200-ton mill, tram and compressor

Company expects to produce 585,000 tons in four years with net va $6,867,050, expenses in that time to be $940,000.

This will be a big mine if these figures are correct.

MARYLAND MINES & RED. CO. COLO

Officers: W. N. MacPhail, pres.; J. Miller, v. p.; H. F. Christensen treas.

Property: Maryland group of 22 acres on South Boulder mining trict, Gilpin county. Ore averages $12 per ton in gold and copper. Co planned erection of mill in 1919.

COLD MINING CO. **COLORADO**

oston Bldg., Denver, and Romley, Chaffee county, Colo.
C. Parson, pres.; Geo. E. Collins, v. p. and gen. mgr.,
; John W. Hudston, treas., with Louis F. Eppich, directors;
supt.; H. L. King, mill supt., at last accounts.
909, in Colorado. **Cap.**, $1,850,000: $5 par; $1,790,500 out-
1, 1918. Bonds authorized, $350,000; issued $231,000, of
redeemed Dec., 1917. Majority of stock and bonds are said
d. Stock transferred at company's office. Continental Trust
ar. Annual meeting second Monday in March.
nt for year ending Dec. 31, 1917, showed net smelter returns,
were $314,004; depreciation, interest, loss from commission,
deficit $94,047.
neral balance sheet years ending Dec. 31:

ETS		LIABILITIES		
1917	1916		1917	1916
037,821	$2,009,074	Cap. stock.....	$1,850,000	$1,850,000
		Bonds	169,000	179,000
45,398	34,710	Current liabil....	120,200	39,646
166,876	228,420	Sinking fund.....	965	10,507
17,688	.....	Reserves (a)...	127,617	126,905
		Surplus		66,146
267,783	$2,272,204			
		Total	$2,267,782	$2,272,204

ation, purchase and development of new properties.
of 7c per share each, paid in 1915, and one of 7c in 1916.
c in 1915, $110,000; and in 1916, $15,000, for acquisition of

fary Murphy mine, discovered 1874, was not extensively
ed by a St. Louis company in 1880. The yearly output
about $300,000 net from ores sold to smelters. The gross
ee times as much. One-third of the gross value of the ore
mine, the remaining two-thirds being absorbed by smelting
, and by railway freight.
was erected in about 1886. Subsequently the property was
with varying success until about 1906. The lessees built
St. Elmo, and a smelter at Buena Vista. All of these plants
ismantled, and the mine practically abandoned in 1906.
laims, mostly patented, 350 acres in Chalk Creek district,

L. Genesee-Vanderbilt and Robinson mines in the Red Moun-
equired in 1917, and a 50-ton mill built at the Genesee. The
lex silver ores in vertical chimney deposits. Development is

gold, zinc, lead, silver and copper, in order of value, in a
system of nearly vertical fissure veins in quartz-monzonite;
is the main vein. Veins vary in width from 6" to 12', and
irregular lenses of ore. Average assay of milling ore:
silver; 4.4% lead; 7.9% zinc; 0.5% copper.
by tunnels with a shaft connecting the tunnel levels:
tunnels, No. 7, 750'; No. 14, 1,500'; Golf, 4,350'. Total
gs over 9 miles; greatest depth of workings, 1,975' vertical
in 1919 a crosscut tunnel on 1,500' level had been connected
800'. No stoping has been done between.
plant, small hoist, 3 air-compressors, 2 aerial tramways
ramway mill. Steam power is used.
concentration is used followed by flotation of slime, using
25 ton electrostatic separation plant for the zinc-iron mid-

on and as well on the zinc ore in 1916, even on sulphide

material. The process cost 23c. per ton of ore milled. Some interesting has been done at this plant.

Production: in 1913, 14,428 oz. gold; 2,233,037 lb. zinc; 3,321,31 lead; 146,606 oz. silver; 152,000 lb. copper.

Ore mined, 1917, was 36,231 tons, compared with 54,954 tons in 1916, 60,561 in 1915.

In 1917 the yield was 950 tons lead concentrates, worth $113,025; 755 non-copper concentrates, $29,597; 1,754 tons zinc concentrate, $73,956; to with bullion and crude ore, receipts totaling $242,701.

Recent costs have been:

	Tons Milled	Mng.	Mllg.	Tram-ways	Gen'l
1916	51,116	$4.11	$2.18	$0.16	$0.34
1915	55,880	3.20	1.99	0.12	0.25
1914	48,526	3.08	1.96	0.13	0.21
1913	34,271	3.45	2.04	0.24	0.30

Note: mining costs are distributed over a slightly larger tonnage than milled.

The Mary Murphy mine has seen its best days. At the beginning of available ore was estimated as 8,000 tons, and 6,000 tons in the Iron Chest Much of the ground being mined would not pay under normal metal p Unless larger orebodies are opened, the manager, G. E. Collins, predicts a pension of milling operations.

In Oct., 1919, the mill was treating lessees' ore and old tailings.

MASTER KEY MINING CO. COLORA

Office: 403 Empire Bldg., Denver, Colo. **Mine office:** Columbine, C

Officers: T. F. Kleckner, pres.; J. A. Leslie, v. p.; H S. Holcomb, treas.

Inc. January, 1919, in Colorado. **Cap.,** $250,000; $1 par.

Property: 14 claims, about 289 acres in Columbia basin, Hahn's mining district, Routt county, has contact and cross fissure veins in limeston quartzite, yielding gold, silver, and lead.

Development: by two shafts, 70′ and 110′ deep, tunnels and u ground workings, 380′. Company reports smelter returns as $407 per ton silver was 75 cents an ounce.

MATRIX MINES CO. COLORA

Address: Idaho Springs, Clear Creek county, Colo.

Mail returned from Denver office. J. A. Hazen, mgr., at last accounts.

Property: 16 claims, including the Prince Albert, on Columbia m tain, opposite Lawson. An 18″ vein of rich silver ore was mined in 1919.

MATTIE B. MINING CO. COLORA

Inc. in Colorado. **Cap.,** $100,000; $1 par. Stock offered at 50c in

Property: Bob Cat group, 20 acres in Cleora mining district ea Salida, Chaffee county. Reported to have cut copper ore 300′ from port tunnel, said to be 18 to 30′ thick.

MAYFLOWER LEASING CO. COLORA

Operating the Mayflower mine, near Silverton, San Juan county, lease. J. H. Slattery, mgr.; A. Gillis, supt.

Equipment: includes compressor. Reported shipping concent amounting to two cars a day. Employs 20 men.

McCARTHY-HIDDEN TREASURY MINING CORP. COLORA

Officers: E. L. Thomas, Omaha, pres.; T. A. O'Brien, supt.

Reported to have taken over the Oriental mine, formerly known a Hidden Treasure, in Gunnison county. Developed by 3,700′ crosscut tunne several thousand feet of workings on seven levels. Concentrates said to $90 in silver, lead, and gold.

Equipment: aerial tram 3,800′ long, mill and flotation unit, water steam power with combined capacity of 1,000 h. p., and compressor.

McINTYRE MINING CO. COLORA

Address: John W. Prout, mgr., Rico, Colo.

e Puzzle mine at Rico, Dolores county, credited with past
er ore worth $300,000.
: by 135′ shaft with 2,637′ of workings. Present owners
any ore, but have been looking for a vein lost 30 years ago.
4½′ to 5′ wide, but after driving 400′ no commercial ore was

company raised up 132′ on the vein, then drove an adit from
tch the top of the raise and to find the lost vein or orebody.

NE **COLORADO**

estown, Colo. A. Murphy, mgr. Operating the mine lo-
all St. and Gold Run gulch at Salina, Boulder county. The
907, was unwatered late in 1917. Equipment includes a 50 h. p.
re is high-grade gold talc formation with tellurium.

IDAHO SPRINGS GOLD M. & M. CO. **COLORADO**

near Idaho Springs, Clear Creek Co., Colo., J. J. Williams,
lack, sec.-treas., at last accounts.
rado. **Cap.**, $1,500,000; $1 par; non-assessable.
4 claims, patented, carry veins with lead, copper and zinc
developed by shafts of 125′, 250′ and 460′ and tapped at depth
Newhouse tunnel.
includes 22-h. p. electric hoist and air compressor. Was
aykendall of Denver, in 1915. No recent returns.

INNEL CO. **COLORADO**

West 37th Ave., Denver, Colo.
E. Holmes, pres.; J. J. Brown, v. p.; H. G. Fowler, sec.-
with R. A. Haynes and A. H. Daniels, directors.
1915, in Arizona. **Cap.**, $150,000; 10c par; 925,764 outstand-
nual meeting, first Tuesday after first Monday in June, at

1 claims, 160 acres and a mill-site, aggregating 525 acres,
niles S. W. of Idaho Springs, Clear Creek county, Colo. Veins
o 50′ wide, and to assay $5 gold; also carries copper, silver, iron

t: tunnel 2,800′ long and numerous prospect workings.
riving a crosscut tunnel to cut several known veins at last
l can be used for transportation, and was being advanced on
ugust, 1919, advance was 27′ at cost of $17.92 per foot.
includes power-plant, compressor with 6 drills, and black-

y states "in regard to the formation, everything continues favor-
l pitch are right, there is a good amount of moisture, and I
tified in looking for important developments. . . ."

OLORADO COPPER CO. **COLORADO**

obscot Bldg., Detroit, Mich. **Mine office:** Paradox, Mont-
).
C. Carton, pres.; E. V. Laud, sec.-treas.; with G. F. Gallo-
H. Behrendt, P. W. Klintworth, and G. N. McBride, directors.
gr.
000; $1 par; 1,000,000 shares are treasury stock.
2 claims and 3 mill-sites, patented, 150 acres, at Cashin,
Company, in 1918, bought out the La Sal Copper-Silver Mining
reorganization of the Consolidated La Sal Mining & Smelting
eded the La Sal Copper Mining Co. Property includes the
ch has been idle for many years. In August, 1919, company
st in the Locker-Brewer copper mine, near Monticello.
ere are three fault-fissures, at the Cashin, the Red Chief,
laude veins—varying from a few inches to 12′, composed of
lt breccia showing copper carbonates, sulphides, and native
r as sulphides and native silver. Assays average 6% copper

Development: by tunnel 1,540′ long. Company expected its flotation mill to be ready by the end of 1919.

MICHIGAN MINING & MILLING CO. COLO

Bankrupt. Assets sold at Receiver's sale, and bought in by Edward the previous president.

Office: Foster Bldg., Denver, Colo. See Vol. XIII.

MID-COLORADO MINES CO. COLO

Address: Georgetown, Colo.

Officers: Abraham Plank, pres., Wooster, Ohio; O. H. Kniffen, L. A. Lang, sec., Denver; I. E. O'Hail, treas., Wooster, with Geo. B. McI directors.

Inc. March, 1915, in Colorado. **Cap.**, $600,000; $1 par; 400,000 out ing. Annual meeting, second Tuesday in July.

Property: 13 claims, 11 patented, on Republican mountain, ½ m of Georgetown, Clear Creek county, including the Mineral Chief min purchased in 1915.

Ore: gold, silver, lead, zinc in fissure vein in porphyry, said to .09 oz. gold, 16 oz. silver, 18% lead, 7% zinc.

Development: by 7 shafts ranging in depth from 140′ to 1,100 total workings of 1½ miles.

Ore reserves: said to be 50,000 tons.

Equipment: includes electric power 50-ton mill equipped with c rolls, jigs, tables and flotation plant.

Production; previous to 1915 said to be 190,000 tons. No rec formation received.

MIDLAND CHIEF MINES CO. COLO

Address: F. J. Woodward, gen. mgr., Colorado Bldg., Denver, C

Inc. in Massachusetts. **Cap.**, $250,000; $5 par; 12,000 shares in tr

Property: 11 claims, 50 acres on Democrat mountain, Georg Clear Creek county, Colo.; also a 50-ton mill. Two ore-shoots have been one 125′ long and 4′ wide, with 400′ backs; the second on No. 6 l 4′ wide and 450′ long.

Production: in 1917 was about 700 tons returning about $5,000.

MID-WEST METAL MINING & HOLDING CO. COLO

Office: 515 Mining Exchange Bldg., Denver, Colo.

Officers: F. E. Wire, pres.; H. L. Barger, v. p.; W. F. Sien, sec.

Property: operating under lease and option the Iron Mask mi Shock hill, near Breckenridge, Summit county, Colo. The Alladin Lam near Montezuma, was taken in August, 1919.

Company reported taken over by the Climax Molybdenum Co., wh and iron sulphide with gold and silver, averaging $100 per ton.

Development: by 1,500′ tunnel. Two compartment shaft equippe electric hoist being sunk.

MILL GULCH MINING CO. COLO

Address: C. F. Flon, sec., Colorado Springs, Colo.

Inc. 1910, in Colorado. **Cap.** $1,000,000; $1 par, non-assessable.

Property: on 31-mile mountain, 5 miles S. of Guffey, Park coun

Development: work has been done intermittently since organi A 220′ shaft was deepened to 320′ in 1919, opening ore that has returned copper, 13 oz. silver, and some gold.

Equipment: steam power, pump, hoist, smithy, and all necessa

MINERALS RECOVERY CO. COLO

Office: Denver, Colo.

Officers: P. W. Chambers, pres.; W. W. Anderson, v. p.; W. E sec.-mgr.

Company purchased property of the National Radium Institute at Colo., in 1919, and expects to buy 200 tons of carnotite and uranium ores each month to keep plant in operation. The National Radium a lease on 16 claims from the Crucible Steel Mining & Milling Co., a sub

of America. These claims were in Long Park, Montrose
San Miguel county.

NING & MILLING CO. **COLORADO**

e Bibb, mgr., Silverton, Colo.
cFeely, pres.-treas.; A. V. Dawson, v. p.; C. L. Beard,

New York with capital of $100,000, to operate the Min-
ss Basin, Gladstone, San Juan county. The claims have
any extent. A mill has been planned.

EN CO. **COLORADO**

Brown, supt., Boulder Falls, Boulder county, Colo.
dings described under California mines.

G CO. **COLORADO**

Jazen, mgr., Holyoke, Colo. **Mine office:** Breckenridge,

a Dam Flats, ½ mile north of Breckenridge, Summit
Lake, Como, and Breckenridge veins. Company reported
s into a blanket formation of copper ore containing gold,

ides compressor and blacksmith shop.

MINING & MILLING CO. **COLORADO**

st & Cranmer Bldg., Denver, Colo.
Parshall, Grand county, was not regarded favorably by
Stevens, owing to company's alleged preposterous claims
ed nor returned. Fully described Vol. XI, Copper Hand-

RODUCTS CO. **COLORADO**

McCarthy, mgr., Buffehrs, Summit county, Colo.
d taken over by the Climax-Molybdenum Co., which see.
ed on Bartlett mountain, Buffeher, a mile south of
adjoins property of Climax Molybdenum Co. Company
in which a secret process for treatment of molybdenite is
ipment includes a 2-mile aerial tramway. An 80% pro-

CO. **COLORADO**

Colo.
Manley, pres.; A. Drumm, v. p.; T. H. Thomas, sec.-

onon group, 3 miles north of Creede, Mineral county,
first worked in 1891, but has been idle many years. Now
ers who are shipping 90 tons of silver ore per week; 100
returned $173,440.

NSOLIDATED SILVER MINES CO. **COLORADO**

ldg., Pittsburgh, Pa.
h Giediartz, F. C. Ewing, C. A. Brandenburg, J. F.
r, M. Winter, and W. F. Galbraith, H. T. Porter, sec.-
pt.
in Colorado. **Cap.**, $2,000,000; $1 par; 700,000 out-
eting, second Tuesday in February.
ms, 10 patented, in Summit county, shows a fissure vein
y. Orebody is 400 to 700' long and in places 13' wide. Its
and dip 40 to 72°. Ore is a sulphide, averaging 11 oz.
5% zinc.
out 900 of workings. Mine is entered through tun-
perties.
ides 3-drill compressor and lease on a 100-ton mill,
a flotation unit.
operations late in 1919, and no production figures are as

MONTEZUMA MINES & MILLS CO. **COLOR**

Office: I. A. West, sec., 621 Equitable Bldg., Denver, Colo.

Officers: H. H. McCulloch, pres.-treas.; H. F. Baker, v. p.

Inc. in Colo. **Cap.**, $1,000,000; $1 par.

Property: 22 claims, 12 patented, and 29 patented mill-sites, co 215 acres, in Snake River mining district, Summit county, Colo. Ope suspended in 1917, due to lack of funds. Company's indebtedness was re as $51,409. Late in 1918 a mortgage was foreclosed, and by July, 1919, pr had passed out of company's hands. The sale did not pay all debts, prev dissolution of corporation.

MONTEZUMA SILVER-LEAD MINES, LTD. **COLOR**

See St. Johns Mines (Colorado), Ltd.

Address: Equitable Bldg., Denver, Colo. **Office:** 38 Broad St. London, E. C. 2, England.

Directors: G. A. Williamson, chairman; H. Weld-Blundell; Dewar, G. O. Shepherd.

Inc. May, 1917. **Cap.**, £75,000, divided into 34,500 shares of 10% lative preferred at £1 par, and 170,000 shares of ordinary at 5s. par. standing, 22,500 preferred shares and 142,000 ordinary shares, both fully

Property: the St. Johns group of silver-lead mines, 1½ miles of Montezuma, Summit county. This property was purchased from the St. mines, Ltd. for £55,000.

The bulk of the ore is of milling grade, averaging about £5 per ton in The milling plant has been remodeled.

MOORE MINING & MILLING CO. **COLOR**

Office: Sugar Loaf, Boulder county, Colo.

Developing claims on Sugar Loaf since 1914. Has driven a crosscutt 500′ to intersect veins of Livingstone dike, which company estimated to 40′. Company also operating the September Morn group.

MOOSE MINES **COLOR**

Reported owned by Louisiana-Colorado Mining Co., which see.

Property: at Alma, Park county, Colo., was sold in 1909 by the P estate, to H. W. Scott, who formed a company, which failed.

MORNING GLORY MINE **COLOR**

Address: Jas. Harbaugh and A. B. Harbaugh, owners, Pitkin, county, Colo.

Property: 12 claims, 120 acres, at the head of north fork of Q creek, said to show a number of veins from 4′ to 35′ in width, develop tunnels. A 400′ tunnel is said to cut a 10′ vein assaying up to $107 per gold and silver. An 800′ tunnel is said to cut a 35′ vein that will assa copper in addition to 4′ of molybdenum ore, while a third tunnel, 190′ long a 4′ vein assaying $8 per ton in copper, lead and zinc.

Lessees working on property and shipments being made, at last reports.

MOSQUITO GULCH SILVER MINES CO. **COLOR**

Office: 1214 Foster Bldg., Denver, Colo. **Mine office.** Alma, Colo.

Officers: M. L. Peters, pres.; W. Glaister, v. p.; W. A. Benzie, treas.; W. B. Brooks, mgr., with A. E. Mansfield, directors.

Inc. March, 1919, in Colorado. **Cap.**, 2,000,000 shares one mill

Property: 4 claims, 30 acres, in Mosquito gulch, 2½ miles S. E. of Park county, known as Little Elva group consisting of Little Elva, Gold Fraction, and Little Edith claims.

Geology: limestone and quartzite on surface overlying schist and tose granite, and cut by fissure veins containing free gold in a quartz ga Silver, lead, and zinc ores occur as replacement in limestone, and along tacts of sedimentaries with intrusive porphyry. Lead ore averages 25% carries about 12 oz. silver and 25%

Development: by 97′ shaft shafts on property 16 to 26′ deep. Equipment in Company plans to

lime-porphyry contact; and later to sink to the Orphan Boy con-
aid to cut the property.

MINING CO. **COLORADO**

3 E. & C. Bldg., Denver, Colo. J. A. Marsh, pres.
,000; shares $1 par.
5 claims on Kelso mountain, Clear Creek county, and a one-
in the Tiger and Grafton claims.
ocess of development, 1917-18, but only one shipment made.

FLOWER GOLD M., MLLG. & P. CO. **COLO.**

2 Corby-Forsee Bldg., St. Joseph, Mo.
C. J. Griswold, pres.; J. R. Jennings, v. p.; T. G. Sorter, sec.-

in Arizona. **Cap.**, $2,000,000; $1 par; $1,384,000 outstanding.

Mountain Flower group, 6 claims; Delta group, 10 claims;
d Delta tunnel-site, 200 acres, at Deep creek, upper San Miguel
liguel county, said to show a quartz vein in diorite and porphyry.
gold, silver, zinc, and lead.
ent: by 1,100' of tunnels. Company reports 3 veins in Delta
r in the Mountain Flower group.
1919, company was planning a 200-ton mill to use oil flotation.
ospectus and other literature issued in 1917, company expected to
rmous body of ore. Some of the figures given are contradictory.
ment as Ouray Copper Co., which see.

TOP MINING CO. **COLORADO**

Ouray, Colo.
Windsor Morris, pres.-treas.; G. H. Beebe, v. p.-gen. mgr.;
rt, sec., with E. C. L. Bartow, Carl Larger, W. E. Hopton and
, directors.
11, 1911, in Colorado. **Cap.**, $750,000; $1 par; $500,000 issued.
ed, $250,000; $146,000 issued.
12 claims covering 9,000' along the N. extension of the
6 claims covering 9,000' along the N. extension of the Smuggler-

fissure-vein in andesite, showing ore with galena and gray
rrying gold, silver, lead, and copper. Shoot is from 6 to 36"
ong. Mill ore reported to assay $30, and shipping ore over $200

nt: by crosscut tunnel 2,500' long, with total of over 9,000' of
pth of 1,000'.
s: given as 30,000 tons.
includes compressor, 2,300' tram and 50-ton mill employing
ation units. Plant is unique in that ore-treatment is all done
order to prevent snow-slides damaging mill. Extraction is
ery is motor-driven. This plant was described by W. F. Wilcox
American" of December 13, 1919.
ou 3 tons of concentrates every 24 hours in 1919. A carload
ugust was settled for $402 per ton. Similar ore is shipped
eeks.

-SILVER MINES CO. **COLORADO**

lma, Colo.
or J. B. Stevens, pres.; W. B. Brooks, v. p.; A. S. Frost,
. Thompson and Frank L. Loomis, directors.
c. **Cap.**, $400,000; 25c par; 1,000,000 in treasury.
ell group of 200 acres, in Sacramento district, near
Lawson fault, which traverses the ground.
has produced in excess of $2,000,000. Adjoins the
production
ed early in 1919.

MUTUAL CO-OPERATIVE MINING CO. COLORA

Office: 507 First National Bank Bldg., Cheyenne, Wyoming an... Exchange Bldg., Denver, Colo.

Officers: J. F. C. Sievers, pres.; A. M. Startzel, v. p.; Frank E. ... sec.; L. E. Johnson, treas.; H. A. Wilcox, supt., with A. M. Startzell and ... Gibson, directors.

Inc. 1912, in Wyoming. **Cap.,** $2,500,000; $1 par; in treasury ... 1919, 248,289 shares.

Property: 10 claims in Gold Hill district, Boulder county, includin... Hoodoo and Columbus claims, 2¼ miles from Salina. Believed to own ... interest in the Golden Queen group, Kokomo, Summit county; also repor... have purchased 63 acres adjoining the Gold Queen, which gives tunnel ... railroad. In April, 1919, company reported that all the property was ... under bond to Denver men, except the Columbus claim, which was sold.

Development: by 600' of tunnels, and an old shaft on the Ho... which was cleaned out and retimbered in 1916. Quantities of milling o... said to exist in old workings, and the vein is reported to be over 2' wide, c... 2% copper, with lead, gold and silver. The Kokomo properties in 191... duced 54 cars of ore valued at $21,000. This mine is developed by 48' ... and 508' tunnel, which cuts vein 400' from portal. Company planned a ... transportation and drainage tunnel. The Silver Queen mine is the pri... producer. Literature disseminated 1915-1918, regarded unfavorably.

NATIONAL FINANCE AND HOLDING CO. COLOR

Office: Toledo, Ohio.

Reported to have taken over the Hinsdale county holdings of the Col... & Connecticut Gold Mining Co., which see.

NATIONAL RADIUM INSTITUTE COLOR

Property sold in 1919, to the Minerals Recovery Co., which see. Dr. H... A. Kelly, pres., Baltimore.

Inc., 1913, in Delaware. Plant was operated by U. S. Bureau of M... but closed down when Bureau moved its Colorado branch from Den... Golden.

NATIONAL RADIUM PRODUCTS CO. COLOR

Address: Grand Junction, Colo.

Officers: Geo. Kunkle, pres.; A. B. Dillion, v. p.; W. R. Enns ... treas., with T. H. Jones and J. A. Osborn, directors.

Inc. Jan., 1916, in Colorado. **Cap.,** $100,000; $1 par; $71,000 outsta...

Property: 18 claims, 360 acres, in Gateway mining district, Mesa ... Ore is a blanket deposit in sandstone yielding 1½% uranium oxide a... vanadium oxide. Output to 1919 was about 72,000 pounds of these metal...

Equipment: includes 10-ton concentration mill. Reported en... experimental plant to 200 milligrams of radium salts per month.

NEDERLAND-BEAVER TUNGSTEN MINING CO. COLOR

Idle. Mail returned unclaimed, Sept., 1918, from Mining Exchange ... Denver, Colo.

Officers: D. D. Shirley, pres.; W. M. Scott, v. p.; R. Woodwort... treas. Was to be incorporated in Colorado with capitalization $... shares 10c. par; non-assessable. Pre-organization certificates offered ... early in 1916, at 3c. per share, with 5% discount for cash.

Property: company claimed to own 8 claims, 80 acres, in Nederl... trict, Boulder county, Colo., and that, "the surface showing is excelle... orebodies should be opened with a small amount of work. The stock ... sold to provide a development fund to open the tungsten ore." Careful ... will certainly refrain from investing in this "Tungsten opportunity."

NEW ENGLAND EXPLORATION CO. (THE) COLO...

Office: 14 Ashburton Place, Boston, Mass. Controls the S... Union Mining Co., Colo., which see.

Officers: T. L. Livermore, pres., Bulkeley Wells, v. p.; ... Agassiz, directors. T. E. Sherwin, treas.

Inc. 1898, in Maine. **Cap.,** [illegible] shares $100 par; ...

nnual meeting first Wednesday in June, at Portland, Me.
t company's office.

ES **COLORADO**

te St., Boston, Mass. **Mine office:** Idaho Springs, Clear

. A. Howland, pres.; E. M. Sanger, sec.; Robt. H. Mc-
V. A. Gilman, mgr.

915, in Maine. **Cap.**, $500,000; $1 par; 100,000 shares held
ry. Stock listed on Boston Curb. Paul Revere Trust Co.,
ents. Annual meeting, second Monday in January.

laims, 3 patented, about 75 acres, and a millsite, 5½ miles
, formerly owned by the Trail Mining Co., and worked during
met-Corbin Mining Co.

of a mixture of coarse galena, chalcopyrite and pyrite,
d silver, with a quartz gangue and much siderite. Gray
t, while zinc blende is occasionally found. Five veins have
th main workings on the Great Western and New Era veins.
ore averages from $50 to $60 per ton, mainly in gold and lead.
have the extension of the Lamartine and Oneida veins, and
lead and gold-silver production of 2,361,000 lb. and $650,000
eloped by over 4,000' of tunnels, crosscuts and shafts. Benj.
stimated 64,330 tons of ore in sight, valued at $415,382, based
tion. Property reported on by Forbes Rickard.
orts obtainable from company.

UNNEL CO. **COLORADO**

ning and Tunnel Co.

NNEL & MINING CO. **COLORADO**

. Reinhart, Kentland, Ind.

lliam Darroch, pres.; E. D. Quigley, v. p.; H. A. Reinhart,

as a reorganization of the Hoosac Tunnel & Mng. Co.,
was in receiver's hands for many years. **Cap.**, 1,000,000
ssued.

s issuing the proceeds from stock sales for paying off debts,
old company, and was to resume mining operations when out

unpatented and 16 patented claims, 81 acres in Spanish
ict, Clear Creek county, about 1½ miles west of Idaho Springs.
rtz impregnated with iron and copper pyrite, also some lead
uires milling and concentration, as the gold-silver values are
with the pyrite. Veins vary from 6" to 4' in width, about ¼
ade material, the balance milling ore.
t: by 200' incline shaft said to show a vein carrying $10-$14
odel below 50' in depth. Main working is the Hoosac tunnel
driven 1,015' on the Rising Sun vein. There are a few stopes,
60' wide, all said to show ore.
includes compressor, drills, 10-stamp mill, classifier, and

seems to be earnestly trying to rehabilitate company, but appears
pital to get mine on a paying basis.
been done since May, 1918, on account of lack of funds. A
payable Oct., 1919, should have raised $300,000, paid off the
enable work to be resumed.

ASING CO. **COLORADO**

Teller county, Colo.
W. K. Hannah, sec.-treas.; H. C. Watson,

paid a dividend of $12,500, or 25% on the

Development: by 5,500′ main tunnel from which 3 inclined raise 200, and 900′, have been driven to cut the ore.

Production: 1,100 to 1,500 tons of $35 to $40 silver-lead ore mont August, 1919.

NIL DESPERANDUM MINES CO. **COLOR**

Office: 15 Citizens National Bank Bldg., Boulder, Colo.

Officers: M. S. Brandt, pres.-mgr.; B. S. Sim, sec.-treas.; T. F. S directors.

Inc. 1916, in Colorado. **Cap.,** $300,000; 10c par, increased Nov., 1 $500,000, $1 par.

Property: a ten-year lease on the Nil Desperandum and Inte properties, in all 65 acres, at Sunshine, Boulder county. Company repor to be 5′ to 15′ wide, about 4 miles long, averaging $42 gold, 1 to 5 oz, also some vanadium.

Development: 350′ Nil Desperandum shaft, and 600′ Interocean workings total 3,000′.

Company has been reopening these old mines which will be operated t the American shaft, 525′ deep. The Interocean group is credited with p tion of $2,000,000; the Nil Desperandum with over $100,000.

OHIO AND COLORADO SMELTING & REFINING CO. **COLOR**

Office: 822 A. C. Foster Bldg., Denver, Colo., and 61 Broadway York. Works: Salida, Chaffee county, Colo.

Officers: J. C. Kortz, pres.; H. V. Putzel, v. p.; Max Schott, se mgr.; J. B. Beaty, treas.; A. T. Thompson, supt.

Cap., $3,000,000. Is controlled by American Metal Co., Ltd., th ownership of 65% of the capital stock. The company is indebted to the Co. for over $1,000,000, but is not generally considered so valuable an ass

Property: the Salida smelters 12,000 tons monthly capacity, de general custom business. It includes a 300-ton sintering plant, samplin 4 lead blast-furnaces, 48x180", and handles mainly silver-lead ores. Th copper treated is that bought with lead ores, which is concentrated to 40%

Company reports show 95,305 tons Colorado ores treated in 1918, 12,460 oz. gold, 1,454,597 oz. silver, 9,603,089 lb. lead, and 1,241,353 lb. copp

Smelter was closed indefinitely in February, 1920.

OHIO MINE **COLOR**

Located on Shroek hill, Breckenridge, Summit county. The lessee gins and Anderson, reported to have opened a streak of high-grade silv in 1918.

OLD HUNDRED MINING CO. **COLOR**

Property inactive for several years prior to 1918; enquiries through channels have been fruitless. Company probably defunct.

OLD TOWN M., M & TRANSPORTATION CO. **COLOR**

Address: Idaho Springs, Colo.

Officers: Wm. L. Bush, pres.; Geo. K. Kimball, sec.-treas-mgr. R. J. Davies, J. Ramsey Speer and J. B. Phillips, directors.

Inc. 1910 in Colorado. **Cap.,** $1,000,000; $1 par; 738,302 outsta Annual meeting, first Monday in February. Company succeeded the Old Consolidated Mining Co., which itself was the successor of the Old Town & Milling Co., both defunct. Property bought in at sheriff's sale for $ in 1910 and reorganized under present name. Dividends since 1910 amo $59,826.

Property: twenty-two patented claims in Russel mining district, county, has the Old Town vein, carrying a paystreak of 4′ average with gold and silver-bearing copper ore.

Development: 2,205′ incline shaft with 4,326′ tunnel; over 5 mi workings.

Equipment: includes hoist, pump, steam and electric power a compressor.

Production: total production to 1916, $218,467. Company idle in

erty was reported to have produced about $12,000 per month
ty Sharp shaft, operated by lessees.
, the mine was taken over by E. R. Clark and others of Colo-
ler bond and lease; G. K. Kimball, in charge.

GG MINING & MILLING CO. **COLORADO**

. T. Rogers, mgr., Idaho Springs, Colo.
s a consolidation of the Oneida and Stagg Mining com-
Freeland, 5 miles from Idaho Springs, Clear Creek county.
t: by 1,000′ tunnel and a 150′ raise from the tunnel level,
ein of gray copper ore, said to assay as high as 4% copper, 10
52 oz. gold. A 50-ton cyanide mill was erected in 1914 to treat
ntinuous decantation system, but was remodeled in 1915 to use
lling costs were placed at 85 cts. per ton of ore treated. Pro-
velopment work is said to have paid all operating expenses.
s.

MINES CO. **COLORADO**

Onondaga Bank Bldg., Syracuse, N. Y. **Mine office:** George-
ek Co., Colo. Arthur H. Osborne, mgr.; T. Kyner, supt.
the Onondaga and Colorado Central-Aliunde group on
ountain, Georgetown. In the Onondaga, the Ruler vein 18″
gold-silver-lead ore, is developed through the Capital tunnel
astward on the vein at 3 different points. The Aliunde group
iles of underground workings, including the Hall and Doric
er will be advanced to intersect the Ruler vein of the Onondaga.
reported to have produced milling ore which yielded 275 oz.
n former years.
work on the 300′ level opened up 2′ of pyrite and steel galena,
y more than $75 per ton. Production is small as company is
e for future shipments.
: includes compressor, hoist and power plant.

SOLIDATED CO. **COLORADO**

Whitehead, Janesville, Wis., chairman bondholders' committee;
men are: John R. Evans, Oshkosh, Wis.; Wm. Smith, La Crosse,
Watertown, Wis.
fifty odd claims, including the Ophir gold mine, near Tel-
g the Carribean mine on the east, and the Butterfly mine on the
ir was first opened about 20 years ago, but was idle 10 years,
lders started operations.
nt: includes a 2,500′ tunnel and considerable work on sev-
ar the tunnel end an 800′ raise connects with the 6th level of
s. Recent work has opened up considerable milling ore.
t plans organizing an operating company, capital about $500,000,
s to develop the mine and remodel the old mill.

O MINES, MILLING & POWER CO. **COLORADO**

Oct., 1915, by Ophir Range Gold Mining Co., which see.

O MINES & RED'N. CO. **COLORADO**

. M. Belisle, mgr., Telluride, Colo.
1916, in Colorado. Cap., $250,000; 10c par. One million
property.
the New Dominion and April Fool mine at Ophir, San
said to show ore in upper workings carrying gold and silver,
inc at depth.
nt: by 985′ tunnel and 1,100′ crosscut tunnel. By Sept., 1919,
′ of driving, a shoot of milling ore had been developed. Over
spent in development work. Management plans to install a

E GOLD MINING CO. **COLORADO**

ed in 1917, from Ophir, San Miguel county, Colo., and mine
lown.
uired the holdings of the Ophir Gold Mines, Milling & Power

Co., Oct., 1915. W. P. Day pres., Peoria, Ill.; A. W. Wilson, sec.; Staver, mgr.

Inc. July, 1915, in Colorado.

Operated a lease on the Suffolk mine, 300 claims, partly patented, at

Ore: gold-silver, in fissure veins, traversing andesite and noted pockets of free gold ore.

Development: by several tunnels 500' to 2,000' long, with a to 20,000' of workings.

Equipment: includes 300 cu. ft. air compressor, 5,270' tramway an ton concentrating mill with 2 Wilfley tables.

Production: in 1915 amounted to 2,000 tons of ore. Concen averaged $15 per ton in gold and silver. No recent returns.

OPPORTUNITY CONS. GOLD MINING CO. COLOR

Letter returned from 318 Century Bldg., Denver, Colo. Arthur Par R. Hayes, L. W. Partridge, Francis B. Choate and D. L. Cubberly, dir at last accounts.

Inc. 1915. **Cap.,** $500,000; $1 par.

Had a 3-year lease and bond on the London mine, comprising 12 in Pine or Wisconsin district, Gilpin county, said to show well defined ve gold-silver ore. Developed by 204' shaft with 3 crosscuts, 140', 250' an in length.

Equipment: included a 10-stamp, 50-ton amalgamating and conc tion mill and boarding house. Closed down since 1917.

O'REILLY GOLD MINING CO. COLOR

Reported in 1915 that company was reorganized as the Marie Minin and development continued. Owned the Bay State mine, near Brecke Summit county, developed by a 300' tunnel, showing auriferous and ar ferous copper ore.

OURAY CONS. MINING & REDUCTION CO. COLOR

Office: Ouray, Colo. Presumably the operating company for the S. & R. Co., which see.

Officers: Thos. B. Crawford, pres.-treas.; C. J. Sigfrid, John Ha Richard Davis and J. R. Patterson.

Inc. 1916, in Colorado. **Cap.,** $5,000; one mill par; 2,000,000 outstan

Property: the Treasury tunnel group, near Red mountain, county, also a bond and lease on the Beaver, Belfast, and Ida L. prop In 1919, company purchased 8 claims and 65 acres of placer ground near I Park, including the Guadalupe, mine, formerly owned by the Brown Min ing Co., and developed by 2,000' tunnel and 500' crosscut.

Equipment: 2 mills of 400-tons capacity with flotation unit and gr concentrators. An aerial tram will connect the Guadalupe mine with one mills.

Company reports expenses of $30,000 for construction work and equip First shipment in April, 1918, reported to have yielded 64 oz. of silver an copper per ton, with gross value of $8,000.

OURAY SMELTING & REFINING CO. COLOR

Office: Hayden Bldg., Ouray, Colo. Thos. B. Crawford, pres.- T. J. York, sec.

Inc. in Colorado. **Cap.,** $750,000: $1 par; divided into 185,000 7% ferred shares, 82,000 outstanding, and 562,500 common stock, 150,000 outsta

Was reported in 1916, to have taken over the Brown Mountain Smeltin

Property: 435 acres, patented, on the Uncompahgre river, 4 miles Ouray county, which is presumably operated by the Ouray Cons. M. & S which see.

Development: by 250' shaft and over 3,500' of tunnel and drift The company being without funds in 1914, the mine was closed down, b reopened in 1917. The 350-ton smelter at Ouray is idle. Company als a 75-ton custom mill.

INING CO. **COLORADO**
Henry C. Demming, gen. mgr., 15 N 3rd St., Harrisburg, Pa.
Tirbircio Gold Mining Co.
400 acres of lode and placer claims near La Plata, La Plata
oped by 1,500' of adits.
; includes rock crusher, electrical plant, a 50-stamp and a
Company was idle in 1917-18, but expected to resume opera-

EL MINING & MILLING CO. **COLORADO**
Aspen, Colo.
Robert Shaw, pres.; W. R. Foutz, v. p.; F. M. Yates, sec-
H. Cornwall, Ed. Turner, John Castellini, and H. O. Halleck,

in Colorado. **Cap.**, $150,000; $1 par.
21 claims patented, about 180 acres, in Tourtelotte Park, 2
Aspen, Pitkin county, partly owned and partly held under lease.
are on fault contact, said to contain a remarkable amount of low-
ore.
plans to drive a 3,000' tunnel at a depth of 700' to develop all
install a tramway. Although the properties were worked for
little mining has been done in this particular section for nearly
Camp Bird, Iowa Chief, Edison, and Best Friend claims, on
any has leases, are reported to have produced $645,000.

OUP OF MINES **COLORADO**
John H. Meager, owner, Silverton, San Juan county, Colo.
5 claims, about 2 miles N. E. of Silverton, said to show a
andesite-lime-porphyry formation, traceable at surface for several
The ore is a sulphide, containing copper, silver, gold, iron, and

ent: by several tunnels and crosscuts. A prospect

A MINING & MILLING CO. **COLORADO**
Westcliffe, Custer county, Colo.
in White Hills district, produces iron-copper-lead sulphide,
d by 330' shaft.
f lessees are at work, and company reports shipments of about
ek.

SILVER MINES CO. **COLORADO**
Silver Plume, Clear Creek county, Colo. E. L. N. Foster,

ince 1892; was discovered 1872 and is reported to have produced
h of silver-lead and zinc ore.
nt: by a series of tunnels, connected by a 700' winze.
mpany working since Sept., 1917, principally cleaning and re-
ld workings.

ONSOLIDATED COPPER CO. **COLORADO**
Symes Bldg., Denver, Colo.
A. Pate, pres.; W. B. Bishop, v. p.; F. B. Tiffany, sec-treas.
Colorado. **Cap.**, $50,000; 1c par.
0 acres and tunnel-site, totaling 205 acres in Spruce Creek
lside, Custer county, Colo.
t: by 2,200' tunnel; deepest workings are 950'.
includes compressor, blacksmith shop, etc. Company has
on development work.

NING & MILLING CO. **COLORADO**
lida, Chaffee county, Colo. H. F. Schnelker, pres.-gen.-
ght., sec.-treas., at last accounts.
04, in Colorado. **Cap.**, $500,000; $1 par.
e North Pole group, 6 claims, 70 acres, with 10 acres tim-
ountain, in the Monarch district, 16 miles west of Salida,

showing several fissure veins in granite. Veins have auriferous and arg ferous lead and copper sulphides, with lead predominating.

Development: by 1,600' crosscut tunnel and a 65' shaft sunk on the

PELICAN MINING & MILLING CORPORATION COLORA

Office: 141 Milk St., Boston, Mass. **Mine office:** Lake City, Hins county, Colo. Mine was developed by tunnel and equipped with electric po and air-compressor. No 1918-19 report obtainable; probably dormant.

PENNSYLVANIA MNG., POWER & REDUCTION CO. COLORA

G. L. Levi, Philadelphia, Pa., v. p.-sec.; Leopold Sternberger, mgr. P Box 972, Denver, Colo.

Inc. 1910 in Colorado. **Cap.,** $2,500,000; 600,000 shares in the treas Is a close corporation, owned by Leopold Sternberger and Estate of Sam Sternberger. Owns entire stock issue of the Fall River Hydro Electric Po Co.; also the Lotus group of mines and property formerly held by Luca Tunnels & Mines Co., which includes the Ludwig tunnel.

Property: lies between Fall river and Central City, Clear Creek Gilpin counties, and includes the Pennsylvania group, 374 patented cla including several millsites and placers, covering about 2,500 acres. Sh fissure veins with complex lead-zinc-copper ore, containing silver and gold, uranium, molybdenum and tungsten. None of the mines were producers exc ing the Lotus group which is reported to have shipped some ore until cl down by water.

Development: by shafts and adits, about 8 miles in all; including 6,400' Lucania tunnel.

Equipment: includes steam and water-power plants, air compress No production figures available.

PENNSYLVANIA MOLYBDENUM MINES CO. COLORA

Address: 705 Johnstown Trust Bldg., Johnstown, Pa.

Officers: M. Dembinski, pres.; G. A. Farmer, v. p.; J. A. Sloan, S. G. Fetherman, mgr.

Inc. 1916, in Colorado. **Cap.,** $100,000; 10c par; all outstanding.

Property: 14 claims, unpatented, 150 acres, in Quartz Creek district, Pitkin, Gunnison county, shows fissure vein 5 to 6' wide, producing gold, s copper, and molybdenum, assaying $25 molybdenum and $5 gold, silver, copper per ton. The Bon Ton claim was acquired early in 1920 for $15,000.

Development: 1,500' tunnel, and total of 2,800' of workings.

Equipment: compressor, 50-ton concentrator, and steam power. Co pany started operations in March, 1919, and has since opened some high-gr gold-silver ore.

PERIGO MINES COLORA

Address: Perigo, via Rollinsville, Colo.

D. W. R. Kinney, mgr., and S. J. Gish were reported to have taken a l and bond on the group.

Property: 44 claims in three groups and placer ground extending miles along South Boulder creek, owned by J. E. Lighthouse, the E. W. Wil estate, and Mrs. L. H. Potter. The mines are credited with a $2,000,000 duction in the past, but have not been worked systematically for 40 years. carries gold.

Lessees plan to operate both the 50-ton Gold Dirt mill and the 10 Perigo mill.

PHILADELPHIA MINES CO. COLORA

Mine office: Montezuma, Colo.

Officers: E. F. Pooley, pres.; F. P. Rosengarten, v. p.; W. F. Wa sec.-treas., 16th and Indiana Sts., Philadelphia, Pa.

Inc. May, 1913, in Colorado. **Cap.,** $1,250,000; $1 par; [illegible] standing.

Property: 75 claims, 10 patented, about 800 acres, in Montezuma district, Summit county, carries a sulphide ore in dacite rock traversing teruma granite and porphyry, and an oxidized ore of [illegible]

lead; 26.6% zinc. The main orebody is reported to be from 900' long, running N. W., with dip of of 45°.
t: by 6 tunnels, the 405' Jumbo, 150' Monitor, 450' Tip Top, ia, 3,400' Colorado-Toledo and 112' Cross Lode, with total 0'.
includes compressors, electric power, and 100-ton concen- g a ball-mill and flotation plant.
sed in 1919 to Philadelphia Mines Leasing Co., after having some time.

IA MINES LEASING CO. COLORADO
property of the Philadelphia Mines Co., which see.

D, SILVER & COPPER M. & M. CO. COLORADO
L. Gage, mgr.
), par $1. Listed on Boston Curb.
ave bought the Two Forty group, in the Russell district, near in county.
: by 1,000' tunnel and 320' shaft.
ncludes a 10-stamp mill with flotation unit. A compressor

MINING CO. COLORADO
as and Electric Bldg., Denver, Colo.
P. Young, pres.-supt.; B. F. Bachman, v. p.; Chas. B. G. Krape, mgr.-treas., with G. B. Kemp, directors.
7, 1915, in South Dakota. Cap., $250,000; 10c par; 1,139,400 nual meeting, first Wednesday in March. From Dec. 1, 1917, ceipts were $1,953;; expenses, $1,823.
patented claims, about 50 acres, held under bond and Eagle county, said to show a blanket quartz vein in porphyry- carrying gold and silver values. The orebody strikes N. and

: by 8,000' of old workings, mainly tunnels. Management tons of ore developed and on dumps. Company built 100-ton centration and flotation mill in 1916; also a dam with 2,000' mill with its own power. Started operations August, 1917. company acquired the Ground Hog dump, reputed the largest district, and this is now going to the mill.

ES COLORADO
A. King, mgr., Buffehrs, Colo.
ce separate groups of claims on Bartlett mountain, near nty, Colo. Three prospect tunnels develop molybdenite ore Os, which experiments show will make 1 ton of 95% con- tons of ore.
put up a 500-ton mill near Climax, but its erection is said to by litigation.

MILLING, POWER & TUNNEL CO. COLORADO
H. Thompson, supt., Central City, Gilpin county, Colo.
ims, 5 patented, said to have 4 small veins showing d tungsten values, with porphyry hanging-wall and granite

665' tunnel and 400' drifts, reported to have cut the 1916.
les stamp-mill, compressor, etc. Company also owned placer ground and water-rights on Pine and Clear creeks No recent reports.

E COLORADO
City, Gilpin county, Colo.
el by Scales Gold Mining Co., which see.

O CO COLORADO
Colo.
ing its mine, the Poor Man mine, north of Caribou,

Boulder county, Colo. The paystreak, reported as 1 to 2' wide, consists of running 100 to 300 oz. silver per ton. Mill returns show a total production $750,000.

POWERS MINING, MILLING & LEASING CO. COLORA

Address: Robert Wilkinson, mgr., Black Hawk, Colo.

Company has taken a lease on the Powers mine in Russell district, G county, said to be a large copper producer.

Planned to purchase an air-compressor and electric pump.

POZO GILPIN MINING CO. COLORA

Mine near Idaho Springs, Clear Creek county, Colo., has lead-copper mined for its gold and silver contents, by shaft and tunnel work. The E neering Mining Co., operating a lease on the property, sank a 100' shaft b the tunnel level. Work was suspended in Oct., 1915, pending addition of ele power to handle the water encountered in this work.

Equipment: includes steam power plant and compressor. No re information.

PRECIOUS METALS CORPORATION COLORA

Office: 109 W. 26th St., New York. Mines in Mill gulch, San J county, Colo.

Officers: Chas. E. Force, pres.-treas.; F. W. Force, v. p.-sec.; and Fricke, directors.

Inc. Nov. 7, 1905, in Colorado. **Cap.,** $5,000,000; shares $5 par, redu in 1918 to $1,000,000. Columbia Trust Co., New York, registrar. Annual m ing, third Monday in November. Company owned the entire stock issue of East Canada Smelting Co., Ltd., which owned the McDonald copper-sulp mine at Weedon, Quebec. The Canadian holdings were sold in 1915 to Wee Mining Co., Ltd.

Property: the Silver Crown group, 12 claims, 9 patented, and mill sites, about 7 miles from Silverton; also the Forest and John mine miles distant, patented and freehold. Ore occurs in quartz veins in ande carrying lead and silver values. Developed by 2,500' of tunneling.

Idle since November, 1914.

PRIDE OF THE WEST MINE COLORA

Address: A. W. Harrison, mgr., Silverton, San Juan county, Colo.

Property: the Pride of the West and Green Mountain mines, in C ningham gulch, 6 miles from Silverton. The latter mine is opened by a 1 tunnel. At 600' a raise was driven to the surface and is said to have cut ore at 1,250'.

Equipment: the old mill was remodeled to include flotation. Produc in 1918, but closed down Jan., 1919, owing to scarcity of labor and high co

PRIMOS CHEMICAL CO. COLORA

Office: Primos, Delaware county, Pa.

Officers: Gideon Boericke, pres.; John J. Boericke, treas.; Har Boericke, sec.

Inc. 1901, in Pennsylvania. **Cap.,** $500,000. Is the largest buyer producer of vanadium, molybdenum, and tungsten ores in the United St

Vanadium Department: company owns at Vanadium, Colo., about acres of roscoelite bearing land, locally known as the Bear Creek property. this place company operates a 400' shaft and tunnels, mining both on its account and through a large number of lessees. About 65 men are employ the mine and 40 at the mill. The reduction plant at Vanadium was burn March, 1919, but rebuilt by October.

The output of this property, together with that from the Placerville San Pete properties, in San Miguel county, Colo., are treated in a local mill the concentrate shipped to the parent company, at Primos, Pa. The prop are the biggest vanadium producers in America.

At Placerville, a two-bucket tram and a compressor plant were in 1918.

Molybdenum Department: operates the Uncle Sam mine, the best to be worked for molybdenite exclusively. It is on the Daily claim, U

r Creek county, Colo. Ore occurs in veins, is mined through
n cut, the product being sacked and shipped.
ncludes compressor, flotation mill and 2,400′ aerial tram-
men.

oration Co.: subsidiary of the Primos Chemical Co. H.
.-pres.; G. Boericke, treas.; J. J. Boericke, sec.
1915, in Delaware, to explore for ores and minerals. **Cap.,**

ng & Milling Co.: is a close corporation, controlled by the
Co., the largest dealers in rare minerals in the world. Same
o., with C. F. Lake, v. p., and Harold Boericke, sec. and gen.

ns many properties at widely scattered localities, which are
rent departments.
large and extremely valuable holdings in Boulder Co., Colo.,
ljacent to Nederland.
,680 acres, distributed over 5 sq. miles in the northern part
d district.
ocks are gneissoid granite and a granite schist, which grade
mica-schist. These rocks are cut by dikes of pegmatite in which
is veins and streaks, carrying ferberite, black tungstate of iron,
quartz and feldspar and crushed rock. Veins run N. and S. and
ply, rarely as little as 45°.
r is the principal mine, but two others are operated. At the
veins are open, the Conger, Middle and East. The first two
strike on the 450′ level, making a large orebody. Ore shoots are
id show rapid pinching and enlargement. On the 200′ level the
stoped for a total distance of 800′, and a big ore shoot has been
long, 90′ high, and 8′ wide.
ent: the shaft is said to be 1,100′ deep, making it the second
en mine in the world, the Atolia in California coming first.
out 100′ apart, and shrinkage stoping is employed. A working
s with the shaft at the 150′ level.
t: includes hoist and 300 cu. ft. compressor. A two-mile
mine to mill hauls ore in trains of five cars of 1½-ton capacity
rage battery motor.
er and Oregon mines, about 4 miles from Lakewood, have a
ll output, which is delivered to the mill by wagon. The Lone
lf a mile from Lakewood, has a high-grade orebody, 100′ long,
high and as much as 20′ wide. The Quaker shaft is 325′ deep.
os mill, at Lakewood, treats 60 tons daily of 3 to 5% ore. It
bin for company ore, and six 15-ton bins for custom ore. After
goes over 1⅛″ grizzlies, oversize to Blake crusher, then to 10
lbs. each; delivering 3½ to 4 tons of 20-mesh pulp per 24 hours.
oes to No. 6 Wilfley tables, making concentrates which are sent
s above Frue vanners, whose tailings go through settling tanks,
to Dorr classifiers and sand to Prosser tube mill, whose product
ettlers goes to Frue vanners. Tailings of vanners go to canvas
practice produces concentrates carrying from 40 to 65% tungstic
eries ranging from 65 to 85%.
y, 1920, the Vanadium Corporation of America, which see, acquired
s of the Primos company.

ING CO. **COLORADO**

O. Barlow Willmarth, Montrose, Colo.
W. H. Gibson, pres.; M. J. Katz, sec.; A. S. Schafer, treas.;
C. Cohen, H. F. Dawes, Fred Rothchild, Edward Schafer and
rs, directors.
ew Jersey. Cap., $250,000; $1 par; all issued. Annual meet-
at Jersey City.

Property: 9 claims, 6 patented, 15 acres, in Gilpin county. Exam by E. E. Chase. Claims show a 4′ N. E.-S. W. fissure vein in granite. Ore sulphide containing gold and silver.

Development: by 1,500′ shaft with 6,000′ of workings.

Equipment: 37-h. p. electric hoist. No operating figures available

PROGRESS MINING & MILLING CO. COLORA

Address: R. D. McCausland, mgr., Frawley, Colo., and Equitable B Denver, Colo.

Officers: P. S. Smith, pres.; M. E. Peters, sec., with Wm. B. Brook Martin Barber, directors.

Inc. in Colorado. **Cap.**, $2,500,000; $1 par. No balance sheet issu

Property: 26 claims, patented, including the Wilson mine, Robi group and Felicia Grace, Champion and New York leases, all at Robinson, 16 miles from Leadville, Lake county. Ore carries lead and zinc. Reserves mated by T. H. Teal at 678,644 tons.

Development: by Robinson tunnel 3,000′ long, which attains dep 1,200′ and exposes 4 ore shoots in 6′ to 10′ contact vein with incline shaft to ground below tunnel. There are also 3 shafts, East, 650′, El Dorado, 650 the 1,200′ Wilson shaft opening ore at 1,040′ depth.

Equipment: 300-ton Wilson mill, which is idle.

The company is not, strictly speaking, a mining company, but rather a treatment enterprise, specializing in the separation of the complex zinc-lead silver-gold ores of Colorado in its 300-ton custom concentrator at Robins controls, by contracts, the outputs of a large number of mines in the Ke district. However, the company also has mines of its own upon which rely in case of necessity. The company's first twelve carloads of lead-iron centrates shipped gave average smelter returns of $33.73 per ton. When motion was brought out in 1916, P. S. Smith, pres. of the company, esti profits on lead-iron concentrates at $52,350 per month, promoters claiming 000 tons of ore blocked out that varied from $20 to $40 per ton.

Property: believed to have merit, but ore treatment is not as ea as cheap as estimated. Has been much touted in newspapers and broker culars. Presumably idle.

PUEBLO SMELTER COLOR

Is owned by the American Smelting & Refining Co., which see.

PURITAN MINE COLOR

Address: Geo. R. Stuart, owner, Alice, Colo., at last accounts.

Property: 78 claims, 46 patented, 330 acres, in Lincoln mining Clear Creek county, said to show contact and quartz veins, up to 26′ in in granite and schist.

Ore: is a sulphide, high in silica, from 20-30% sulphur, with gold, copper and iron, gold predominating. Pay-shoot said to be 400′ long.

Development: by 4 tunnels, 1,320′, 500′, 190′ and 135′ long; also 85′, 40′, and 35′ deep. Total workings about 3,825′. No recent returns.

PUZZLE LEASING CO. COLOR

Address: William Keogh, supt., Breckenridge, Colo.

Property: the Puzzle mine in the Breckenridge district, Summit c Colorado.

Development: by 500′ shaft and several thousand feet of drifts June, 1917, high-grade lead ore was shipped to smelter. Mill was overha 1917. Extensive development reported in progress during 1918, but n figures obtainable from company. Examined by Forbes Rickard.

QUINTET MINING CO. COLOR

Address: Sunnyside via Creede, Mineral county, Colo.

Cap., $50,000. Company is a holding corporation for the origin pany, Creede Quintet Co., whose 20-year charter has expired. New was considering rai[illegible] capital stock [illegible] original $500,000 basis. Re have paid a divid[illegible] 1917, and January, F and Marc[illegible] 1918

[illegible] under lease

ve shipped 600 tons per month of 100 oz. silver ore during
developed to a depth of 100', is 80' long and 20' wide.

NG & REDUCTION CO. **COLORADO**

L. Kingsley, Silverton, Colo.
. Kinsley, pres.; A. B. McClave, treas.; O. L. Keen, sec.
rating under lease the 27-claim group of the Ruby Min-
orthern part of San Juan county, comprising 450 acres. Mine
nsiderable high-grade silver ore. Some ore was being devel-
n September, 1919, but no definite information procurable
on.
cludes a 50-ton mill.

ANY OF AMERICA **COLORADO**

Tidwell, 15 miles from Green river in Paradox Valley
county, Colo., comprises a number of claims covering carn-
tone cut by quartz stringers. Carload shipments carried
le and 3.87% vanadic acid. Described in U. S. Geol. Survey

ANY OF COLORADO, INC. **COLORADO**

name was changed from Schlesinger Radium Co. to present

, Colfax Ave., Denver, Colo., also 50 Union Square, New
Mine office: Naturita, Colo.
V. C. Thorne, pres.; K. L. Kithil, v. p.-gen. mgr.;
v. p.-tech. mgr.; J. W. Thorne, sec.-treas., with S. B. Thorne,
L. J. Hunt, directors.
New York. **Cap.**, $600,000; $150,000 issued.
aims in Gateway district, Mesa county, and Paradox dis-
anty. Contains blanket formations in horizontal beds, the
ated in sandstone. Ore occurs in pockets and vein layers,
im, except at the Rock Creek claim, where ore occurs in a
s 2 to 5% uranium oxide, 1 to 9% vanadium oxide, and 2 to
dium per ton.
surface work, underground stopes, and tunnels. Total
2,000'.
ncentrator and chemical plant at Denver. Three build-
use this chemical plant.
000 to 1,300 tons of carnotite ore per year, averaging $150
918. Recovery was over 85% of metals contained, at cost of
f radium extracted.
covered as a by-product in shape of sodium uranite and
l vanadium, also a by-product, as iron vanadate containing
dium.
Mfg. Co., which makes luminous articles, is a subsidiary of

AMPLING CO. **COLORADO**

Barlow Willmarth, mgr., Montrose, San Miguel county,

custom sampler completed in 1918 and costing $12,000, to
rare ores, such as vanadium, tungsten, etc., and concentrates.
se is connected with the sampler. It is reported that com-
y, purchase, nor deal in ores. Up to September, 1919, the
20 cars of radium-bearing ore.

LD MINING, MILLING & TUNNEL CO. **COLO.**

uitable Bldg., Denver, Colo.
Snyder, pres.; T. P. Fohry, v. p.; W. A. Skinner, sec.;

olorado. **Cap.**, $1,000,000; shares $1 par; 525,000 out-
uthorized, $100,000; $58,000 issued.
Gold Dirt mines on Carode mountain, Empire Clear
ning, of 45 patented lode claims and 3 placers, 430 acres in

all. Mine formerly owned by the Empire Tunnel Co., had been shut d years because of litigation. Property bought in at trustee's sale. O tains gold, silver and copper.

Development: by two tunnels 2,700′ and 4,000′ long, greatest dep Past production of mine is said to be $1,000,000. Present owners claim 1 tons blocked out that will average $6.35 per ton. The Empire comp ceived royalties from lessees amounting to $7,690, $22,270, and $30,000, tively, in the last three years of operation.

Recent work in tunnel has been preparatory to operation on a larg A mill with concentration, flotation and amalgamation units is planned.

Equipment: includes compressor, transformer, blacksmith sho concentrating mill.

RARE METALS ORE CO. COLO

Office: 603 Symes Bldg., Denver Colo.

Officers: G. S. Wood, pres.; Nelson Franklin, v. p.-mgr.; Geo. A. sec.; A. F. Zang, treas; S. B. Tyler, supt.

Inc. March, 1916, in Colorado. **Cap.,** $100,000; $1 par.

Is a subsidiary of the Vindicator Consolidated Gold Mining Co. of Creek. Owns a 75-ton custom tungsten mill at Rollinsville, Gilpin cou the D. & S. L. R. R., 4 miles from Nederland. Equipped with crusher, roll mill, jigs, Wilfley and Deister tables, classifiers, and Callow tanks. Th centrates produced averaged 60% in tungstic acid content. Probably shut 1919.

RAWLEY MINING CO. COLOR

Office: 61 Broadway, New York. Chas. E. Beckwith, mine Bonanza, Saguache county, Colo.

Officers: E. M. Davis, pres.; H. A. Millard, v. p.-gen. mgr.; Broughton, sec.-treas.; R. E. Cranston, cons. eng.

Inc. 1901 in Colorado **Cap.,** $2,500,000; $1 par; 1,903,679 share standing. Annual meeting, third Monday in January.

Property: 64 claims, 400 acres, shows fissure veins in andesite, ru N.-S., nearly vertical and about 6½′ in width. Veins carry argentiferous g bornite, and chalcopyrite, in a heavy sulphide smelting ore.

Development: mine is 1,200′ deep, with 10 levels and a total of 1 of workings. Reserves estimated at 90,000 tons, that will assay 8.89 oz. per ton; 2.36% copper, 8.92% lead, 80c gold, and 190,000 tons addition same ore-shoot. Ore from all levels is handled downward through a 3 partment shaft to a crosscut tunnel 6,235′ long, and connecting with 1,200′

Equipment: includes 20-mile power line, 2,100 cu. ft. compressor, locomotives. Company plans to crush coarse ore at mine and transport it mile aerial tram, being constructed in 1919, to Shirley mill handling 125 daily.

A small force was working in 1919, company waiting for completio tram before resuming full operations.

RAYMOND CONSOLIDATED MINES CO. COLORA

Address: Dexter T. Sapp, pres., Gunnison, Colo.

Property: about 600 acres, includes the Raymond mine in Gold C district, about 5 miles N. of Ohio City, Gunnison county, said to have 2 bearing veins.

Development: by 2,700′ tunnel and drifts.

Equipment: includes compressor, steam plant, and concentrating Has been idle for years.

READY CASH MINING & MILLING CO. COLORA

Company operated a mill at Robinson, Lake county, Colo., in 1918-19 addition to handling its own ores, company purchased zinc-lead-iron ore s to its system of concentration.

RED MOUNTAIN MINES CO. COLORA

Subsidiary of Mary Murphy Mines Co. George E. Collins, mgr., Tre Colorado.

Propert[illegible] including the Yankee Girl, Gene

ison, and Joker tunnel properties at Red mountain, near Iron-
y, Colo. The main tunnel is in 2,250'.
d been idle many years, but are said to have produced copper,
ther metals, of a total value of $12,000,000.
sub-leased the Yankee Girl dump and some of its properties.
were made in 1918, and a small mill has just been built.

GOLD MINING CO. **COLORADO**

35 10th St., Denver, Colo.; also 226 Walnut St., Ft. Collins,

ul Burkhart, pres.-treas.; H. Y. Maier, v. p.; A. W. Hau-

1909, in Colorado. Cap., $300,000; $1 par; 217,653 out-

claims and a lease on another claim, 100 acres altogether,
f Ft. Collins and ½ mile from Masonville, Larimer county.
artz vein in granitic schist, the vein running N. E. and dipping
g gold, silver, and copper ore. Mill concentrates assay about
ipping ore runs about $30 per ton.
t: by 240' of underground workings including 40' shaft and

ned erection of mill in 1919.

INING CO. **COLORADO**

A. Houghton, pres., 54 De Menil Bldg., St. Louis, Mo.
ico, Dolores county, Colo.
elegraph, Newman and Expectation groups, near Rico,
t, 1918-'19. Mill, with flotation unit, planned.

NES CO. **COLORADO**

ray, Ouray county, Colo.
wned by A. E. Reynolds, of Denver. Includes the Cum-
Virginius, and Wheel of Fortune mines. Extensive develop-
one in 1918, and the Cumberland mine shipped silver-lead ore.
ginius is credited with a total production of $26,000,000. The
e mine, located in 1875, has been worked for varying periods
ated with the Revenue.
mine was optioned to the A. S. & R. Co., in May, 1919, but
nber.

NG & INVESTMENT CO. **COLORADO**

ver Cliff, Custer county, Colo.
e Hornsilver Consolidated mine just E. of Silver Cliff
le district, operated under bond and lease. Ore carries silver

NING & MILLING CO. **COLORADO**

leased to Lincoln Mines and Reduction Co., which see.
pple Creek, Teller county, Colo.
out 35 acres, includes the Ironclad, Pard, Magna Charta,
nex claims. While investigating potash deposits, manganese
l in what is believed to be a blanket deposit, extending for per-
width of 50'.

MINES CO. **COLORADO**

na, Park county, Colo.
ramento district, near Alma. Company reported in 1919 to be
silver vein, assaying $50 per ton. The strike is believed to be
sure, which underlies several properties in that section. There
es working on the London on a tunnel and equipment planned
1919 200 to 300 oz. silver ore was opened.

ILL MINING, MILLING & LEASING CO. **COLO.**

en, Pitkin county, Colo.
H. Cornwall, pres.; C. E. Doolittle, v. p.; F. M. Yates,
W. Layton and A. Johnson, directors.
919 to have secured a 5-year lease and option on the Little

Annie mine and mill. Dump was said to contain 5,000 tons of payab sides 4,000 tons of ore broken in the mine.

RICO ARGENTINE MINING CO. COL

Office: Mackintosh Block, Salt Lake City. **Mine address:** Wr lough, supt., Rico, Dolores county, Colo.

Officers: F. W. Price, pres.; A. E. Rykert, v. p.; J. H. Woo sec.-treas.; S. A. King, J. E. McKnight and J. E. Frick, directors.

Inc. 1911. **Cap.,** $100,000; 10c par; 963,136 issued; assessabl ment No. 6 of 1c per share levied January 4, 1917. Company is its ow agent and registrar. Listed on Salt Lake Exchange. During 1918 paid off indebtedness amounting to $70,000.

Property: the Black Hawk and Argentine groups, 21 claims, mostly patented, adjoining the Rico-Wellington Mining Co. property.

Geology: alternating strata of limestone and sandstone, dippin of about 30° and cut by almost vertical fissures of great extent and p Where these fissures cross the soluble limestone they contain flat r deposits of sulphide ores, carrying copper, zinc, and lead, with gold values. The ore shoots or bedded deposits are from 3-30′ thick. The and the limestone are identical both in character and occurrence which are producing in the Rico-Wellington property.

Development: a new tunnel, 200′ lower than former workin 1917, a strong shoot of marketable ore carrying copper, lead and zinc, gold and silver content. This opening drained the main shoot through nection with upper workings. In 1918, it was reported that bismuth w ing in some of the ore.

Production: for 1917, $100.000; the net smelter returns of wh $88,837. Of this, $47,576 was for ore shipped by company and $41,26 by lessees. On January 1, 1919, company operations were suspended tember, but lessees continued shipping at rate of 1,000 tons per month.

It was reported late in 1918 that the Rico Consolidated Co. ha suit against the Rico Argentine Mining Co. over apex-rights for wr traction of ore, worth $900,000.

RICO CONSOLIDATED MINES CO. COL

Owned by Jesse Knight interests of Provo, Utah. G. Garren, s Dolores county, Colo. Listed on Salt Lake City Exchange.

Property: adjoining the Rico Argentine on the N. E., is said t vein of copper-silver-lead ore 35′ wide in the upper workings. A t driven over 300′ to gain 140′ depth. Company has been making ship they are not reported.

Company brought suit in 1918 against the Marmatite Leasing and Argentine companies, alleging that they had trespassed on the Alleg Company claims that 15,000 tons of ore valued at $60 per ton, amo $900,000, had been shipped.

RICO MINING CO. COL

Reorganized as Syndicate Mining & Milling Co., which see.

RICO-WELLINGTON MINING CO. COL

Address: Provo, Utah.

Officers: Jesse Knight, pres.; Chas. Read, v. p.; W. L. Mang treas.; R. L. Anderberg, asst. sec.-treas.; H. R. Trenholm, gen. mgr. Jesse Knight, J. W. Knight, Chas. Read, K. S. Jordan, W. L. Mang Allen, H. R. Trenholm, Albert Lofquist, supt.

Inc. August, 1911, in Utah. **Cap.,** $1,000,000; $1 par; 51% owned by Knight Investment Co. Listed on Salt Lake Exchange.

Since the property was taken over by its present owners it has ea $500,000, has invested $50,000 in a mill and expended $100.000 in de work. The debt of $150,000 advanced for this equipment and work off in 1916. Present debt of company, 1919, for development, is $50,00

On April 25, 1917, No. 1 dividend of 1½c per share was paid, fo similar amounts in May and June. On July 25, 4c was paid. Th $39,000.

e Wellington mine, at Rico, which contains ore-shoots ement and contact metamorphism in the limestone beds of the f the Hermosa formation. In 1914 a flat deposit of zinc-lead es parallel to the Black Hawk fault. To the north the orebody ss fault parallel to the Nellie Bly fault, the orebody north of 0' below. Across the Black Hawk fault a copper deposit, re- and broken by several faults, has been opened, the ore carry- nd silver values.

: consists of about 22,000' of underground work, reported mounts of lead-zinc and copper ore. Exploration is devoted vk and Iron veins, two great ore-bearing fissures, traversing V. and S. E. In these the ore makes in lime beds that look leposits, and as many as 5 and 6 beds, one above the other. At 2,500' from portal of Mountain Spring tunnel and about gton level, copper ore was opened in 1919. The better grade e, averaging, it is said, about 9% copper and 14 oz. silver, or

ncludes a 2,500' tram to the Rio Grande railroad, handling t a cost of 23c per ton. The 100-ton mill, formerly belonging Co. and leased for 5 years, was remodeled at a cost of nearly nill, 5 Deister tables, 6 Callow tanks, 2 Callow screens and nt were installed in 1918. A compressor costing $4,000 was

for 1917, 424 tons of copper ore, 1,826 tons of lead-zinc, hide, and 1,687 tons lead-silver, all dry weights, net value, hand, December, 1917, was $2,395. No work is reported for was again operating in 1919, and had shipped 300 tons of by April 1st, 1919.

good one and, being managed by Jesse Knight, the company ul, economical and up-to-date operation.

CO. **COLORADO**

hur J. White, 68 Devonshire St., Boston, Mass., and

A. Irving, pres.; Edson W. Noyes, v. p.; Frank S. Sin- th Samuel Klous and Geo. S. Sinnick, directors.

1915, in Colorado. **Cap.**, 1,000,000; $1 par; 500,000 in es listed on Boston Curb, January, 1916. Annual meeting, in January. Company is practically a reorganization of the ing Co., capital being reduced from $2,500,000.

Bay State group, 13 claims, 65 acres, on the north slope , 8 miles from Breckenridge, Summit county, said to show gold ore in fissure veins in diorite and porphyry. The Witch le.

tunnels, 1,300', 200', and 60' in length. In the 1,300' ut was said to have cut a 6' vein of copper ore. Management 00 had been spent on development work. No ore reserves

30 cu. ft. air-compressor, electric power. Future plans mill and 2 additional compressors.
roposition. No recent returns.

LD MINE **COLORAD**

ent. of stock owned by Assets Realizing Mines Corp. of C

ut 800 acres, patented, near San Luis, in Costilla count 11½ acres, over 2,000 tons have been shipped averaging $3. per ton. Company expects same value from 200 acres.

company reports "a body of ore about 600' wide and to a depth of 125'," and that 37 shafts, tunnels, crosscuts and ,900,000 tons of ore, which will be mined by steam shovel and flotation plant, to have a capacity of 1,250 tons daily. The

by-product is pyrite, said to run 35% sulphur and devoid of zinc, lead, an mony or arsenic, making it valuable for sulphuric acid.

Water power 3 miles from mine is capable of generating 1,500 h. p.

The Assets Realizing Mines Corp. reports that the owners of the other 49 of the stock will furnish $500,000 to build the mill, etc.; that $200,000 has be paid, and $100,000, is due in June, 1920.

ROANOKE MINING & MILLING CO. COLORAD

Office: 221 Foster Bldg., Denver, Colo.

Officers: E. LeN. Foster, pres.-treas.; F. G. Warden, v. p.; W. Johnston, sec.

Inc. in Colorado. **Cap.,** $100,000; 10c par; all outstanding.

Property: 11 patented claims, in Clear Creek county, Colo., conti ing gold, silver, bismuth, and lead ore in a fissure vein in granite. Ore is a s phide almost 2′ wide, and runs N. 60° E. Said to assay 10 to 2,000 oz. silver, 3 lead, and 0.2 oz. gold per ton.

Development: by tunnel 900′ long, and total of 3,000′ of workin Property has not been operated for 20 years, but company plans driving crosscut tunnel to intersect vein at 400′ depth.

ROCKY MOUNTAIN GOLDFIELD MINING CO. COLORAD

Offices: Denver, Colo., and St. Elmo, Chaffee county, Colo.

Property: the Hayden, San Diego, Little Johnny and Nellie claims Barren mountain, Chalk Creek district, Chaffee county, said to carry seve veins whose outcrop is owned for 4,500′. The mine is near several produce including the Mary Murphy, credited with a $25,000,000 production.

Development: 600′ tunnel and 80′ shaft on Hayden vein, and shall shafts on others. The Nellie has made shipments of $40 ore. A 150-ton co centrating mill at St. Elmo treated the ore. No recent returns available.

ROSS MINING & MILLING CO. COLORAD

Idle many years.

Office: Ross Bldg., Waynesburg, Pa. Mines at Silverton, San Ju county, Colo. Company sub-leased the Champion mine, which it controls 1918, to Cassagranda & Co. The company has had much financial trouble, its predecessors and collateral relatives in a chain of promotions, all fu described, Vol. XI, Copper Handbook.

ROYAL GEM MINING CO. COLORAD

Address: Guy Adams, Boulder, Colo., and E. C. Wenzel, mgr., Ca bou, Colo.

Property: 7 claims, 40 acres, purchased in 1916 from W. B. Baker, present company, a New Orleans concern. Claims are Sago, Mammoth, Ro Gem, St. Riter, St. Paul, Index, and Camp Bird, located near Caribou, Boul county. Sixteen shafts have been sunk and payable silver ore reported open

ROYAL TIGER MINING CO. COLORAD

J. A. Traylor, mgr.; T. A. Braun, supt.

Property: company owns and operates the Royal Tiger mine, former known as the I. X. L. mine in Swan valley, 9 miles north of Breckenrid Summit county. Vein is said to be 50′ between walls carrying lead, silver a bismuth.

Reported in May, 1919, that company had purchased the Cashier group the Cashier Mining & Milling Co., comprising four claims, about 25 acres Brown's gulch, near Breckenridge, and has produced $125,000 gold and co centrates to value of $25,000.

Company has been using small mill, but plans a new 300-ton mill.

RUBY KING GROUP COLORAD

Option on this group was secured in 1918 by the Mogollon Mines Co., Ne Mexico, which see.

SACO DE ORO MINING CO. COLORAD

Address: Barrick-Dollison Co., fiscal [illegible] Colo. Chas. E. Barrick, pres.-gen. m[illegible]

Cap., $20,000; in 1918 an offer

Property: 5 claims, about 1

nk 215'. Property said to show fissure veins carrying gold,
e.
compressor, hoist and electric plant were added in 1919.
at the mine will warrant its name.

ES (COLORADO), LTD. **COLORADO**

win H. Platt, mgr., Equitable Bldg., Denver, Colo. M. F.
Broad St. House, London, E. C. 2, Eng. Directors: Geo. A.
man; J. O. Shepherd, Chas. P. Winterton, M. M. Dewar.
, 1913. **Cap.**, £75,000; 5s. par; all issued and fully paid.
mpany was organized to acquire from E. L. A. Munby
the St. John silver-lead-zinc mines, 19 claims, 100 acres, to-
entrator, located on the west side of Glacier Mt., 1½ miles
uma, Summit county. Purchase price was £58,250, payable
£30,000 in fully-paid shares for the property and £20,000 cash
ll-paid shares to the promoters, the Tres Forcas Synd., Ltd.
he company's property was sold to the Montezuma Silver-Lead
£55,000, out of which the mortgage debt was discharged. The
w a holding company, whose chief asset is 40,000 ordinary
ntezuma S.-L. Mines, Ltd.
also owns 50 acres timber land within a mile of the mining

merly held an option on the Revenue Tunnel group of mines,
Ouray district, including the Virginius mine, reported to have
tope fills and 50,000 tons probable ore below the tunnel level.
ice of this property was to be $187,000, with final payment of
1, 1917. To provide for further payments a loan of £25,000
£21,000 of which was subscribed. The loan carried 7% in-
veloped portion of this property was sold in November, 1915, for
n 1919, the Revenue mines were said to be in operation under
heir owner, A. E. Reynolds. No information could be secured
n Mines Co.
r, 1915, a 1/3 interest was acquired in the Hilltop mine at Lead-
producing high-grade zinc carbonate ore, £8 to £9 per ton,
lose temporarily owing to the weather; the mine is at an alti-

y also held a 2/5 interest in the Ruby mine at Leadville. Pro-
in December, 1916, and in February was returning a profit of
N lease was also held on the Shamrock, Mt. Sneffels and Lake

turns obtainable.

OLORADO MINING CO. **COLORADO**

be idle; mail returned unclaimed, 1918, from Leadville, Colo.
W. Almond, pres.; S. Davies, v. p.; F. D. Allen, sec.-treas.;
s, directors.
3, 1915, in Colorado. **Cap.**, $500,000; $1 par; 300,000 issued.
16 patented claims, 320 acres, in Lake, Pitkin and Chaffee
s S. W. of Leadville.
ot: by 3 tunnels, 50', 125' and 300' long, which opened a vein
lver, copper, and lead.

NING & REDUCTION CO. **COLORADO**

ilverton, San Juan county, Colo. Norwood Johnson, pres.
kins, v. p. and gen. mgr.; Frank L. Ross, sec.
1908, in Colorado. **Cap.**, $100,000; shares $1 par.
the St. Paul group, in the Red Mountain district, an old
rly shipped some ore getting $1,000 per carload. The mine has a
levels at [illegible] 300' developed, small but rich ore shoots, said
[illegible] 10% lead, 10% zinc, 5 to 10 oz.
[illegible] worked by lessees.
[illegible] a ton. During 1918

SAN ANTONIO MINING CO. COLORAD

Company has been idle for several years, but property has been operated the Summit Copper Mining & Milling Co., which see.

SAN JUAN QUEEN GROUP COLORAD

Address: Rasmus Hanson, Silverton, Colo.

Property: in Picayune gulch, Treasure mountain, Eureka district, S Juan county, about 1½ miles from Picayune and 12 north of Silverton. Th are six veins in andesite. The Sandiago vein has 3½′ of ore in a 50′ vein, ass ing 0.3 oz. gold and 3.7 oz. silver. The Atlantis-Watsika veins average $2 g and 62.9 oz. silver. The San Juan veins shows 6″ to 2′ of ore, a mixture of pyr galena and tetrahedrite in dark quartz. The Sunnyside and Gold Grained ve are cut by a diabase dike, favorable in size and value.

Development: by about 5,100′ of workings.

C. W. Purington, in a report dated August 25, 1906, estimated possible serves as 1,742,857 tons, averaging $7 per ton, or a total value of $12,000,000.

SANTIAGO CONS. MINING, MILLING & TUNNEL CO. COL

Office: Georgetown, Clear Creek county, Colo.

Officers: Mrs. S. F. Glass, pres.-treas.; Mrs. E. J. Smith, v. p.; S. Glass, sec.

Inc Feb., 1906, in Colorado. **Cap.,** $600,000; $1 par; 594,101 shares is standing.

Property: 20 claims, of which 13 are patented, 100 acres in all, n Georgetown, Clear Creek county. Has a fissure vein, averaging 1½′ wide, car ing sulphide ore said to run 2 oz. gold, 300 oz. silver, 10% copper and 30% l in sulphide.

Development: by 600′ shaft and tunnels 200′ to 1,200′ in length, wo ings totalling 25,000′. In 1918, a lessee on No. 4 level mined 200 tons of ore c rying 2 oz. gold, 65 oz. silver, 9% copper, and 23% lead. On No. 7 level, an a body about 10″ wide was opened for about 150′. Company claims to h 100,000 tons of ore in reserve, with 300 tons blocked out.

Equipment: includes electric hoist, tramway, and sampler. Mine worked both by lessee and on company account.

Production: from January, 1911, to December, 1918, was $247,653, average grade being about $50 per ton.

SARATOGA MINING CO. COLORAD

Office: Union Trust Bldg., Detroit, Mich. **Mine office:** Idaho Spri Clear Creek county, Colo.

Officers: F. L. Colby, pres.; Chas. R. Dunn, sec.; E. W. Pendlet treas., with Edwin Lodge, directors. John Owen, gen. mgr.

Inc. Nov. 18, 1911, in Colorado, as the successor of the Clear Cr Mining & Reduction Co. **Cap.,** $300,000; $10 par; issued, 20,024 shares.

Property: the Saratoga-Gaston group and the Cyclops claim, at K sell gulch, opened through the Newhouse tunnel.

Equipment: includes steam power.

In August, 1917, lessees were treating dump ore, but could only operat few months on account of scanty water supply. No later returns received.

SCEPTRE MINES & MILLS CO. COLORA

Address: Georgetown, Colo.

Cap., $75,000; shares $1 par.

Property: reported operating under least the Sceptre mine, Sunburst Consolidated Mines Corp., which see. Property located on Dum mountain, near Georgetown, Clear Creek county. Equipment includes ho tram 6,935′ long.

SCHLESINGER RADIUM CO. COLORA

Name changed, early in 1919, to Radium Co. of Colorado, Inc., which

SEATON MINING & MILLING CO. COLORA

Address: Cincinnati, Ohio. H. E. Marlatt, [illegible] Springs, Colo.

Property: the old Seaton mine on Seaton Mountain, [illegible] Clear Creek county. Mine reached by [illegible] was to be put through [illegible]

on vein is cut at 6,007' from entrance to the Argo tunnel. No ainable.

PER CO. **COLORADO**

H. Swanton, sec., Canon City.; D. A. Freeman, pres.,

Cap., $1,000,000; shares $10 par.
portion paid in 1900, when shares were sold at $10, declining

0 acres, patented, 7 miles from Salida, Chaffee county; of pyritic copper-zinc ore carrying 2.75% to 12% copper, 750' Upper levels show large amount of oxidized ore.
Bros., shoe polish manufacturers, originally interested. Prop- ed to Salida Gold & Copper Mining Co., succeeded by Shawmut ing Co., succeeded by Salida Copper Co., all now dead. The rchased the leaching plant and remodeled it for a 50-ton ore l.
t: by shaft and tunnels, aggregates 4,000'. Is an old prop- the Hidden Treasure Mining & Leasing Co., at last accounts

LS MINING CO. **COLORADO**

Georgetown, Colo.
T. Wilcox, pres.-treas.; James McGee, v. p.; J. J. Weber, n, supt., and W. T. Brooks, mgr.
000; $1 par. Listed on Boston Curb.
the Argentine district, Clear Creek county, embraces the Centennial mine, and mineral rights to the Tobin vein between Centennial. The latter is said to have a vein 5 to 20' wide, show- ving value in silver, gold, and copper.
t: by 900' tunnel in the Stevens; 2 tunnels in the Tobin, one 600' below top of mountain, and the other 200' long 700' below nial is developed to a depth of 1,000'.
at Stevens includes concentrating mill, compressor, and wer-plant.
the Stevens group is credited with a production of nearly of silver, when it was 65c an ounce.
has been much advertised by T. W. Lawson of Boston, who that boosted the stock for awhile, and presumably sold out

NING CO. **COLORADO**

roadway, New York. **Mine office:** Idaho Springs, Clear lo. M. S. Payton, pres.; Chas. D. Ross, sec.-treas.
New York. **Cap.**, $100,000; shares $100 par.
copper ores with value mainly in gold.
t: by an 800' shaft and a 5,500' tunnel. Has been idle for

ON MINING CO. **COLORADO**

Foster Bldg., Denver, Colo.
D. McAlpine, pres.; Dr. Henry Halm, v. p.; W. N. Geis, H. V. Immo, Emil Peltonie, A. W. Jurma, N. N. Puonavara o, directors. W. J. Hockin, supt.
16, in Colorado. **Cap.**, $1,000,000; $1 par; in treasury 79,457 hares held in escrow. U. S. Corp. Co., registrar and transfer New York Curb.
claims in three groups—Bear Creek, Swamp Canon, and including the Highland Mary mine at Swamp Canon, San The Swamp Canon is said to contain ore running 6 to 8 oz. lead ore. The Chapman Gulch mine shows a vein 1 to 5' gold, 6 oz. silver, and 5% zinc. Properties are about 2 miles miles south of Telluride.
by 2 crosscuts the upper 1,400' and lower 1,600' long, and feet of workings. Mine has been in operation since 1899.

Equipment: includes a 24-stamp mill. A total of $450,000 is repo to have been spent on development, etc.

SILVER CITY MINING CO. COLORA

Address: J. H. White, supt., Ouray, Ouray county., Colo.

Property: near Ouray. In Dec., 1919, there were 25 men emplo erecting boarding and bunk houses for 80 men, saw mill, power plant, and c pressor. A lower tunnel was also projected. Production is to commence in spring of 1920.

SILVER GEM MINING CO. COLORA

Company incorporated in 1918 by J. L. Grant, F. E. Wilson and E. M. C son, with capital of $500,000. Said to have purchased the Silver Horn prop on Ute creek, near Idaho Springs, Clear Creek county. Company expected start operations in May, 1919.

SILVER GLANCE MINING CO. COLORA

Address: Louis Sigmund, pres., Coaldale, Fremont county, Colo.

Property: This is a new company incorporated in 1919; 4 gold-si claims at Coaldale, from which shipments have been made from time to t

SILVER GULCH MINING & MILLING CO. COLORA

Office: 1023 St. Paul Ave., Milwaukee, Wis. **Mine office:** Dunton, C

Officers: C. H. Koenig, pres.; Robert Rom, sec.-treas.; with He Indra and Matt. Jacobsen, directors. E. C. Koenig, supt.

Cap., $250,000; shares 10c par.

Property: 7 claims, unpatented, known as the Rosebud mine, in Lone Cone district, Dolores county. Mine shows a fissure vein, about 4' w in sandstone, containing gold, silver, copper and lead sulphides. Course N. E.-S. W. with dip of 95°.

Development: by about 900' of tunnels, blocking out 1,000 tons of

Equipment: includes 2 concentrating tables. In Oct., 1919, a 50 flotation mill was in course of construction.

SILVER LAKE MINES COLORA

Owned by American Sm. & Ref. Co. R. P. Reynolds, supt., c/o A. S. Co., Durango, Colo.

Property: 143 patented claims in the Animas mining district, Silver San Juan county.

Ore: carries gold, silver, lead, copper, and zinc in fissure veins in an site. Vein dip 70°, and have an E.-W. strike. Ore reported to occur in sh from 1x20' to 8x1,200', and said to assay 0.20 oz. gold; 6 oz. silver; 2.5% le 1% copper; 3.5% zinc.

Development: by tunnels, the two longest 12,000 and 7,500'; great depth of workings 1,700' below surface; total workings, 165,000'.

Equipment: includes 2 air-compressors, aerial tram, and a 450-ton equipped with flotation plant.

Mine has been worked by lessees since 1911, but production figures are obtainable.

SILVERMANE MINES CO. COLORA

Office: Chicago, Ill. **Mine office:** Lake City, Colo. R. A. Ralph, Inc. in 1919; a close corporation.

Property: 14 claims, patented, 7 miles west of Lake City, Hin county. Shows gold, silver, copper, and lead ore in a fissure in rhyolitic andesitic breccia. There are 3 pay-shoots, one 250' long, and two each long. Orebody is from 9" to 4' wide. Ore assays 25 to 100 oz. silver, 20% 3% copper and 0.1 oz. gold per ton.

Development: by tunnels, 1,140' and 200' long; also 4,030' of work The inclined shaft is 620' deep and connects with the tunnel.

Company said to have been recovering old workings and blocking ore. Property promising, but?

SILVER MOUNTAIN MINING CO. COLORA

Address: 604 Denham Bldg., Denver, Colo.

Officers: A. J. Hoskin, pres.; Thomas Parks, [illegible] Stratton, [illegible]

orado. **Cap.**, 2,500,000 shares; one mill par; non-assessable, ain office.
3 claims, Chief, Ruby Silver, and Funston, a bond and lease ck, and an option or agreements on Little Silver and other ad- ies, all situated on Silver mountain, near Blackhawk, Gilpin

nt: 185' Black Jack shaft and considerable drifting. Ores ver, and lead. A 9-ton trial shipment realized $110 per ton net, Another lot of 20 tons gave $192.11 per ton net. Regular ship- pected by June, 1919. Mine has produced $20,000 from upper f ore shipped late 1919 yielded $4,569.
Savery Securities Co. of Denver, in November, 1919, advertised in," saying that it had "tremendous possibilities." One of its took 6 samples, the lowest of which assayed 9.16% lead and nd silver, all the others being considerably higher.

NT MINES CO. **COLORADO**
7 First National Bank Bldg., Denver, Colo. **Mine address:** n, supt., Box 548, Ouray, Colo.
. E. Bundsen, pres.-treas.; H. E. Larson, v. p.; P. R. Ander-

ary, 1918, in Colorado. **Cap.**, $50,000; $1 par.
operating under bond and lease, three claims, two of which 0 acres in Uncompahgre mining district, Ouray, said to carry per, iron, zinc and lead in pink quartzite, that dips at 30°. Ore and is said to assay $1.60 gold, 10-400 oz. silver, 14% copper, 5% 4% iron.
nt: three tunnels, 160' 135' and 140' long. Equipped with Mine idle for 30 years before work was started by the present

ME CONSOLIDATED MNG. CO. **COLORADO**
Foster Bldg., Denver, Colo.
oderick Stewart, pres.; C. D. Gibbs, v. p.; W. A. Bibbs, ilcox, supt.
,000; $1 par; in treasury 1,470,000 shares. Transf. office at nsfer Co., Equitable Bldg., New York.
2 claims, 249 acres, grouped as (1) the Buxton, ten claims tain, two miles west of Silver Plume, Clear Creek county, con- nel claim and covering area of 3,000 by 5,000'; (2) the Lone claims, on Republican mountain, at Silver Plume; (3) the Snow- ining Lone Wolf mine.
laims show pre-Cambrian granite and granite-gneiss inter- ry dikes. Blende and galena, with some pyrite, are the principal r-lead deposits. Both the galena and blende are argentiferous, mainly as polybasite, tetrahedrite, cyrargyrite, and ruby silver, rystalline quartz with calcite and brown carbonates of iron and

nt: on the Buster lode of the Buxton group, a tunnel was ein; a 40' winze also was sunk on a 2" cross vein, sampling 367 lead and gold. The main development tunnel is being driven to veins of the group. Advance is 100' per month. On the Lone work is on the Florence vein, which averages 99.5 oz. silver, 3% d per ton. The Snowdrift dump is said to contain 150,000 tons l from the Snowdrift mine, when ore less than $90 value could or treatment.
anned a 100-ton mill and erected a compressor in 1919. Ship- illing Co. at Idaho Springs.

ME REDUCTION CO. **COLORADO**
[illegible] the Burleigh mill, near Silver Plume, Colo., and [illegible]-Terry mine. Installed an Edison plant and oil flotation. [illegible] and company probably dead.

SLICK BROS. MINING & MILLING CO. COLOR

Address: B. B. Slick, Ridgeway, Colo. W. B. Slick, pres., Boise, I

Inc. 1909, in Nevada. **Cap.**, $1,500,000; $1 par.

Property: 10 claims, 100 acres, patented, on Mt. Hayden, Uncomp district, Colo., shows fissure vein in andesite. The vein runs N. E.-S. W. at 45°, which for 2,400' long shows 3' of sulphide copper ore carrying gold values, and reported to average $35 per ton in all three metals. The sh said to carry ore for 600'x600'x3'.

Development: by 3 tunnels, aggregating 1,200' and having back o Property reported on by F. M. Kilmer, of Boston Inst. of Technology.

Company spent about $15,000 for development work during 1916-18. were laid and funds pledged to drive a tunnel 2,300' long. Work started 1918; company reported this should be in ore the full distance and w Sutton vein at a depth of 1,155' below the outcrop.

SLIDE GOLD MINING CO. COLOR

Address: Gold Hill, Boulder, Colo.

Officers: G. W. Teal, pres.; Wm. Mitchell, v. p.; C. A. Barr, sec.-t Chas. Gustafson, supt., with R. R. Kermack, directors.

Inc. Jan., 1918, in Colorado. **Cap.**, $100,000; $1 par, 44,744 shares standing. A close corporation. During 1918 ore dump was treated $13,759; expenses were $29,358, mainly for development. Milling operation expected to start in 1919.

Property: three patented claims, 15 acres, at Gold Hill, Boulder c contains gold and silver in quartz vein in granite. Course N. E. with dip at Ore is 8' wide, and carries telluride of gold, the output averaging 1 oz. go 3 oz. silver.

Development: by 1,000' shaft and 5,000' of drifts, blocking out tons.

Equipment: steam hoist, electric compressor, 50-ton concentratio with two flotation units. Mine idle for 20 years prior to 1918.

Production: credited with $3,000,000 gold output.

SMUGGLER LEASING CO., THE COLOR

Address: C. E. Anderson, Aspen, Colo.

Officers: D. M. Hyman, pres.; E. M. Rogers, v. p.; J. L. Tilton, A. B. Simon, treas., with Mark Hyman, Edw. Kuhn and W. P. Arms, dir

Inc. May, 1911, in Maine. **Cap.**, $500,000; $1 par; all issued, non-a able.

Property: the Smuggler mine at Aspen, Colo., shows contact d in lime and shale, containing silver, lead and zinc ores.

Development: by 5,000' and 15,000' tunnels, and 1,000' shaft, g opened to 1,800' depth.

Equipment: includes 2,250-h. p. electric plant, hoist, compresso 500-ton concentrating mill.

Water is troublesome, 3,500 to 4,000 gallons per minute being pumped 1918 report received from company.

SMUGGLER MINE COLOR

Address: J. Simpson, Silver Plume, Clear Creek county, Colo.

Said to be producing 350 tons of lead-zinc-silver ore per month. The grade smelting ore shipped to Georgetown sampler is said to return $500-$ ton. The mill ore is shipped to the Hudson Mill at Idaho Springs, where concentrated 5 tons to one, giving, it is said, a product carrying 50% zinc lead and 150 oz. silver per ton.

SMUGGLER MINE & MILLING CO. COLOR

Mine office: Balarat, via Jamestown, Boulder county, Colo.

Officers: C. F. Leetes, Freedonia, Kan., pres.; G. M. Maupin, v. R. Prunty, sec.-treas.; T. W. Clements, gen. mgr., with G. P. Farmer, Elder and W. B. Scruggs, directors.

Cap., $500,000.

Property: the Smuggler mine at Balarat, 8 miles S. W. of Lyon three miles N. of Jamestown in Boulder county. Mine contains gold and

-shoot reported producing commercial ore averaging $200 per
on is said to be $1,500,000.
ew compressor and drills have been installed lately and
anned.

ION MINING CO. (THE) **COLORADO**

he New England Exploration Co. (which see), 14 Ashburton
.
eley Wells, president and general mgr.; with R. L.
ermore, N. H. Stone and J. M. Crafts, directors. T. E.
Chas. N. Bell, gen. supt.; Carl Aikele, mine supt.;
er supt.; O. M. Sackett, tram. supt.; W. L. Reid, mills supt.,

Colorado. Cap., $5,000,000; all outstanding; $100 par.
$250,000; outstanding, $67,500. Annual meeting in June.
, Boston, transfer office. Financial reports not made public.
atented claims, 996 acres, in San Miguel and Ouray coun-
gler and Humboldt mines. Ore carries gold, silver, lead and
true fissure quartz vein cutting andesite, tuff and rhyolite for
of 2,000'. Vein strikes N. W.-S. E., dips 70°; average width,
of the Telluride district, see U. S. G. S. Geological Folio
omboy Gold Mines Co., Ltd., in this volume. In 1918, the
of claims, in Ingram Basin, Telluride, were taken over by

by tunnels with a 280' winze from lowest tunnel, 3,700'
level, 3,600' long; greatest depth of workings, 2,300'. Total
30 miles. Great Bear developed by 4 levels, shaft and

cludes a 50-h. p. electric hoist, 2 compressors, pumps,
r, 60-stamp mill, 600-ton cyanide plant, and flotation unit.
was burned in November, 1919.
8,668 tons ore in 1912; 137,567 in 1913; 126,505 in 1914;
009 in 1916. No 1917-1919 figures received from company.
ecovery not made public.
919, company was examining the Red Mountain Mines Co.'s
le purchase.

N MINING CO. **COLORADO**

owa Tiger Mining Co.; named changed November, 1919.
rton, Colo.
Iowa and Mayflower mines in the Silverton district of
Ore carries gold, silver, and lead. Only the Iowa gold mine
ed. The mill includes a flotation unit. Company has been
shippers of concentrate in the district. No figures are

NT GOLD MINING CO. **COLORADO**

in June, 1917, by C. A. O'Leary & Co., of St. Paul, Minn.,
Consolidated Specie Payment Mng. Co.
o Springs, Colo.
ws gold-silver-copper ore, developed by 2,800' tunnel.
rsected 2,800' from the portal of the tunnel and 1,000' of
lone to the west. Average grade of ore said to be around
lar shipments were being made in October, 1919.
cludes electrically-driven air-compressor and a 20-stamp
essees.

MINING & MILLING CO. **COLORADO**

d from W. R. Benzie, sec., Majestic Bldg., Denver, Colo.
ge M. Quigley, pres.; S. H. Dunlop, v. p.; George Lopez,

Star mine and mill at Ward, Boulder county, with a
production. Had a 10-stamp mill.

SQUARE DEAL GOLD MINING CO. COLOR

Address: Central City, Gilpin county, Colo.

Officers: R. J. Foster, pres., 424 Wyoming St., Scranton, Pa. Frank, v. p.; E. H. Lawall, treas., with H. K. Griffith and L. F. Hueblein, tors. Harry J. Wolf, mgr., Golden, Colo. Thos. Martin, supt.

No capitalization nor financial statement received.

Property: 3 patented claims, near Central City, said to show silver, copper and lead ore in quartz vein. Vein strikes E. W., dips 65° N.

Development: 850′ incline shaft, with 4 miles of workings. Or serves and production not given.

In December, 1915, property was tied up in litigation, but was being ated by a lessee, who placed his royalties in trust pending the outcome suit. The apex suit, between the Square Deal and Coloma Mining Co. cussed by R. T. Walker in "Eng. & Min. Journal," of August 23, 1919), w unusual one, the Coloma company won it, and took possession of the South away vein, extracting considerable ore therefrom. A mortgage on the S Deal was then foreclosed, and the mortgagee filed a new suit against Coloma, obtaining permission to do exploratory work. This proved tha South Notaway vein was distinct from the Cecil vein. The court upheld view and returned the Notaway claim to the Square Deal. Extremely inter geologic deductions resulted from the work done.

STANDARD CHEMICAL CO. COLORADO-U

Office: Naturita, Colo.

Operating carnotite mines in Colorado and Utah.

Property: 350 claims in Paradox Valley, 60 miles from Placer Colo., contains vanadium-bearing and radium-producing ores.

Company gives out no information, but is reported during 1918 to shipped 7,000 tons of radium-bearing ore. Temporarily closed late in 191 opened and employing 200 men in 1919; advertising for 75 additional August, 1919.

See U. S. Bureau of Mines Bull. No. 1: 25, p. 944.

STANDARD GOLD-BEARING MINING & MILLING CO. COLOR

Officers: F. E. Groves, v. p. and mgr., Salida, Colo.; Hon. W O'Brien, pres.; George L. Ramey, sec.; J. S. Ramey, treas.; Jas. Zoeter, Millner, Dr. S. B. McFarland, directors.

Property: 8 claims, 144 acres, in Monarch district, Pass Creek, C county, shows fissure veins in granite porphyry that carry copper-lead Values run $4-$16 per ton.

Development: by 900′ of tunnel work with 285′ back. Company a mill with flotation equipment. Examinations have been made by Clyde H and J. H. Freeman. No recent report received.

STANLEY MINES CO. COLOR

Office: 1027 First National Bank Bldg., Denver, Colo. **Mine** Idaho Springs, Clear Creek county, Colo.

Officers: J. P. H. Cunningham, pres.; Geo. W. Johnson, v. p.; Wolf, sec.-mgr.

The property formerly owned by this company was acquired by Cunnin Johnson & Fisher, a co-partnership, in August, 1916, by purchase, the old S Mines Co., being dissolved. The S. M. company was incorporated 190 $75,000 capital as successor to Consolidated Stanley Mining & Milling Co.

Property: 76 lode claims, 10 placer claims, 3 millsites, all pate Shows gold and silver-bearing lead and copper ores.

Development: 641′ main shaft, and 5 others from 60′ to 680′ dee crosscuts, total 1,050′; Hukill tunnel, 380′; adits and drifts, 22,790′; 3,460′; winzes, 570′; a total of 30,181′ Vein area stoped is 635,000 sq. ft. production is $3,500,000. New company cleaned and retimbered main adi 3,500′ long and resumed active development, November, 1918.

STAR TUNNEL & MINING CO. COLOR

Office: 213 Coronado Bldg., Denver, Colo.

Hea, pres.; W. P. Day, v. p.; E. T. Butler, treas.; S. L.

lorado. **Cap.**, $40,000; 1c par; 1,000,000 shares in treas-

terprise mining district, Blackhawk, Gilpin county, and ntrating mill, 75-ton capacity, at Blackhawk. Mill has 0 worth of ore.

y 450' crosscut tunnel. Plan to drive tunnel an addi- ee veins. Company reports ore samples returning $231 a is in gold values.

n operated since 1883.

NING & REDUCTION CO. **COLORADO**

City, Colo.

rgess, pres.; W. C. Humphrey, sec.; H. G. Heath, treas. rated, 1919. Cap., $100,000. Has taken bond and lease on ret properties, 1½ miles from Lake City, believed to be h.

y 216' shaft and tunnels. Company plans concentra- on unit.

MINING & MILLING CO. **COLORADO**

Reserve Bldg., St. Louis, Mo.

ick Kohn, pres.; R. A. Morris, sec.; G. P. Heckel, mgr.;

lorado. **Cap.**, $500,000; $1 par.

ims, patented, 200 acres, including Carbon Lake, Camp groups and a 20-acre mill-site, all located in Red mountain San Juan counties. Mines said to show veins in porphyry pper, 10% lead, 10 oz. silver and about $3 gold per ton. y owned by San Antonio Mining Co., which see. Examined Kirby Thomas.

y 37' and 200' shafts the Camp Roberts tunnel 625', and '; driving a raise 310' from the Koehler tunnel to the gs.

00-ton concentrating plant is to be erected.

SOLIDATED MINES CORP'N. **COLORADO**

of E. T. Larkin & Co., 10 Postoffice Square, Boston, Georgetown, Colo.

Nye, pres.; Arthur Longley, v. p.; H. N. Stevens, sec.- albot, N. W. Jordan, J. C. Hershey and J. M. McClave,

o. **Cap.**, $1,000,000; $1 par. In treasury 400,000 shares. fer agents, U. S. Corporation Co., N. Y., and Metropolitan fass.

tented, 3 unpatented claims and 3 patented millsites, in- or, Stewart, Sceptre and Wolverine mines on Republican tains, near Georgetown.

arries about 10 oz. silver, 10% lead, 12% zinc, and -grade area, an ore which company expects to net almost ections, silver is reported as running from 150 to 500 oz. eins are in gneiss and pegmatite.

tarted reopening tunnels in May, 1916. Sceptre tun- nel, 1,000' long, and Sunburst, 900'. A raise 380' long from Sunburst tunnels was completed in 1918. The main tunnel 919, and lessees opened some rich silver ore.

ludes compressor, transformer, blacksmith shop. Aerial merring loading station with Col. & Southern R. R. at $25,000, was completed early in 1919.

$1,250,000 spent on development during 1916, 1917 and 1918.

Reported that Canadian interests, headed by Isbell, Plant & Co., Toron taken over the property.

SUN-MOON LEASING CO. **COLO**

Office: 517 Equitable Bldg., Denver, Colo.

Officers: J. C. Hershey, pres.-treas.; G. L. Felt, v. p.; G. L. Ny with G. C. Manley and S. P. Doran, directors.

Inc. Feb, 1917, in Colorado **Cap.,** $100,000; $1 par; 90,000 shares

Property: the Hill Top mine, 35 patented claims, 320 acres, Hors district, Park and Lake counties, Colo. Replacement deposits in limeston ore that assays 25 oz. silver and 20% lead. Company formerly operated 6 on Seaton mountain, Clear Creek and Gilpin counties.

Development: by 450′ shaft and 3,500′ underground workings. pany developing known ore-bodies and expected to ship early in 1919.

SUNNYSIDE GOLD MINES CO. **COLO**

Defunct. Property taken over by Sunnyside Mining & Milling C operated by the U. S. S. R. & M. Exploration Co.

SUNNYSIDE MINING & MILLING CO. **COLO**

Subsidiary of U. S. S. R. & M. Exploration Co.

Office: Eureka, San Juan county, Colo.

Officers: M.H. Kuryla, mgr.; E. L. Young, mine supt.; B. Mar mill supt.

Property: shows a deposit of complex gold developed by tw shafts, two 5,000′ tunnel, and 5 levels.

Equipment: four 1,500 cu. ft. compressors, electric underground age, 33,000′ tramway with capacity of 50 tons per hour, and 500-ton mill has 2 crushers, three 1,400-ton steel bins, tube-mills, ball-mills, flotatio chines, Dorr thickeners, and Portland filters. The process employs s flotation of lead-gold-silver-copper, followed by flotation of zinc.

Company plans a 9-mile railroad to Ouray.

On April 21, 1919, a fire destroyed the bunk houses, commissary bui and compressor house; the machinery was ruined and mining operations Company re-built the structures of steel and corrugated iron, and in Sep was in full operation. By December, there were 300 men employed.

SUN TUNGSTEN CO. **COLO**

Mail returned September, 1918, from 329 Foster Bldg., Denver, Colo.

Officers: A. E. Blakesley, pres.; Denver, Cons. Stock Ex.; Va Wilson, v. p.; J. M. Caldwell, sec.; Paul Hardy, directors; Mr. Von Kueren Boulder, Colo.

Cap., $3,000,000; $1 par; 2,800.000 in treasury at last report.

Property: 2 claims, the Lucille group of tungsten mines, Sunshi trict, near Boulder, Colo., held under bond and lease, and similar lease C. O. D. mine at Cripple Creek.

Stock offered at 5c a share, March, 1916. Is a G. R. Q. proposition a favorably regarded.

Probably idle.

SWARTHMORE CONSOLIDATED MINING CO. **COLO**

Officers: Chas. B. Galbreath, pres.; Harvey Hanes, v. p.; J. E penter, sec.; Paul Barriclow, treas., at last accounts.

Inc. July, 1907, in Colorado, as a merger of the Swarthmore C Co., and Enterprise Mining Co. **Cap.,** $3,500,000; $1 par.

Property: 17 claims, 11 patented, 60 acres, near Eldora, Boulder c includes the Golden Fleece mine, having fissure veins in pre-Cambrian gne by dikes. Veins [illegible] to average 8′ wide and to carry a paystreak of 3 [illegible] telluride of gold.

[illegible] shafts, deepest 403′, and by tunnels of 800′

[illegible] small steam pl[illegible] h. p. hoist and [illegible] concentrator [illegible] chlorination

[illegible] Leasing [illegible]

INING & MILLING CO. **COLORADO**

Rico, Dolores county, Colo. Phillip Flynn, supt.
ition of the Rico Mining Co., whose property was sold October
rganization committee and transferred to the Synd. M. & M.
capitalized at $500,000.
6 claims, 1,110 acres, with 20-acre millsite and 320 acres
Pioneer district of Colorado, includes the Group and Syndicate
s in fissure veins as lime replacements. Veins are reported to
inches to 15′ in width, traceable a mile long and to be proven
In one mine the ores carry 4% copper, 10% lead, 10% zinc and
copper ore occurring as chalcopyrite associated with pyrite,
ena in fluoritic gangue.
: by tunnels, 1,000 to 3,000′ long. A crosscut tunnel was
run through the group and to cut 3 veins. Equipped with 125
er at mine and 100-h. p. at mill. There are two 75-h. p. hoists,
ompressors, 10 air drills and 1 air electric drill; two 9 by 15″
3 Wilfley tables, etc.
up to 1918 estimated at 1,200,000 lb. copper.

NTAIN MINING CO. **COLORADO**

E. Cook, asst. sec., Chippewa Falls, Wis. **Mine office:**
county, Colo. W. F. Norway, pres.
05, in Colorado. **Cap.,** $1,200,000; shares $1 par. Annual
nber.
e Lily mine, 7 claims, 65 acres, in the Monarch district,
arfield and 19 miles from Salida. The property has a nearly
ntact vein, between granite and limestone, carrying lead and
howing copper ore which the management estimates to average
oz. silver per ton.
t: by a 280′ main shaft, with 4,000′ of workings.
includes electric power with 16-h. p. hoist and 35-h. p. air
ine house, smithy, carpenter shop. Shipped about 120 tons per
No later shipments reported, as company has not worked mines

GROUP **COLORADO**

. Wallace Gibb, lessee, Lawson, Colo., or 638 G. & E.
lo.
patented claims on Eastern end of Red Elephant Mountain,
silver, lead, copper and zinc in fissure veins in granite. Ore
urring in faults and assaying, according to manager's report,
oz. silver per ton.
t: by surface shafts 10′-50′ deep, 500′ tunnel and some
rospect class.

MILLING & LEASING CO. **COLORADO**

aho Springs, Colo.
n old mine with dumps estimated to contain 150,000 tons
silver-lead ore averaging $4 per ton.
he main tunnel was said to have cut 3½′ of 3 oz. gold and 7 oz.
om 3 to 12% copper. Manager Weber appeared, however, un-
ut development.
turns.

MOUNTAIN MINING CO. **COLORADO**

, supt., Chattanooga, via Silverton, Colo.
be developing the Telescope mine at Chattanooga, San Juan
ns started in fall of 1917, but owing to internal difficulties
holders and officials, mine was closed until April, 1918. The
roperty said to show ore that assays 50% lead, 8-10 oz. silver,
values. Shipping to Durango smelter.
includes compressor and power.

TENNESSEE MINING & MILLING CO. **COLORA**

Office: care J. W. Thayer, sec., 715 Belmont Ave., Chicago, Ill. **M**
office: Empire, Clear Creek county, Colo.

Officers: J. W. Loofbourow, pres.; S. B. Anderson, v. p.; J. F. Kid
treas., and H. J. Fersdick, directors; E. D. Payne, supt.

Inc. Feb. 11, 1911, in Colorado. **Cap.,** $400,000; $1 par; issued 294,
Annual meeting, August 13. Company is a reorganization of the Gold
Mining Co.

Property: 6 claims, 2 deeded, in the Colorado district 1¼ miles i
Colorado Southern Railroad. Claims have veins which show gold and si
ore with traces of copper. Property leased to Golden Empire Mining
which see.

Development: by 1,300′ of tunnels, a shaft and several drifts. Est
sive developments have been made and large shipments are predicted in
TEPEE MINING & DEVELOPMENT CO. **COLORA**

Letters returned in May, 1917, from Alamosa, Colo.

Officers: J. F. Reynolds, pres.-mgr.; C. L. Cunningham, v. p.; W.
Platt, sec.; B. P. Middleton, treas., with J. F. Reynolds, W. W. Platt, T.
Connoly, directors.

Inc. 1914, in Colorado. **Cap.,** $1,000,000; $1 par.

Property: 21 claims, about 400 acres, at Alamosa Forest Station, Fo
Reserve, Conejos county. Pay ore occurs in shoots in veins in diorite. V
vary from vertical to 45° dip, and from 8″ to 2′ in width, with strike N. E.-S
Ores are both oxidized and sulphide and contain gold-silver values.

Developed by 90′ shaft worked by windlass. It was proposed to cut
by tunnel 1,500′ long. No recent reports obtainable.

TERRIBLE DUNDERBERG MINING & POWER CO. **COLORA**

Company liquidated; entire assets sold to the Denbigh Silver Lead Mi
Co., which see.

THIRD VENTURE MINING CO. **COLORA**

W. A. Palmer, pres.-mgr., Leadville, Lake county, Colo. Company ha
lease on the St. Louis mine, which has a vein with complex sulphide ores carry
copper-lead-zinc with gold and silver.

Development: by 1,450′ tunnel.

Equipment: electric, with air compressor. Shipments reported to h
been 25 tons a day during 1915. No recent reports received. Probably dead.

TOMBOY GOLD MINES CO., LTD. **COLORA**

Under management of Exploration Co., Ltd., of London.

Office: T. D. Pillans, sec., 24 Lombard St., London, E. C. 3, Engla
61 Broadway, New York; D. A. Herron, gen. mgr., Telluride, Colorado.

Officers: Lord A. Butler, chairman; Marquis d'Hautpoul and I. H.
Shaw, directors. P. L. Foster and R. M. Raymond, cons. engrs.; W. K. Be
metallurgical adviser, and J. S. Peterson, asst. mgr.

Inc. June 7, 1899, in England. **Cap.,** £350,000; shares £1 par; 310
issued.

Financial statement, years ending June 20:

Year	Revenue	Profit	Dividends	Previous Balance	Ba Fore
1919.....	$861,700	$67,000	.....	$168,000	
1918.....	1,131,267	287,843	111,000	149,000	15
1917.....	1,180,000	346,000	149,000	94,560	14
1916.....	1,120,320	369,200	149,000	99,760	9

Dividends: since 1899, to June, 1918, total is 55/6 ($13.2) per
equal to 277%.

Property: included, July, 1915, 76 claims
Original holdings were
Co. of W. Va.
Later the co
northern
property

ed an interest in the Carbonero mine at Ophir, San Miguel

ie veins in the Telluride district are filled fissures, 2½′ to
ger lodes sometimes appearing as a number of parallel plates
eparated by sheets of altered rock. Country rock is andesite,
Juan tuff, with underlying sedimentaries in which the existence
not been proven. Principal metallic minerals are gold, pyrite,
nde, and chalcopyrite. Ores contain 2 to 3% sulphides, and
gold and a few ounces of silver per ton. For geology of the
S. G. S. Geologic Folio No. 57; also Lindgren's "Mineral De-

it: the Tomboy and Montana properties to 2,400′ depth, and
to 2,200′. In the Argentine lower levels is a large quantity of
ore containing zinc, lead and copper, which will be profitable
e Montana mine is opened longitudinally by the Ophir or 1,750′
eyond the boundary. In the year 1918, 568′ of new work was
gentine mine, opening a 5′ vein for 359′ on the 1,900′ level,
gold and silver, 4.5% lead, 6.89% zinc, and 0.8% copper; and
2,100′ level, 4.2′ of ore running $2.83 gold and silver, 2.13%
and 0.95% copper ore. Reserves are estimated at 200,000 tons.
mine, the reserves aggregate 300,000 tons, and new work on
in disclosed 3′ of ore for a length of 900′, that averaged $9 in
A parallel vein, opened for 200′, shows 4′ of $12 silver and

electric power, 80-stamp mill, concentrators, cyanide plant,
nt erected in 1919, capable of treating up to 450 tons daily. The
ers the complex ore in the mine available for treatment. Its
being paid for out of current profits.

years ending June 30:

	Tons	Yield	Cost Per Ton
.....	155,334	$864,699	$5.03
.....	151,028	$1,135,389	$5.58
.....	148,939	1,150,611	5.40
.....	150,488	1,074,088	4.92

on recovers 27%; concentration, 58%; and cyanidation, 15% of

still a good future, especially now that flotation will permit the
be treated.

LACERS CO. **COLORADO**

y the Tonopah Mining Co., Tonopah, Nev.
litt Bldg., Philadelphia, Pa. **Operating office:** Breckenridge,

0,000; $1 par. Notes outstanding, $112,000. Balance sheet
918, showed assets totaling $1,228,110, of which $883,280 was for
91,881 for dredges. Current assets were $152,948, and liabilities,
7 total assets were $1,355,627, of which property was $953,159,
7, current assets, $172,410, current liabilities, $80,001.
1918 was $282,974, and expenditures, $332,902. Other income,
9,923, less depreciation on property and plant, $99,818 making a
Surplus, 1917, was $219,525, making surplus December 31,

lacer deposit near Breckenridge, on which 3 dredges operate
each year.
in 1918 was 13,565 oz. gold, and 3,345 oz. silver from
of gravel. The average value per yard was 8.6c. During 1917
51,821 cu. yds., producing $451,743 at cost of 7.6c per yard.

ISOLIDATED MINING CO. **COLORADO**

ly dead.
Gilpin County, Colo.

Officers: at last accounts, Henry P. Lowe, pres., treas. and ge C. A. West, sec., with Sir Chas. Allen, Arthur Firth and M. A. Lowe, d

Inc. July 30, 1909, in Colorado, as successor of Topeka Min **Cap.**, $1,000,000; $5 par; fully issued. Annual meeting, June 30.

Property: 7 claims, patented, 16.46 acres, in the Russell district, schists and metamorphic gneiss, cut by 3 veins with N.-E. strike and dip One vein of 4' average width, traceable 1,300', carries chalcopyrite and sp estimated to average 0.5% copper, 2% zinc, 2 oz. silver and $10 gold per

Development: by 1,500' shaft, with a second 510' shaft and a 11,640' of workings, estimated to show 50,000 tons of ore. The mi discovered 1862, and worked at intervals.

Finally closed down again in 1914, leaving workingmen unpaid.

TORONTO MINING CO. COLO

Office: 420 Century Bldg., Denver, Colo.

Officers: G. W. Summers, pres.-treas.; Stephen Haskins, v. p.; Summers, sec.; J. J. Elliot, supt., with F. G. Elliot, directors.

Inc. 1918, in Colorado. **Cap.**, $100,000; $1 par.

Property: lease and option on Congress mine, a patented lode in Enterprise mining district, Gilpin county, two miles from Blackhawk lease expires March, 1921, and company can purchase the mine at any time then for $18,375. Vein is 3' to 60' wide, carrying iron and lead carbonat native silver and said to average about $3 per ton in gold.

Developed by 2 shafts, 350' deep and a new shaft, 50' deep in Januar Company reports about 600' of drifts and considerable stoping. Assays shaft were said to be about $2-$3 per ton in silver.

Equipment: includes a 60-h. p. hoist. Mine had been idle o years.

TUCKER MOUNTAIN M. & M. CO. COLO

Mail unclaimed in October, 1919, at 901 Foster Bldg., Denver, Colo. office: Kokomo, Colo.

Officers: G. P. Lingenfelter, pres.; S. H. Dunlop, v. p.-mgr.; Benzie, sec.-treas., with G. N. Quigley and F. A. Clarkson, directors.

Inc. Nov. 9, 1916, in Colorado. **Cap.**, $150,000; 10c par; 500,000

Property: the Washington and Hancock mines at Kokomo, S county, said to show a contact deposit in limestone, dipping 22° and stri W.-S. E. Ore is a sulphide of lead and zinc, with gold and silver, assay to $20 per ton.

Development: by 300' tunnel and 1,000' of workings. Shipme ported June, 1917. No later reports received.

TUNGSTEN EXPLORATION CO. COLO

Probably dead. Letters are returned unanswered from Lakewood.

Inc. April, 1916.

Officers: at last accounts, L. A. Ewing, pres.; Chas. Theob Theobald & Knuth, Cripple Creek, Colo.), v. p.; Dr. R. W. Bailey, treas. Tilborg, sec., with C. M. Webb, Norfolk, Va., G. C. Stumm and Clark G. directors.

Property: the Bradley tract, 200 acres, 1 mile E. of Lakewood cent to Primos Chemical Co.'s mines, the Cold Spring, Cross and Bonanza

TUNGSTEN GIRL CO. COLO

Probably dead as letters are returned from former address: 325 Bldg., Denver, Colo., and Ward, Boulder Co., Colo.

Officers: Joe Connors, pres.; S. T. Weller, v. p.; Dr. Osee W treas.; Hon. L. L. Harrington, sec.; above, with Kenneth Kennedy, Lafferty, Dorothy Weller and E. S. Conners, directors.

Inc. 1916, in Arizona. **Cap.**, $1,000,000; shares $1 par.

Property: the Blue Jay and Burnt Mountain groups, 3 mile Ward, adjoining holdings of the National Tungsten Co.

TUNGSTEN METALS CORPORATION COLO

Address: T. McSherry, supt., Boulder, Colo. W. W. Geo. Teal, mgrs.

916. **Cap.**, $550,000. Company took over property of the Co. and the Ferberite Co., including the **Red Sign, Red Sign** berite mines, and constructed a $50,000 mill in Boulder Canyon, m Boulder.

7, company acquired the Kekionga mine at **Magnolia, Boulder** was a gold producer but a footwall of the gold vein is the tungsten vein 6 to 8′ wide. Has 400′ shaft. Company plans anted by development.

IOUNTAIN MINES CO., THE **COLORADO**

ılder National Bank Bldg., Boulder, Colo. J. D. Maxwell,

G. Clark, pres.; Thomas Leeke, v. p.; F. N. Totman, sec.- Greenwood and L. W. Means, directors.

1916, in Colorado. **Cap.**, $1,250,000; $1 par; 1,049,500 issued. t of September 30, 1918, shows assets of $1,314,184, including nd equipment, $1,268,590; mine development, $34,456; notes 99; cash, $434. Liabilities include surplus, $63,429; accounts d capital stock, $1,250,000.

2 claims, 24 patented, 360 acres, in Grand Island district, contains tungsten deposits in veins.

nt: to depth of 300 to 800′ by shafts, and tunnels, latter 2,400′ started June, 1917. Lessees are reported producing steadily.

PRODUCTS CO. **COLORADO**

ılder, Colo.

. F. Bleecker, pres.; L. C. Schultz, treas.; W. G. Bleakley, Holmes, Jr., H. C. Morgan, Morgan Belmont, directors.

ngaged in manufacture of tungsten alloys. Closely associated Products Co., which see.

PRODUCTS MINING CO. **COLORADO**

William Block, Boulder, Colo.

. F. Bleecker, pres.-mgr.; R. D. George, v. p.; L. C. Schultz, oss, sec., with Harry Cassaday, directors.

lorado. **Cap.**, $2,500,000; par $1.

wns and operates Luckie 2 groups of mines, 112 acres, 9½ ılder, in Boulder Canyon, between Middle and North Boulder rages 2%-6% tungsten. The Luckie 2 and Lookout are the best

Mining company is distinct from the Tungsten Products Co., a oncern engaged in the production of various tungsten alloys; oducts Co. contracts to treat the Mining Company's ore at a e, and the Mining Company has an option to purchase control Products Co. at a reasonable price.

ING & MILLING CO. **COLORADO**

Quincy Bldg., Denver, Colo.

F. Stratton, pres.; T. Richardson, v. p.-treas.; G. K. Mann, Stratton and L. S. Wade, directors.

orado. **Cap.**, $100,000; $1 par.

claims in Turret mining district, Chaffee county, about 8 da.

ins occur in mica-schist that alternates with black gneiss, artz porphyry. Croppings of amphibolite carry fibrous asbestos ornblende. Average value of ore reported as, gold, $1.40, silver, $22 per ton. Company claims 25,000 to 50,000 tons in sight.

& EMPIRE MINING CO. **COLORADO**

uth & Empire Mining Co.

ank Brady, supt., Empire, Colo.

D. Pelletier, pres., 1123 Villard Ave., Superior, Wis. J. E. J. Borgstrom, sec.; O. G. Olson, treas., with H. R. Corey, Darrow, directors.

rado. **Cap.**, $500,000; $1 par; 200,000 issued, 100,000 for

property 100,000 for cash at par and 198,000 pooled. Bonds authorized $5[illegible] (for mill), convertible 1927; over $4,000 issued.

Property: 16 claims, 2 tunnelsites and 5-acre millsite, about 520 ac[illegible] in upper Union district, Clark Creek county, 8 miles W. of Idaho Springs. C[illegible] pany organized 9 years ago as a consolidation of 14 properties whose locat[illegible] high up on a mountain side, permit working by a tunnel.

Ore: gold and complex lead zinc pyrite, also galena in the Pelle[illegible] vein.

Development: main tunnel 2,900' with face 1,100' below surface, [illegible] poses 15 veins. There is also 1,100' of drifting (850' on Columbine vein al[illegible] The Columbine vein with average width of 5' carries ore assaying $2 to [illegible] per ton. A 500' tunnel, 600' above main tunnel, also exposes this vein. [illegible] Pelletier vein developed by 190' tunnel, will be cut by new tunnel 3,400' f[illegible] portal, and 1,500' below existing workings.

Equipment: tramway, 60-h. p. hoist, air-compressor and drill.

Ore reserves: President Pelletier estimated 2,000,000 tons of ore [illegible] 10 years' supply blocked out for 50-ton mill. Existing underground work[illegible] are, not, in our opinion, sufficient to warrant this optimistic estimates even [illegible] the figure given be confirmed by further development.

UNITED LEAD CO. COLORA[illegible]

Controlled since 1906 by the National Lead Co., which see.

U. S. GOLD CORPORATION COLORA[illegible]

Address: Boulder, Colo.

Officers: N. P. Garretson, Topeka, Kan., pres.; J. R. Wolfe, v. p. [illegible] gen. mgr.; W. T. McGinnis, sec.-treas.; J. W. Middlesworth, J. H. Ho[illegible] F. E. Campbell and C. N. Watts, directors. T. J. Benjovsky, mine supt.

Inc. 1903, in Colorado. **Cap.**, $3,500,000; $1 par; 3,271,062 outstan[illegible] Dec., 1917.

Property: the Klondike group, 225 acres, patented. Sphinx group [illegible] mining claims in Boulder county, and Livingston group, 50 acres. Company [illegible] owns 50,000 shares, or entire capital stock of the U. S. Reduction Co., w[illegible] owns the mill. Chims show fissure veins in porphyry, carrying gold [illegible] Widths, 3'-15' in different workings; mill feed varies from $4 to $12 per [illegible]

In July, 1917, company started exploring for the old No. 1 oreshoot in [illegible] Livingston claim, which is said to have yielded $300,000 years ago.

Production: 34 tons of ore were shipped, 1915, to Denver smelt[illegible] which neted $1,414. Company reported April 10, 1916, bullion to the amou[illegible] $15,086 shipped to U. S. Mint, Denver, and that 7 tons ore shipped to De[illegible] smelter Feb. 9, yielded $1,974. Mill was treating up to 100 tons daily at en[illegible] 1916. During 1917 the yield was about $75,000 from 15,000 tons of ore. W[illegible] was slowed down during the war, and company made arrangements to s[illegible] Klondike group above Nederland. In Nov., 1919, it was stated that all [illegible] was limited to leasing, but when conditions are more favorable treatme[illegible] the large low-grade orebodies will be considered.

After 13 years of intermittent development, and lurid advertising, [illegible] pany started producing. The corporation is not looked upon favorably, and [illegible] vestors are advised to take company statements with a grain of salt.

UNITED STATES ZINC CO. COLORA[illegible]

All stock owned by the A. S. & R. Co., which see. Plant at Pueblo, C[illegible] has 2,330 retorts. Plant was operated at greatly reduced capacity in 1919.

UNIVERSAL ORE PRODUCTION SYNDICATE COLORA[illegible]

Office: Central City, Colo.

Property: the Homer mine in Central City hill, Central City, [illegible] county, said to show an 18" streak of ore on the 300' level assaying 2[illegible] gold, 6 oz. silver and 14.7% lead per ton.

Developed [illegible] Plan to [illegible] an additional 100' and [illegible] a large boiler [illegible]

U. P. R. M[illegible] COLORA[illegible]

tor. Mines have vein with gold and silver-bearing copper ores, 00' shaft, equipped with steam hoist and air compressor. Mill Fuller, McCulloch Co., which see.

NG & MILLING CO. **COLORADO**

C. A. Knabe, mgr., Ward, Colo.

00.

eopening property in 1917, which had been idle for years due to npany plans mill and aerial tramway.

ING CO. **COLORADO**

of Vanadium Alloys Steel Co., Latrobe, Pa. J. A. McKenna, onklin, v. p. and gen. mgr., Voegtle Bldg., Boulder, Colo.

roperty in the Nederland district in 1915, and remodeled the concentration of tungsten ores which are both mined and pur- ferberite occurring in veins in pegmatite or granite, containing WO_3, and averaging 10%.

includes 15 operating mines, shipping 8-10 tons concentrates

ment: crusher, rolls to ¼", trommel, jigs, stamps for jig for jig hutches and battery pulp, Card and Wilfley tables, Monell eister slime tables, and rag tables. Three mills have been built.

INING CO. **COLORADO**

L. Fleming, 50 Broad St., New York.

e: A. G. deGolyer, mgr., Ironton, Colo.

W. L. Fleming, pres.; N. L. Young, sec.-treas., with W. P. Golyer, W. S. Roberts and H. W. Hubbs, directors.

1916, in Delaware. **Cap.**, $1,000,000; $1 par; all outstanding; o syndicate subscribers. Security Reg. and Transfer Co., transfer

eet for year ended Dec., 1917, showed receipts totaling $140,266, from sale of shares. There was spent at the mine $86,418, at mill laneous $2,873, leaving $26,850 cash on hand.

21 claims, 2 patented, 475 acres, located at timber line ie Red Mountain mining district of Western Colorado, about 7 Ouray, Ouray county. There are four main veins, the South onda, Mogul, and Indian Chief. Ore developed above water in verages 10 oz. silver, 1.75% copper and small amounts of gold. kota vein has a shoot 175' long by 5' opening to a width of 20' in he tunnel level where the ore averaged 12% copper, 44 oz. silver, on in gold.

ent: on the South Dakota vein is an incline shaft, 450' to serves are estimated as worth $200,000.

t: includes machine-drills, electric hoist, compressor and A recovery of 85 to 95% has been made at this mill. Practically ace plant was burned in July, 1919, causing a loss of $100,000. meritorious, and management good.

MINING CO. **COLORADO**

Main St., Brockton, Mass., and Salina, Colo. **Mine office:** d, Wall Street, Boulder, Colo.

W. S. Garland, pres.-treas.; John Buchanan, v. p.; F. Allen, Alderson, mgr.

in Colorado. **Cap.**, $500,000; $1 par; 200 000 outstanding; of stock held in treasury for conversion of bonds. Funded debt k listed on Boston Curb.

5 patented lode claims, about 19.469 acres, at Summerville ing district, Boulder county, has fissure veins in granite showing inc, copper and a little lead.

ent: 470' shaft. Property examined by Victor C. Alderson, , and Arthur Hookins. By Nov., 1919, a rich shoot of silver ore ed for 100' along the 400' level, the last carload assaying 102 oz.

VINDICATOR MINES & TUNNEL CO. COLO

Property near Idaho Springs, Colo., formerly operated under lease Standard Leasing Co., financed by Casper, Wyo., and San Francisco c Mine said to carry the Tom Tuck vein, 6' wide, with porphyry hang Reported taken over in 1918 by Western Tunnel Mining Corporation, w

VULCAN MINES & SMELTER CO. COLO

Mail returned unclaimed, March, 1918, from 302 Century Bldg., Colo. C. H. Mace, supt., Iola, Colo.

Officers: at last accounts, Robt. G. Ainsworth, pres.; C. H. Ma Chas. P. Mety, sec.-treas., with W. W. Mace, Geo. E. Bermont, John R. and F. J. Greenwald, directors.

Inc. Nov. 3, 1915, in Colorado. **Cap.**, $100,000; $1 par; 75,00 Stock transferred at company's office. Annual meeting in November.

Property: 9 patented claims, 95 acres, in Domingo mining Gunnison county, said to show gold-silver-copper ore in fissure veins. sulphide occurring in sericitic schist. The orebody strikes E.-W. N. 80°. Old workings and dumps said to have a considerable tonnag averaging 1 oz. gold, 4 oz. silver, and 2½% copper.

Development: by 700' vertical shaft with 5,000' of workings.

Equipment: includes steam power, hoist, and 50-ton hot blas matting furnace. Mine credited with production of $200,000 under form ership. No recent reports.

WANAKAH MINING CO. COLO

Ouray, Colo.

Property sold at Sheriff's sale during 1916. Mine now owned b Diamond Mining & Milling Co., which see.

WARD GOLD COIN MINING CO. COLO

J. F. Weber, mgr., Ward, Colo.

Reported, 1919, to have purchased the Ward Gold Coin mine gro mill-sites, near Modoc Lake, Ward, Boulder county. Mine is said to vein 5-15' wide carrying iron-gold-silver-lead sulphides. Developed shaft.

WARD MINING & MILLING CO. COLO

Office: 215 Coronado Bldg., Denver, Colo.

Inc. in Colorado. **Cap.**, 2,000,000 shares, par 1 cent.

Property: 14 claims, Pine mining district, Gilpin county, open 150' shaft and 100' of drifts. Ore claimed to have assayed over $100

WASATCH COLORADO MINING CO. COLO

W. A. Franklin, mgr., Georgetown, Colo.

Operating the Mendota mine at Silver Plume, Clear Creek county. ore is concentrated at company mill; zinc is shipped to local smelt A large mill was to be erected in 1919, and the smaller plants reserve of lessees and custom business.

WASHINGTON MINE COLO

Ray Meyers, mgr., Breckenridge, Colo. And old-time property o Hill, near Breckenridge, Summit county, operated under lease. Ore t 20-stamp mill, and silver, lead and gold concentrates shipped. A new Christmas, was down 50' early in 1919, and a sample of ore from t was said to have returned $67 per ton. Examined by V. C. Alderson.

WELLER GOLD MINING CO. COLO

Idle.

J. C. Weller, mgr., Telluride, Colo. Operated the Ballard mine luride, San Miguel county, Colo. Last reports received were in 19 company was reported shipping bullion twice a month.

Equipment: included pipe-line, tramway, 10-stamp mill 6ft plates and concentrating tables.

WELLINGTON MINES CO. OF COLORADO COLO

Office: 1000 Grand Avenue Temple, Kansas City, Mo. **Min** Breckenridge, Colo.

Officers: [illegible] Clifford Hisgen, v. p.; C. Charl

H. Harless, W. B. Burget, directors. R. M. Henderson,

1906, in Arizona. Cap., $10,000,000; $1 par; all outstand-
ice in Kansas City, transfer office and registrar. Annual meet-
in June. The company organized in Arizona was only a
property being operated by the Wellington Mines Co. of
had a capital of $50,000. To reduce taxation the former
the present company reorganized Jan. 16, 1917, with a capital
es $1 par. Company has over 5,000 shareholders.
918 totaled $735,640, of which concentrates yielded $724,926.
unted to $349,322. Cash on hand Nov. 30, 1918, $407,984.
915, $300,000; 1916, $600,000; 1917, $400,000; 1918, $200,000,
$100,000. The total is $1,950,000.
patented claims, 75 acres, at Breckenridge, is said to
c sulphide ore in a fissure vein in diorite; dip 60° S.; strike
re occurs in shoots and is said to give average assays of 3%
% iron, 15 oz. silver.
1917, the Dives-Pelican claims at Silver Plume were acquired.
: by one vertical and incline shaft and several tunnels,
reatest depth of workings, 1,000′; total linear extent several
mined by stulling method. In 1918, 3,340′ of work was done.
s confined to the Great Northern vein, a total of 40,242 tons
e Wellington vein was opened on the 6th level 500′ west of
on for 500′. Good-grade ore was reported. The company
e Siam vein, and if workers are available, other veins during

ncludes double-drum electric hoist, 500 cu. ft. compressor
way, all electrically driven. There are two mills, a concen-
for roasting and magnetic separation, with a capacity of 2,000
uring 1918, the transformer capacity was doubled and an
ip ore shaft for the developing of the Siam vein was purchased.
n 1918, 39,295 tons of ore carrying 25% zinc was crushed
oduced 16,631 tons of 49.6% zinc concentrates and 184 tons of
assaying 25.7 oz. silver and 36% lead; 2,681 tons of iron tail-
ill was shipped to the smelter. There was 947 tons of 45.7%
ct to smelter.
ines is now a highly profitable concern, handling a complex
ry manner.

MINES CO. **COLORADO**

stcliffe, Custer county, Colo.
ado. Cap., $500,000; $1 par.
) acres in the Westcliffe district, near the Black Friday,
ther mines.
: by 5 shafts from 20 to 57′ deep, said to show "remark-
ore."
nched about mid-1919.

VELOPMENT CO. **COLORADO**

men's Bank Bldg., St. Louis, Mo., and 129 W. 8th St.,

J. Walker, pres.; E. T. Cash, v. p.; W. H. Mann, sec.;
with W. M. Edinger, directors.
913, in Maine. Cap., $2,250,000 common and $750,000 pre-
ll the common and $500,000 preferred is outstanding March
aid amount to $100,000.
company, its principal assets consisting of the entire capital
Town Mines Co. of Leadville, Colo., which see.

PE COPPER MG. & SM. CO. **COLORADO**

rated in Unaweep district, Colo. Out of business, bond-
over property. For description, see Vol. XII.

WESTERN TUNNEL MINING CORPORATION COLO

J. H. Marshall, mgr., Idaho Springs, Colo.

Reported, late in 1918, to have taken over the property of the V Mines and Tunnel Co. of Idaho Springs, Colo., which see.

Plan to add a new compressor and a flotation unit to the mill. believed financed by Cleveland capital, which is to spend $200,000, st spring of 1920.

WEST SIDE MINING CO. COLO

Georgetown, Colo.

Reported early in 1919, to be driving the Hall tunnel now 3,000' lon same time drifting on the lodes cut by it.

Equipment: includes 24" track with 40 pound rails and a 4" air stalled to the heading.

WHITE RAVEN MINES COLO

Address: L. A. Ewing & Co., owners, Ward, Colo

Property: the White Raven mine and Rook mine, in Boulder The White, though located on the edge of the gold sulphide belt produc and high-grade lead. The Rook mine, located a mile S. W. of Puzzler is a new silver-lead property.

Development: at White Raven, the drifts and crosscuts have extended that 5 distinct reserve ore shoots have been blocked out, not i the main chimney which has been worked out from tunnel level to ap down to the 900' level. The Rook is developed by a 200' shaft and som opening a vein 7 to 10' wide.

Equipment. a concentration plant was reported in course of co tion in 1919.

WIDE WEST MINING CO. COLO

Address: Joseph Terry, Silver Plume, Colo.

Operating 30 claims on Leavenworth Mountain between Georgeto Silver Plume. Tunnel 2,700 long, is to be driven an additional 500' to veins of the Wide West group.

Equipment: includes compressor and electric power.

WIN-U-WILL M. & M. CO. COLO

Address: 807 Central Savings Bank Bldg., Denver, Colo.

Officers: A. M. Beam, pres.; J. A. Beam, sec.; L. J. Beam, ass Frank Potts, treas.

Inc. July 30, 1917, in Colorado. **Cap.,** $50,000; $1 par.

Property: about 10 claims at Ward, Boulder county, includ Little Giant.

Development: by a 900' shaft and 1,400' of driving. No stop been done below 100'.

WOLF TONGUE MINING & MILLING CO. COLO

Office: 1541 Oliver Bldg., Pittsburgh, Pa., or 1137 Pearl St., B

Mine and mill office: Nederland, Colo. William Loach, gen. mgr. Todd, supt.

Property: about 600 acres, including the Cold Spring and other in the 75-acre Beaver group, a mile south of Nederland, and the Clyde the Ranch group, 3 miles N. E. The Cold Spring mine is leased to Geo. R and others.

Ore: the principal ore mineral is ferberite, iron tungstate, occur veins in granite or pegmatite. Orebodies are commonly in the form o lenses a few feet in length. The Cold Spring mine has a vein showi face of ore with 12" ore streak containing 57% tungstic acid in a sh long on the 300' level. Twelve men were reported working in 1919. description of tungsten ores see Bull. 583 of U. S. Geol. Sur Hess & Sch Bull. 652 by F. L. Hess, 1917.

The gr the mining is done by lessees who are paid fo sorting and by the compa mill; the company rece

ore cars, etc., and loans money for development when d. Company operates its own 50-ton mill.

MINE **COLORADO**

Cotten, Boulder, Colo. J. W. Pherson, mgr., Crisman, via ked by lessees.

Loaf Mountain, above Crisman, Boulder county. Develop- d 5 miles of workings. Reported to have been a big silver

GILPIN MINING CO. **COLORADO**

honing Bank Bldg., Youngstown, Ohio.

Lynn, pres.; Geo. Rudge, Jr., v. p.; H. B. Lynn, sec.; .; Geo. E. Collins, mgr.

olorado. **Cap.**, $1,500,000; $1 par. Transfer office, 120 own, Ohio.

tented claims, about 5 acres, on Quartz hill, Gilpin gold, silver and copper in quartz vein and patch deposits. by 700' shaft and 600' tunnel. **Equipment:** includes a p. hoist.

COLORADO

r lease, early in 1918 by J. Anderson and E. Jackson.

Anvil Mountain near Silverton, San Juan county. The ey deposits and contains gold, silver and copper. Property years though said to have been a large silver producer.

CRIPPLE CREEK DISTRICT

MINING CO. **COLORADO**

ns Bldg., Colorado Springs, Colo., **Mine office:** Cripple ckenzie, pres.; J. Yeomans, sec.-treas.

); 5 cts. par; outstanding, Jan. 1, 1916, 61,011 shares. Jan., 1919, $1,460,321. Cash and securities on hand, Jan. 1, bilities. Annual meeting in January.

January, 1920, $136,703; last dividend, December, 1912,

Burns and Morning Star claims, patented, 20 acres, on ek. Developed by a 425' shaft with over 2,000' of work, on nd 3 shafts on the Burns claim, one a double compartment ' and a mile of underground workings. Shipping ore on about $15 per ton. A second shaft, 350' deep, has 3,390' ird, 825' deep, has 3,600' of drifting. Operations have been t of high costs, but shipments resumed in Sept., 1919. Parts ed. During 1918, about 700' of development work was done.

NING CO. **COLORADO**

ax Mining Co.

N GOLD MINING CO. **COLORADO**

Creek, Colo.

t accounts, Frank Vetter, pres.-treas.-gen. mgr.; F. W. R. Dunn, sec., with Wm. Y. Seaman, D. W. Kilpatrick and ectors.

in Colorado. **Cap.**, $250,000; 10 cts. par; 1,602,825 shares 0, 1917. Annual report for 9 months, ending Jan., 1917, from ore shipments and stock sales, $11,596; expenditures amounted to $10,577.

3-year bond and lease to purchase the Prince Albert mine, hase for $50,000; all royalties paid on ore shipments during apply on the purchase price.

Prince Albert, Beacon and Eureka claims, 26.42 acres, hill, Cripple Creek, Teller county, credited with a past pro- 0. Company's literature closely resembled that of a stock- eported merged, May, 1917, with Gold Camp Syndicate, and ning Co., which see. No 1918 report received.

ALOHA GOLD MINING CO. COLO

Property: the Coriolanus mine on Battle mountain, Cripple Colo., adjoins Colburn-Ajax Mining Co. on the north.

Ore: gold ocurs in footwall of intrusive dike, phonolitic in ch

See Colburn-Ajax Mining Co.

ANCHORIA LELAND M. & M. CO. COLO

Address: Cripple Creek, Colo.

Inc. about 23 years ago. **Cap.,** $600,000; $1 par. Irving Howbert cipal stockholder; Chas. Howbert, mgr.

Property: Anchoria mine on Gold hill, Cripple Creek, is one old-time producers and dividend payers. In 1914 the company had a $30,000, due to attempts made in recent years to open up new orebodie mine had been worked down to the barren zone, reaching from a depth to 1,000', the lowest development. No recent returns secured.

BACKOFF LEASING CO. COLO

Office: St. Louis, Mo.

Company operates the Midget and Bonanza King mines of the Consolidated Gold Mining Co., in Gold Hill, Cripple Creek, Teller county, was suspended on December 15, 1917, but resumed in February, 1919. sets of sub-lessees reported at work.

BANNER GOLD MNG. CO. COLO

Address: 317 Exchange National Bank Bldg., Colorado Springs

Officers: J. T. Hawkins, pres.; J. R. McKinnie, v. p.; E. C. Shar treas.; A. D. Aitken, asst. sec.-treas.

Cap., $2,000,000; $1 par. Treasurer's statement, Jan 1, 1916, 11,000 shares in treasury, and $185 cash on hand. At last accounts tas to 1915; liabilities, $490. Last stockholders' meeting June, 1903. Lis Denver and Colorado Springs Exchanges.

Property: 7 claims, patented, 68 acres, on Beacon hill, Cripple show 3' fissure vein, containing gold and silver, and the C. K. & N. wide where cut.

Development: 90', 110' and 400' shafts, with prospecting on 3 Worked through the 700' level on the Henry Adney shaft on adjoining p Latest reports give the gross production to 1916 as $8,149.

BEACON MINES CO. COLO

Address: J. S. Anderson, supt., Cripple Creek, Colo.

Property: company has a lease on part of the El Paso Ex ground, and in August, 1919, found a rich shoot of gold ore on the 40 The deposit has been opened for 300', and shipments have realized $200

BERTHA B. MINE COLO

Property was reported sold, May, 1919, to the Blue Flag Gold Min which see. Mine is on Raven hill, Cripple Creek, adjoining the Blue F the Cresson Consolidated Gold Mining Co.'s claims.

BIG THOMPSON MINE COLO

Formerly worked by L. G. Carlton and I. T. Russell, Elkton, C Chapman, lessee of the Elkton Consolidated M. & M. Co., is now repo operator.

Property: the Big Thompson mine, an old-time producer, near Teller county. Ore occurs in vein 15 to 25' wide, reported to average ton; mined by stoping. See Elkton Consol. Mining & Milling Co., in this

BLUE FLAG GOLD MINING CO. COLO

Office: 703 Exchange Bldg., Denver, Colo.

Officers: J. F. Erisman, pres. and gen. mgr.; Jos. S. Pugall, v. p.; Gunnell, sec.-treas.; W. B. Warren, asst. sec.-treas.; A. R. Ulrich, D. A. S J. M. Burkhart, R. S. Burns, J. A. Dingwall, directors. Company is a clo poration.

Inc. in Colorado. **Cap.,** $3,000,000.

Balance sheet of July 31, 1919, showed current assets of $30,695, a liabilities of $188,473. The profit and loss account, with a total loss of $ brought forward, was increased to $424,111.

lue Flag mine on Raven hill, Cripple Creek; the Laurium idge; also holdings in the Harshaw mining district, Ariz.; placer in Idaho, and at Ballarat, Calif. Reported in May, had purchased the Bertha B and the Rattler lodes, comprising Raven hill, Cripple Creek.

g main shaft is 1,250′ deep; management planned general urther sinking to connect with the Moffat tunnel at depth of a drift will be continued to the Scott shaft of the War Eagle ls the tunnel. This will perfect ventilation and make a public el. The Blue Flag has a 150-ton cyanide mill.

group is developed by tunnels, one over 1,800′ long. Ore car- ad and zinc. Property is equipped with 100-ton mill, operated n after a short campaign. In September, 1919, the workings out preparatory to resuming development.

ES & MILLING CO. **COLORADO**

ado Springs. **Mine:** Cripple Creek, Colo.
Johnson, W. J. Shinn, R. C. Argo, of Colorado Springs.
ado. **Cap.,** $50,000.

s was operating property of the Blue Bird Gold Mining & l hill, Cripple Creek, developed by the Blue Bird shaft, down

NING, LEASING & POWER CO. **COLORADO**

. Gunnison county, Colo.
R. L. Dougherty, pres.; F. E. Gilbert, v. p.; C. Gilbert, , treas.

t, 1914, to operate the Camp Bird mine, located between ian. The mine is said to have produced high-grade gold ore. t accounts was sinking a shaft with intention of crosscutting workings at a depth of 230′.

f the Rose Nicol Gold Mining Co., on the northwestern slope , at Cripple Creek, was reported leased to the Camp Bird Mg. Co., for a six-year term starting Jan., 1917. Company refused iblication.

NING CO. **COLORADO**

oration, E. M. Rabb, supt. Operating under bond and lease, property on Bull hill, Cripple Creek, Colo.
by 2,000′ shaft. Orebodies are 250′ long and 4 to 8′ rted to average better than $20 per ton.

OLD MINING CO. **COLORADO**

Bull Hill, Victor, Teller county, Colo.
Street, pres.; H. C. Eddy, v. p.; John A. Gallagher, sec.- rding and W. Bigby, directors, all of Chicago, Ill. Chas. or, Colo.

reported to have taken a 5-year bond and lease in 1917 on ne, adjoining the Modoc, in the Cripple Creek district. ements said to have been completed by which the Modoc Cons. perate the Last Dollar mine, but no confirmation was obtain-

brick and stone shaft-house was erected, and an electric d installed in 1918.

ING CO. **COLORADO**

ple Creek, Colo. G. A. Macdermid, gen. mgr.; H. Chris-

C. K. & N. mine, 5.3 acres, on Beacon hill, Cripple 3 to 4′ wide. Ore occurs in shoots, and is said to average ton.
by 860′ shaft.
t last reports amounted to about 550 tons of ore monthly. sses was a steady producer for many years and is credited of over $1,350,000.

C. O. D. CONS. GOLD MINING & DEVELOPMENT CO. COLO

Address: Cripple Creek, Colo.

Officers: L. A. Van Tilborg, pres.; Claude Sachs, sec.-treas. Evans, supt.

Inc. 1915. **Cap.,** $200,000; shares 10 cts par.

Organized to operate the C. O. D. mine in Poverty Gulch, Cripple Teller county, which was one of the old-time producers, credited with an of $1,000,000 in gold. The mine was closed down years ago as a re drainage difficulties and was in litigation for a number of years. The E and Roosevelt drainage tunnels have since lowered the water level 1,(more below the lowest workings of the mine. The main 3-compartment v shaft was bottomed at 800', with the 10th level the lowest. The first c shipped in September, 1915.

Equipment: includes a 65-h. p. air compressor.

In Sept., 1918, a liberal leasing policy for the development of the mi reported decided on.

COLBURN-AJAX GOLD MINING CO. COLO

Address: 416 E. 10th Ave., Denver, Colo. **Mine address:** Victor

Reported Dec., 1916, to have bought the Ajax Gold Mining Co. for $

Officers: E. A. Colburn, pres.; Wm. Lennox, v. p.; B. L. Gorich treas., with E. A. Colburn, Jr., and C. H. Dudley, directors.

Cap., $500,000; $1 par; none outstanding.

Property: 11 claims patented, 33 acres, on southwest slope of Mountain, Cripple Creek mining district, show quartz fissure veins in phonolite, and basalt. Veins dip 72° S. W. with strike of N. 32° W. occurs as telluride. Lessees found good gold ore in the Ajax mine fr 400' to the 2,000' levels. The veins are from 2 to 4' wide, and the ore is p the extension of ore-shoots previously worked. Average grade of ore in 1917 was $18.64 per ton.

Development: is by means of the 2,000' Ajax shaft, with over 1 of underground workings.

Equipment: includes a steam hoist and 40-drill air-compressor. put to date said to total $5,000,000. Property operated by lessees, the M Metals Co., has a 5-year lease on the Ajax mine, from 1917, and the C Mining Co. was also reported working on the mine.

CONSOLIDATED MINES & REDUCTION CO. COLO

Office: 433 Century Bldg., Denver, Colo., **Mine office:** 412 E. I Ave., Cripple Creek, Colo.

Officers: P. A. Burns, pres.; R. A. Schwab, v. p.; John H. Gallu treas.; J. B. Conger, gen. mgr., with W. W. Oliver, directors.

Inc. March 10, 1916, in Colorado. **Cap.,** $1,200,000 common and $ preferred stock; $1 par.

Property: the Mary A and Ella W. claims on Tenderfoot Hill, Cripple Creek district; the Kittie Wells No. 2 mine and a millsite on Ca hill; the Buckhorn mine, adjoining the Kittie Wells on the east, and the foot Hill mine. The Ella W. developed to a depth of only about 85', o vein for 100' along the strike, said to be 20' wide and to assay $20 to $50

The Tenderfoot Hill property is said to show ore in vein 1' to 2 assaying $3.20 to $75 gold per ton.

Development: the 700' Tenderfoot tunnel with drifts and crosscu

Equipment: a 30-h. p. hoist and an 8-drill electric air compress

Production: claimed to have shipped 20 cars ore in first 3 w March, 1916. Planned building a 250-ton mill and cyanide plant, sin third shaft, extending the Tenderfoot tunnel an additional 700', and a 6-drill air compressor to the tunnel equipment. Company sent out much sive advertising and is evidently in the hands of the "promoter." No since July, 1916, are available.

CO-OPERATIVE MINING & LEASING CO. COLO

Officers: A. LaMontague, mgr., Cameron, Colo.; L. D. Taylo Colorado City, Colo.

last reports company was operating a lease on school adjoined the Isabella mine.
: 1,500′ of drifting on upper levels and 875′ shaft with . In the lower levels a stope 600′ long, 6′ to 8′ wide and 125′ to average $12 to $14 a ton, but could not be mined owing ompany had 200,000 tons of tailings said to run $3 per ton.

SOLIDATED GOLD M. & M. CO. COLORADO

xchange Nat'l Bank Bldg., Colorado Springs, Colo. **Mine** eek, Colo.
E. Carlton, pres.; C. K. Boettcher, v. p.; A. F. Zang, sec.; ., with S. Penrose, T. B. Burbridge, C. M. MacNeill, L. G. der, directors. A. L. Blomfield, gen. mgr.
04, in Colorado, with original capitalization of 1,000 000 ie. In 1907, corporate life renewed and capital increased to 1 par; of which 1,220,000 are issued. Listed on New York Springs Mining Exchange. Columbia Trust Co., New York, ares sold for $2 in Dec., 1919.
ed August 31, 1918, ore sales, etc., amounted to $1,651,683. 163,297; depreciation, $17,000; net profit was $1,188,386. For 1919 the net value of ore sold was $1,089,000, but dividends 4,000.
tal to Sept., 1919, $8,613,162. In 1916, 85%; 1917, 120%; aid 10c. per share monthly to September, 1919. In October, that "future distributions at the rate of 10 cents a share will e to time as the net proceeds of the mine will permit, in view mining conditions. . . . "
acres on Raven hill, Cripple Creek, was considered of 914, when a sensational discovery was made in a cave, 14′ by 33′ he 1,200′ level, whose walls were coated and lined with rich One shipment returned $468,637. The former owners divided half of 1915, and in July, 1916, sold property to the present $4,000,000.
: by a two-compartment shaft 1,600′ deep with interme- intervals. For the year to August 31, 1918, drifts, crosscuts, together with diamond-drilling 4,540′. In addition, 886′ were main shaft and the 1,603 orebodies with Roosevelt drainage-

: in Feb., 1919, Louis R. Noble reported net value of erves as $2,537,889. In August, the value was about $2,100,000. not, however, include a rich strike reported on the 10th level, ′ by 8½′, and assaying $40 per ton. High assays on this ran

for year ending Aug. 31, 1918, company shipped 89,730 t value of $1,628,188, after deducting freight and treatment production for that period aggregated 9,028 lb. of pure gold. 1,599 tons which gave royalty of $2,539. For period of August of 95,000 tons returned $1,089,000 net.
, 1919, had shrunk to $36,000, due partly to labor shortage, and grade of ore being mined. It would seem that unless new er rich pockets, profits will be greatly curtailed in the future. received very handsome returns on their investment, but the ed from $4 to $2 in 1919, discounting the mine's future.

EK DEEP LEASING CO. COLORADO

A close corporation, 50% of the stock being held by the n Gold Mining Co., a Nevada corporation, and the remainder g the Jerry Johnson mine. The Cripple Creek Deep Leasing the workings of the Jerry Johnson mine below the 650′ level. escribed under title of Jerry Johnson Gold Mining Co. The

lease ran from 1915 to 1918, when company claimed it was impossib lease at a profit during the war and forfeited same.

During 1918 shipments averaged $17 per ton. Information operations kept secret.

CRIPPLE CREEK DRAINAGE & TUNNEL CO. C

Colorado Springs, Colo.

Officers: A. E. Carlton, pres., with Irving T. Snyder, R. Ro Howbert, executive committee; Colo. Title & Trust Co., treas.; W. sec.; T. R. Countryman, engr.; C. H. Fuller, supt.

Cap., $1,000,000; $1 par.

Company drove and controls a drainage tunnel through properti Creek producers, from western slope of Grouse Mtn. toward the and Vindicator mines at the N. E. end.

The tunnel as originally driven had a length of about 14,300′, it is 9′ wide, 7′ high, with a ditch on one side, 2′ deep and 4′ wid 0.3%. Average cost per foot of tunnel was $27.27, the cost being the larger companies of the district. An extension financed in the was completed during 1918, giving the tunnel a total length of extension, a little over 7,700′ long, passes under the Golden Cycle cator mines, cutting latter at 1,950′ vertical depth.

In 1918 the water was flowing at an average rate of 3,000 gallon

CRIPPLE CREEK GENERAL MINING & EXPLORATION CO. C

Believed out of business. Mail returned, unclaimed, June, Cripple Creek, Colo.

Officers: at last accounts were Geo. S. Ryan, pres.; S. N. F with H. T. Hartman, E. A. Ritter and O. H. Nelson, directors. M sec.-treas.

Inc. in Colorado. **Cap.,** $200,000; shares 10 cts. par. Treasu shares.

Property: 5 claims, 25 acres, patented, on Bull, Raven a hills at Cripple Creek. Developed by a 300′ shaft, 3 shallow shafts all on the Katie Hollis claim. Reported merged, 1917, with the Mining Co., which see. No 1918 report obtainable.

CRIPPLE CREEK GOLD MINING CO. C

Address: Victor, Teller county, Colo. Company is a close Geo. Harris, mgr.; B. J. Corbett, supt.

Property: the Kohyneo mine at Victor, first worked abo ago, operated unsuccessfully for a time, closed down and again reop

Ore: shows gold-quartz ore in veins 18″ to 24″ wide, between black schist dike and granite country rock.

Development: 220′ shaft and drifts on the Strong vein, whi the property. Shaft was to be sunk an additional 300′. Two levels large bodies of fair grade ore, and a few shipments reported to $15 per ton.

Equipment: hoist, air compressor, electric compressor, a boiler. No recent information.

DANTE GOLD MINING CO. C

Office: 317 Exchange Bank Bldg., Colorado Springs.

Officers: L. L. Aitken, pres.; W. Arthur Perkins, v. p.; A. sec.; Thos. A. Dines, treas. E. P. Arthur, Jr., supt.

Inc. 1895, in Colorado. **Cap.,** $1,250,000; $1 par; all issued has no liabilities, and had $17,555 cash and $1,575 securities in the tre 1919. Stock listed on the Colorado Springs Mining Exchange. Cha Nov. 25, 1915, for 20 years.

Property: Dante mine, about 10 acres, patented, in Sec. 20 o Cripple Creek, is under 5-year lease from April, 1916, to the Big and Milling Co. Said to show gold ore averaging $20 per ton. a strike of ore assaying $25 per ton was reported cut on the 60 sub-lessee.

850′ shaft with 6,500′ of crosscuts and drifts, 520′ shaft
cuts and drifts.
-h. p. hoist, air compressor, complete machinery plant,
surface buildings. During 1918 a cyanide plant with a daily
tons was installed to treat low-grade ores.
gross) to Jan. 1, 1919, $1,213,136; gross production for
,758.

ES CO. **COLORADO**

larion, Ind. **Mine office:** Pitkin, Gunnison county, Colo.
Colorado. **Cap.,** $1,000,000; $1 par; 700,000 shares out-
neeting in August.
R. Wagoner, pres.; Edwin Caldwell, sec.; J. H. Deakin,
k, gen. mgr., all of Marion, Ind.
ode mining claims, 40 acres of placer ground and a mill-
k, a total of 198 acres, about 9 miles from Pitkin, Gunnison

in 1918 management reported that three tunnels, 650′,
respectively, had been driven on a vein showing ore said to
35% copper, $40 gold, 20% lead, and 20% zinc.

EASING CO. **COLORADO**

ictor, Teller county, Colo. Samuel Stumpff, mgr.
Deadwood mine, on Bull hill, Cripple Creek district, under
ted Gold Mines Co. In 1918, while following a drift from
toward the Victor-Pauper vein, company is reported to have
f sylvanite, assaying 30 oz. gold per ton.

MINING CO. **COLORADO**

ation controlled by Eastern capital.
Dexter mine, on Bull hill, Cripple Creek, under lease to
of Denver, and Anderson Bros., of Victor. Gold ore occurs
d proved for 175′.
by 1,300′ shaft, crosscuts and tunnel. Mine was a steady
al years. Average output amounted to 600 tons monthly,
n $10 to $30 per ton.
mpressor, power plant and surface buildings.
development to the 1,400′ level, but results of recent work
ved.

ING CO. **COLORADO**

Rondes, sec., Denham Bldg., Denver, Colo.
p., $150,000.
Alpha and Omega mines, on Gold hill, near Cripple
y.
a vein, 5′ wide on 200′ level, and is said to assay from
gold. Surface work said to show a number of veins con-
re.
by 270′ shaft on line between the two claims. Mine is
l by the Roosevelt tunnel.
cludes hoist and air compressor.
ed to be shut down early in 1919, but was to reopen in latter

POT MINING CO. **COLORADO**

Nat'l Bank Bldg., Cheyenne, Wyo., and Cripple Creek,

Carlton, pres.; V. H. Mann, sec.-treas.; L. G. Carlton,
hepherd, Ira Harris, A. M. Stephenson, directors.
1905, in Wyoming. **Cap.,** $75,000; shares 2½c. par;
; non-assessable. Colorado Title & Trust Co., Colorado
gents. Annual meeting second Wednesday in June. Listed
gs and Denver. Balance sheet Jan. 1, 1918, shows cash
eceivable $566. No liabilities.
18 amounted to $3,579, expenses $13,500, depreciation, etc.,

$331; total loss for year $10,252. Company reported affairs inactive. Company furnished air and supplies to lessees. Unable to secure le latter part of the year.

Dividends: to Jan. 1, 1919, $143,264; last dividend, $30,000, p 1916.

Property: 15 claims, 99.3 acres, patented, on Raven hill, Cripp said to show gold ore in fissure veins. Three fractional claims were at a cost of about $5,000, in 1916.

Development: tunnels and vertical shafts, amounting to seve of underground workings with deepest at 900'. The Raven tunne 3,000' long. A total of 577' of work was done in 1916 without devel ore.

Equipment: includes a 52 h. p. electric hoist and air compress tric power is used. A tramway was erected in 1918 to the Ingham d

Production: in 1918, leases produced 524 dry tons of ore w value of $6,025, netting company $1,129. In 1916 the output was 15,2 $7.47 ore. The total output of this mine, 1903-1919, is about $2,850,00

EAGLE ORE CO. COL

Operates ore sampling plant at Victor, Colo. A. W. Oliver, gen.

ECLIPSE LEASING CO. COL

Address: F. R. Marsh, pres.; Colorado Springs, Colo.

Inc. 1917, to operate a five-year lease on the Jo Dandy mine hill, Cripple Creek. No recent information received.

ELKTON CONSOLIDATED M. & M. CO. COL

Address: P. O. Box 146, Colorado Springs, and Cripple Creek,

Officers: George Bernard, pres.; A. E. Carlton, v. p., with M. C. G. Kingsbury, C. B. Ferrin, D. C. Goddard, and E. P. Shove, direc M. Ragle, sec.-treas.; R. P. Windsor, supt., at last accounts.

Inc. 1892, in Colorado; extended 1912 for 20 years. **Cap.** $3,0 par; 383,116 shares in treasury. Annual meeting in February. Listed rado Springs and Denver Exchanges. Company is one of the olde Cripple Creek district.

Balance sheet as of Dec. 31, 1918, shows: assets, $3,406,326, which property and plant, $2,649,158; treasury stock, $383,116; Cripple Creek & Tunnel Co., $98,300; cash, $1,352; accounts receivable, $2,224. Cu bilities were $21,333.

Earnings from ore sales amounted to $36,217; miscellaneous $10,103. Expenses were $52,006, making loss from operations 191 Depletion of mine, $36,217 less treasury stock sold, $2,400. Earnings were $283,050.

Dividends: to Jan. 1, 1919, were $3,579,460; the last dividend p 24, 1915, was $50,000; previous to this date the rate had been 2c. a share

Property: the Elkton group, 93½ acres, patented, on Raven Cripple Creek district. Company holds the Arequa lease on the proper Raven & Beacon Hill Gold Mining Co.

Ore: is a sulpho-telluride in fissure veins in breccia and gra The Ida May group of claims was purchased in 1911.

Development: by shafts, with many miles of workings. T shaft, 1,630 deep, has 17 levels, and is connected with the Roosevelt a raise [illegible] on the 4th level.

(from the Elkton mine)

	Tons Ore	Value p. Ton	Cost p. Ton (a)	Freight & Treatment
.....	3,284	$11.40	$....	$7.04
.....	24,854	6.22	....	2.79
.....	36,036	8.09	.....	4.17
.....	16,510 (b)	18.42	3.36	5.63
.....	29,509	18.37	2.62	5.34
.....	28,814	18.88	2.40	5.95
.....	29,163	19.01	2.22	5.85

ost of ore shipped includes underground labor and sorting, ading, but not development. (b) Production was curtailed, on of Roosevelt drainage tunnel.

NSOLIDATED GOLD MINING CO. COLORADO

Broad St., New York; Cripple Creek and Colorado Springs,

ed W. Bailey, v. p.; Daniel Thatcher, sec.-treas., with J. C. Sherwood, Geo. W. Gano, R. M. Rankin, A. E. Carlton, G. N. Miller, directors. Owen Johnson, mine supt.

, 1893, in Colorado. **Cap.**, $2,450,000; $1 par; changed, 1913, nares $5 par; outstanding, 490,000 shares. No bonded debt. d at office of secretary, Colorado Springs. Colorado Title & ado Springs, registrar. Annual meeting, 2nd Monday in April. March 31. Listed in Colorado Springs.

(on stock of $1 par) 1903, 2½c.; 1904, 13½c.; 1905, 23c.; nd 1908, 2c. each; 1909, 1c.; 1910, 2c.; 1911, 2½c.; 1912, 5c.; tock of $5 par): March 31, 1913, 12½c.; Feb. 25, 1914, 10c.; al dividends, $1,707,545.

e of Dec. 31, 1918, shows: assets, $3,404,819, which includes: (stock), $2,500,000; mining property (cash), $92,762; stocks and otes receivable, $215; ore in transit, $457; cash, $2,152. Liabili- ng capital, $50,000; surplus, $69,211; vouchers payable, $1,635.

r 1918 show: company ore sales, $35; royalty, $8,287; other total income, $10,102. Mining and general expenses, $14,650; tions, $4,548; accounts charged off, $16,526; Magnet Rock sus- loss for year 1918, $21,043.

70½ acres in the Cripple Creek mining district, including ado mines developed by three shafts to a depth of 1,350'. Has t operator for a great many years. For geology of the Cripple ee 16th Ann. Rept. of Colo.; also U. S. G. S. Bull. 260, 1915, odies occur at vein intersections in vicinity of phonolite dikes.

er careful investigation it was found by new management that as in sight and it was mostly low-grade; that during 1914-15 l made no profits, had exhausted its treasury surplus, was about and doing business largely upon credit; that general expenses 500 per month and mining operations were being run at a loss 00 per month.

property by Louis S. Noble, sent out in 1917, was far from unless some radical changes are made, stockholders will never dividend.

nt: management stated that the prospects of finding pay ore level did not warrant further exploration work, and that there- 1917, company had confined itself strictly to leasing. Work in stoping amounted to 1,011' of drifting and crosscutting, accom- es.

: in 1918 amounted to 516 tons by the company and 2,537 having gross value of $1,219 and $34,840, respectively.

917, an "Independent Stockholders Committee" was formed with chairman; K. Macdermid, vice-chairman, and C. J. Starke, sec., of changing the management of the company. The committee

asserted that the El Paso mine had been worked for the benefit of Cycle Mng. & Red. Co., and that if a flotation mill had been bu could have mined its large reserves of low-grade ores, instead of only the high-grade to the Golden Cycle mill. The committee also the present management had shipped over 30,000 tons of El Paso Golden Cycle mill, averaging $8 to $11 per ton, on which treatmen $4 and sorting charge of $1 were paid, whereas, if a flotation mill ha the company might have treated its ores at $1 a ton and made a han

During 1918, the hoist at the Nichols shaft was sold for $11,300 agement reported this advantageous, as the price was sastisfactory, in taxation was secured and operations were consolidated at the reducing expenses. In March, 1919, it was reported that litigation El Paso Consolidated and the Katinka Co. over extra-lateral righ settled out of court, and operations were to be resumed at the N an electric hoist taking the place of the steam engine.

Company has been promised a lease on part of the Henry through which the Beacon Hill-Ajax vein passes. This will be for 25% royalty basis.

EL PASO EXTENSION CORP'N OF WEST VIRGINIA C

Address: C. W. Hays, gen. mgr., Cripple Creek, Colo.

Property: Rocky Mountain and North Slope claims; 9.5 Beacon Hill. First named claim has old 250' shaft.

In 1918, company was reported to have taken a 5-year bond and Index mine, formerly operated by the Index Mining Co. The mine the southwestern slope of Gold hill, was idle for about 7 years. I operations the shaft was sunk 200' to the 1,150' level, and compa lessees have shipped regularly about 7 cars of ore a month, ave than $30 per ton.

Work has shown a promising quartz vein, 665' from surface, mineralized dike of basalt containing sylvanite, reported to average

In August, 1919, company acquired control of the Lexington Co.'s 13 acres on Gold Hill and the Laura D mine.

EL PASO GOLD KING MINE C

Owned by Gold King Mining Co., of Cripple Creek, in Po Cripple Creek district, developed by 1,007' shaft. Lessees were re making shipments in 1918.

EXCELSIOR MINING, MILLING & ELECTRIC CO. C

Office: Interstate Trust Bldg., Denver, Colo.

Officers: F. B. Wiborg, pres.-treas.; W. F. Robinson, sec.; E herty, supt.

Cap. $250,000; $1 par, fully issued

Property: the Excelsior mine at Frisco, Summit county, Co under lease and bond by F. Flood of Frisco, and carrying lead-cop gold and silver. Developed by 2,600' tunnel and 120' shaft. In 1 was remodeled to a 50-ton capacity, and a flotation unit added.

Company has a lease from the Stratton Cripple Creek Mng. & the Longfellow mine, consisting of 2 claims adjoining the Golde Vindicator mines at Victor, in Cripple Creek district, Colo. Thi mine was operated through the Golden Cycle shaft in 1916, but i worked through its own shaft. In 1918, a 4' vein, with an ore ba which assays $ oz. gold per ton, was opened in the Longfellow mine; to be the Legal Tender vein.

Company also has a lease on the Polar Star group at George

FAUNTLEROY GOLD MINING CO. C

Office: 31[illegible] Exchange National Bank Bldg., Colorado Sprin

Officers: Verner Z. Reed, pres.; L. L. Aitken, v.-p.; A. D. treas.

Cap. 1,250,000 shares $1 par. In treasury Jan. 1, 1919 stock 40 taxes paid; [illegible]es $3,563. Last stockholders' m 18, 1[illegible] listed on Colorado Springs Exchange.

claims, 20.3 acres, patented, on Gold hill and Mineral hill,

t: on the Little Fauntleroy, consists of 900′ of work done
tunnel at 278′ from surface. Shaft from surface also con-
. On the Garfield claim is an 80′ shaft with 100′ of drifting.
ction to date, $8,311.
919, company reported the mine idle, and that no work was

ES CO. **COLORADO**

ipple Creek, Colo.
G. Carlton, pres.; A. E. Carlton, v. p.; V. H. Mann, sec.-

1912, in Wyoming. Cap., 2,000,000 shares; par value 2½c.
1, 1919, 750,000 shares.
otal, $337,500; last dividend paid September, 1906, by orig-
nount, $12,500. Colorado Title & Trust Co., Colorado Springs,
Annual meeting 2nd Wednesday in June. Last meeting, June,
d on Colorado Springs Exchange. Liabilities, $3,000 demand

claims, patented, 12.5 acres, on south slope of Bull hill,
olo.
gold and occurs in fissure veins. Underground workings
ggregating about 6 miles. Property fully equipped with

Stratton C. C. M. & D. Co. vs. Findley, re extra-lateral rights
d Luce vein. The vein is being worked by lessees and royal-
posited in escrow pending settlement.
gross to date is $1,651,183. None of this company's mines
l.

THE WEST GOLD MINING CO. **COLORADO**

ipple Creek, Teller county, Colo.
C. Schuyler, pres.; N. S. Gandy, sec.-treas.
000; $1 par. In treasury Jan. 1, 1916, 69,500 shares; cash,
ge Registry and Guarantee Co., Colorado Springs, transfer
Colorado Springs.
claims on Squaw mountain, and 2 on Gold hill. 15 acres,
cent returns available.

EN MINES CO. **COLORADO**

e Forest Queen mine, on the eastern slope of Ironclad hill,
olo.
A. Sullivan, pres.; Edwin Gaylord, v. p.-gen. mgr.; J. H.
as. Company has a five-year lease from May, 1917. Ore is
15 per ton.
ments were made to the Golden Cycle mill in 1919.

GE CONS. MINES CO. **COLORADO**

illen, Reinert & Downey, 717 Cooper Bldg., Denver, Colo.
lependence, Colo.
L. Killen, pres.; L. N. Neff, v. p.; E. G. Reinert, sec.-treas.
mgr., Altman, Colo., at last accounts.
successor of Free Coinage Mng. Co.
Colorado. Cap., 1,500,000 shares, one mill per share par;
ng.
he Free Coinage group, 5 patented claims, 40 acres, in
strict, said to carry the Pinto, Wilson, Black Dick and Pueblo
monico, adjoining them, was acquired for $500,000 in April,
uction is over $1,700,000.
t: will be through the 1,125′ Delmonico shaft, into Pinto
nd, two mines that have a $2,000,000 production. Mines are
y lessees. L. F. LeBrun, who had a lease on the Wilson claim,
ee-year extension; he has also obtained additional ground. The

lease now covers 1,300'. It was reported in 1919, that A. Edwards, o would lease and reopen the Free Coinage mine.

GOLD BOND CONSOLIDATED MINES CO. COL

Office: 234 First National Bank Bldg., Denver, Colo.

Officers: G. A. Hummer, pres.; S. R. Herber, v. p.; C. R. Slo treas., with I. W. Herber and Dr. Geo. L. Dewey, directors.

Inc. 1900, in Colorado. **Cap.**, $1,350,000; shares $1 par; out 1,255,000 shares.

Gross production to 1919 said to be $110,000. Company office stock. Listed on Colorado Springs Exchange. Last shareholders' me in 1900. No sale of stock since 1916.

Property: 4 patented claims, 18 acres, on S. W. slope of Cripple creek.

Ore: gold in fissure veins in granite, said to average $5 to $ ton, with 1918 shipments of $18 ore.

Development: 400' vertical shaft with over 2,500' workings by lessees, 1916-18, but production unknown.

GOLD BOND LEASING & DEVELOPING CO. COL

Operating under lease the Cripple Creek claims of the Gold Bon dated Mines Co., which see.

GOLD COIN MINING & LEASING CO. COL

Office: Colorado Springs, Colo.

Officers: H. E. Woods, pres.; F. M. Woods, sec.

Cap., $1,000,000; $1 par.

Property: 280 acres in Greeley district, Weld county, through of Gold Coin property at Victor, Colo. Company also reported to o shares in the California Southern Oil Fields Co., which owns fields in Arizona, and California, 80% of stock of Crown Point Gold Mng. C large number of shares in Lexington Arizona Mining Co.

The Crown Point Gold Mining Co. is operating a lease on the l of the Gold Coin shaft.

GOLD CAMP SYNDICATE COL

Address: W. Y. Seaman, 1842 Stout St., Denver, Colo.

Property: 16 acres, said to be favorably situated at Cripple Cre but the method of raising money by boom literature, memberships membership, three for $100), and shares of an adjoining property, conducive of confidence. In July, 1917, property was transferred to then to a new company, the Victory Gold Mining Co, which see. reports received.

GOLD DOLLAR CONSOLIDATED MINING CO. COL

Stockholders voted to dissolve, in April, 1919, their interests t served by surrender of old stock for shares in the New Gold Doll Co., on payment of one cent a share.

Dividends: paid to 1919, $1,000,000; last dividend, $12,500, pai 1912. Company's indebtedness in 1919 was $16,310.

GOLD KING MINING CO. COL

Company inactive. Fully described in Vol. XII. The El Paso C mine at Cripple Creek is operated by lessees.

GOLD SOVEREIGN MINING & TUNNEL CO. COL

Office: 218 Burns Bldg., Colorado Springs, and Cripple Creek

Officers: Jas. F. Burns, pres.-treas.; John T. Hawkins, v. p.- Daniel Thatcher, A. Feringher, directors. C. G. Jackson, supt.

Charter renewed Oct. 31, 1915. Cap., $2,000,000; $1 par; in Jan. 1, 1917, 195,228 shares; cash, $8,471. Listed on Colorado Springs

Dividends: $32,559, last dividend of $5,000 paid in 1912.

Property: Gold Sovereign and J. G. Blaine claims, 7.2 acres, on Bull hill (Sec. 29), adjoining the Cresson, reported under lease to Leasing Co. Management believes firmly that rich Cresson veins ex the Gold Sovereign ground. Shoots reported as 3' wide and assayin ton in gold said to be disclosed on the 15th level.

: 1,350' shaft, to be sunk an additional 200'.
gross production of lessee, Union Leasing Co., for 1916.
ted company $5,554. No later information could be obtained
t it is known that lessees are extracting ore from No. 9 level.

LE MINING & REDUCTION CO. COLORADO

ado City, El Paso county, Colo.
E. Carlton, pres.; E. P. Shove, v. p.; I. T. Snyder, sec.-
r Penrose, Richard Roelofs, H. McGarry and L. G. Carlton,

Virginia. Cap., $1,500,000; $1 par; all issued. No bonded
eferred stock. Listed on Colorado Springs Exchange. Stock
c., 1919.
g 50% of capital of East Colorado Springs Land Co., com-
es Peak Consolidated Fuel Co., which has lands containing
narketable coal. The Golden Cycle also holds 1,515,000 shares
the United Gold Mines Co. of Cripple Creek.
for year ended Dec. 31, 1918, showed current assets totaling
rent liabilities $215,027.
Jan., 1920, total $9,453,000. The rate is 36% per annum,

acres in the Cripple Creek district. In March, 1915, the
e was sold to the Vindicator Cons. Gold Mining Co. for
lorado City the Golden Cycle operates a custom mill treating
monthly of Cripple Creek ore. Plant includes rolls, roasting
ide equipment.
of mill have been as follows: $571,108 in 1909; $687,689 in
1911; $670,333 in 1912; $583,292 in 1913; $672,191 in 1914;
43,004 in 1916. No later figures available, but the plant worked
g 1919, save for 3 weeks when coal supply was given to the
Springs.
s do not include about $100,000 per year income from various
ich are owned by the company.
the company has decided to construct an electric power plant
coal mine, Colorado Springs, to cost $200,000. The plant
r and light to its subsidiaries nearby.

D MINING CO. COLORADO

Mining Exchange, Colorado Springs, and Victor, Colo.
M. MacNeill, pres.; C. C. Hamlin, v. p., treas. and gen.
rose, sec.; C. B. Garnett, asst. treas., with Michael Finnerty,
Tutt, directors. A. T. Holman, supt.
Wyoming. Cap., $1,750,000; $1 par; outstanding, $1,650,000;
at company's office. Colorado Title & Trust Co., Colorado
Annual meeting, 4th Monday in April. Stock has been very
as listed in Colorado Springs Exchange in July, 1915.
stock, excepting 3 shares, of the Little Montana Mining Co.
the Granite Gold property lying within the City of Victor
as a separate company, the Little Montana Mining Co. Stock
Mng. Co. was purchased in 1916 for $22,580.
917 from ore sales were $411,253, including 25,763 tons of
, 17,441 tons of $19.47 lessees' ore, $6,007 (1,494 tons of $14.54
le Montana lease, and $18,400 (817 tons of $41.99 ore) from
rofit was $126,378, less $49,500 for 3 dividends; and $129,999
d depletion. The loss, charged to surplus account was $53,121.
rge for depletion of ore reserve in 1917, there was a charge
pletion of ore reserves from March, 1913, to Dec., 1916, so as
vernment income tax regulations.
aid to date, $369,000. Last dividend paid March 10, 1918.

claims, 40.5 acres, patented, in the Cripple Creek district.
apex litigation, the Dead Pine claim, owned by the Raynor

Gold Mining Co., was bought for $87,500. The main production of the co
pany is now from this claim. (For geology of the Cripple Creek district,
U. S. G. S. Prof. Paper 54.)

Development: by shafts with several miles of workings. The Dill
shaft is 1,750′ deep, the Gold Coin shaft, 1,300′ deep. The Roosevelt tun
drains the Granite Gold ground and deeper development will be possible. Dur
1918, a new vein known as the Campbell vein was developed from the Coin sh
and opened up on Coin levels 10, 11, 12 and 13; company reports fair valu
There is about 550′ of unprospected ground between the bottom of the Dil
shaft and the Roosevelt tunnel level. Upper levels of the various proper
are operated under lease; lower levels are worked by company.

Equipment: mines are well equipped; a hoisting plant good for 2,0
installed at the Dillon shaft.

Production: total up to 1918 about $15,182,989.

The mine has been one of the best at Cripple Creek. In Nov., 1919, it
reported that machinery at the Gold Coin shaft was to be dismantled as so
of the ore had been extracted.

HAHNEWALD LEASING CO. COLORAD

Had lease on Abe Lincoln mine in Poverty Gulch, near Pitkin. In 19
reported to have operating lease on the Gold Sovereign mine, of Gold Sovere
Mine & Tunnel Co., Bull hill, Cripple Creek. Operations are mainly on
1,450′ level.

HENRY ADNEY GOLD MINING CO. COLORAD

A close corporation that operated the Henry Adney mine on Rosebud
Cripple Creek.

HONDO GOLD MINING & MILLING CO. COLORAD

Dissolved January, 1918. See Volume XIII.

ISABELLA LEASING CO. COLORAD

Address: Independence, Teller county, Colo.

Inc. in Oct., 1919, by R. M. Carson, William Gray and C. B. Garne

Cap., $25,000; $1 par; to be subscribed for by shareholders of the Isabe
Mines Co. The money will be used to develop the Isabella Mines Co.'s P
hill estate under a 5-year lease, with a 3-year extension privilege. Royalt
will be on a sliding-scale from 8 to 30%.

Property: includes the 11th to 15th level of the Lee shaft in 13 clai
Work was to be started on the 15th level to cut several producing veins
depth. In December, 1919, this level had been unwatered and crosscutting start

ISABELLA MINES CO. COLORAD

Office: Box 569, Victor, Colo. R. J. Huff, sec.-treas. **Mine office:**
dependence, Colo.

Officers: E. E. Quentin, pres.; R. M. Carson, v. p.; C. G. Mitch
mgr., with H. S. Lunt and J. H. Nicholls directors. Frank K. Gunn, supt.

Inc., 1903 in Wyoming. **Cap.**, $1,000,000; $1 par; 2,528,331 outstand
Stock listed on Colorado Springs Ex... Colorado Title & Trust Co., re
trar. An... ing 1st Monday ...uary, at Cheyenne, Wyo. In
1919, a co... terest was take... Isabella Leasing Co., which see.

An in... 1%, or $25,0... in 1916. Deficit in 1917 amoun
to $20,305.

Prope... patented ... acres, in N. E. ¼ of Sec
and N. W... Hill ... district. Lands show
Cripple Cre... ...old and some silver.

Develop... ... ...74′ and the
pire, 1,407′. ... compares
18,587′ in 1916 ... 1917 on Ma
level. The win... 250′ deep
drifts have been ... Dec.
Oct., 1917, due ...

Equipment ...
in 1915, to use ...
This plant re...

tion has been as follows:

	Tons Mine ore	Tons Dump ore	Total tonnage	Gross Value
.....	9,151	658	9,809	$192,924
.....	18,752	625	19,377	412,962
.....	23,861	837	24,698	507,791
.....	15,706	2,040	17,746	345,819
.....	11,385	6,903	18,288	243,251

output, 15 sets of lessees mined 8,334 tons, worth $144,129 es Beebe & Nelson reported opening a rich vein of rusty gold the surface. In 1919, lessees were mining upwards of 400

on to date estimated at $8,812,000. Company is one of the ple Creek district, and is operated successfully along con-

LE CONSOLIDATED MINING CO. **COLORADO**

218 Burns Bldg., Colorado Springs, Colo.
iel Thatcher, pres.; R. M. Frank, sec.; F. H. Gay, treas.; gen. mgr.
ing. **Cap.**, $25,000; 1c par; 1,668,885 shares issued. Stock rado Springs Stock Exchange. Company has no debts, all id, and a small reserve was reported in treasury, May, 1919. patented claims, 31 acres, on S. slope of Raven hill, in rict, shows fissure veins with streaks of gold. Developed by to depth of 1,100'. Equipped with hoist, drills and steam ked by lessees in 1916.

ON GOLD MINING CO. **COLORADO**

ymes Bldg., Denver, Colo. **Mine office:** Cripple Creek,

. Mackey, pres.-mgr.; C. F. Potter, v. p.; J. W. Graham, F. Mackey and C. A. Graham, directors. D. C. Smith, supt.
Wyoming. **Cap.**, $250,000; 10c par; all issued; has paid ds to date. Last payment of $5 per 1,000 shares in Nov., 1914. Colorado Springs Exchange. Company derives income from g operations.
claims patented, in Cripple Creek district, shows gold-ct veins. Developed by 975' vertical shaft to depth of 850'. worked from surface to the 650' level by Frank Caley, and l by P. H. Denham, former superintendent of Cripple Creek This lease, operated since 1915 by the Cripple Creek Deep ed in 1918.
ncludes steam power, 8 drills, concentrator and 75-ton d in 1915 by Frank Caley. Total output to 1917, $1,783,126. s found ore averaging $30 per ton.

EASING CO. **COLORADO**

ved to be idle.
se on the Joe Dandy mine on Raven Hill, Cripple Creek dis-. Mine developed to about 1,000' depth by shaft and drifts, dy, 2' to 4' wide, said to average $30 per ton.
dy cyanide leaching plant, operated under lease by Thos. l about 2,000 tons of ore per month, partly $2 per ton dump ts. No recent returns.

GOLD MINING CO., THE **COLORADO**

nsfer office, 507 Exchange Bank Bldg., Colorado Springs,

x Lorig, pres.; B. F. Webster, v. p.; Arthur Cornforth,

Cap., 2,000,000 shares; par 1c; 265,000 shares in treasury. ny had $240 in cash, a certificate of deposit for $1,000, and Stock listed on Colorado Springs Exchange.

Property: about 30 acres on Raven hill, adjoining the Elkton, at ple Creek, includes the Nil Desperandum, Rhinoceros, Kittie Lane, and Bull No. 1 and 2 claims. The Kittie Lane has been leased. Company is in

KOMAT MINING CO. COLOR

Mine office: Bull Cliffs, Cripple Creek, Colo. Math Korf, gen. m

Was reported to be operating the Victor mine under lease from the and Moffat Mines Co., owners. Property developed by shaft, 1,000' deep. S $14 ore in 1918, and produced 400 tons averaging $12 in January, 1919.

LAST DOLLAR GOLD MINING CO. COLOR

Property: the Last Dollar mine, 18 acres, adjoining the Portlan Modoc mines, Cripple Creek district, Teller county. Mine is credited past production of $30,000,000.

Bond and lease on Last Dollar mine reported taken in 1917 by Ca Gold Mng. Co., which see.

Development: by 1,517' shaft with levels at 500', 1,000', 1,200', 1,30 1,500'. The West vein, opened on the bottom level, is said to be 2½' Shipments are made to the Golden Cycle mill at Colorado City.

LELAND MINING & DEVELOPING CO. COLOR

Address: Chas. Howbert, Cripple Creek, Colo., gen. mgr.

Property: the Conundrum and Anchoria Leland mines on Gol Cripple Creek district. The Conundrum is developed by an 800' incline and the Anchoria Leland mine is operated through the Gold Hill tunnel.

No recent returns.

LEXINGTON GOLD MINING CORPORATION COLOR

Property acquired August, 1919, by El Paso Extension Corporation, see

LINCOLN MINES & REDUCTION CO. COLOR

Operates property, is under lease from Rex Gold Mining & Millin which see.

Office: 10 S. La Salle St., Chicago, Ill. **Mine office:** Cripple Colo. F. G. Gasche, mgr.

Officers: Jos. Ballin, pres.; F. A. Altmeyer, v. p.; C. A. Grieb treas.

Inc. in Colorado. **Cap.**, $1,000,000. A close corporation. Prope Ironclad hill, Cripple Creek. In 1919 company reported that mine was in of development, but that owing to recent acquisition it could state definite about its plans. A mill was erected by November, using the process, a patent treatment.

MARY McKINNEY MINING CO. COLOR

Address: Colorado Springs and Cripple Creek, Colo.

Officers: Chas. Castello, pres.; Daniel Thatcher, v. p.; John L. S sec.-treas.; preceding, with J. H. Nicholls, and W. H. Spurgeon, directors.

Inc. 1892, in Colorado; renewed March, 1912. **Cap.**, $1,501,000; $1 par; outstanding June, 1918, $1,309,252. Transfer office: 306 Exchang Bldg., Colorado Springs. Colorado Title & Trust Co., Colorado Springs, trar. Annual meeting, 2nd Monday in February. Listed on Colorado S Exchange.

Income Account—years ended December 31:

	Ore Sales	Oper., etc. Expenses	Net Earnings	Other Income	Paid Lessors	Taxes and Legal Exp.
1918	$86,367	$49,729	$36,638	$4,444	$42,862	$2,467
1917	197,131	109,886	87,245	1,528	35,030	4,196
1916	224,200	173,205	51,015	1,058	50,000	4,441

Dividends: to 1919, $1,182,750. Last paid Oct. 26, 1916, $13,000.

Property: several claims, 144 acres patented, on west slope of Hill, at Cripple Creek [illegible] discovered in 1891. In 1900 the erty of the Anaconda [illegible] was purchased.

Ore: gold in [illegible] Stannes quartz veins to pho

iles. In 1918, 6,713' of new work was done, compared with
Mine was examined Dec., 1916, by J. T. Milliken and L. S.
mmended that No. 9 and 10 levels be extended N. to the West
each its intersection with No. 5 vein. The latter vein and others
xplored. Junctions in upper levels showed good shoots.
includes two plants, with 100-h. p. electric hoist, 200-h. p.
sor, boiler-plant, machine-shop, etc.
gross to end of 1918 was $9,169,685. In 1918, company
ons worth $10,294, compared with 2,962 tons, worth $40,560, in
roduced 6,549 tons worth $88,012 in 1918, compared with 4,960
591 in 1917.
well managed, and a policy of extensive exploration will be
oon as steel and powder drop to a reasonable price. Company
cut to 7 men, or just enough to keep property open. Manage-
sets of lessees at work, 1919.

INING & LEASING CO. **COLORADO**

ed unclaimed, July, 1919, from former address, Cripple Creek,
dead.
4. Company had a lease on the Mary McKinney mine
el down.

N GOLD MINING CO. **COLORADO**

ed unclaimed, April 15, 1919, from Cripple Creek, Colo.
J. Gehm, pres.-treas.; R. S. Ellison, v. p. and sec.
,000; $1 par. In treasury, Jan. 1, 1916, 38,000 shares. Listed
rings Stock Exchange.
the Mary Nevin and Hibernia patented claims, 10 acres, on

nt: by a 385' shaft on the Hibernia claim, a 200' shaft on
claim and some drifting. Property was operated through the
haft. Probably idle.

NSOLIDATED GOLD MINING CO. **COLORADO**

pple Creek, Colo.
F. Doepke, pres.-mgr.; J. H. Heckemey, v. p.; A. T. Labba,

0,000; $1 par.
about 27 acres on Gold hill, Cripple Creek, Colo. Leases
ner operators, the Bonanza King being leased to the Keystone
o.
ent: by 800' shaft.
id to be 150,000 tons low-grade ore on dump and 100,000 tons of
exposed by mine development.

MINES CORPORATION **COLORADO**

operates the Clyde mine on Battle mountain, Cripple Creek, Colo.
t.
corporation composed of Michigan men. Developed by shaft to
haft to be sunk to 1,600' level.

VELOPMENT CO. **COLORADO**

30 Land Title Bldg., Philadelphia, Pa.
L. H. Taylor, Jr., pres.; F. M. Kurie, v. p.-gen. mgr.; P. W.
eas., with Percival Chrystie and E. B. Bronson, directors.
1915 in Delaware. Cap., $100,000; $10 par; 6,000 shares out-
nual meeting third Tuesday in January. Is a close corporation.
consists of leases on certain blocks of the Stratton Cripple
and Development Co. (Stratton Estate), on Bull Hill. The
the Eagle vein and the Basket & Luce vein with other parallel
so the Eagle cross vein running N. E.-S. W.
t: includes complete hoisting plant. Operations are con-
the Star of Bethlehem shaft, 300' deep and also through the
haft 1,500' deep. In the Eagles shaft the Stratton Company oper-

Operations were begun March, 1919. The ore, shipped to the E at Victor averaged $30 per ton.

MODOC CONSOLIDATED MINES CO. C

Address: Victor, Colo.

Officers: F. Cannon, pres.; A. H. Frankenburg, v. p.-mg Roelofs, T. Arneal, M. A. Skinner, and E. D. Avery, directors.

Property: a rich old Cripple Creek gold producer, credite duction of about $2,000,000 since 1892. Bought by T. M. Pettigrev of Denver, late in 1916.

Development: by 600′ incline shaft and 500′ winze. A 1, shaft is being. At 1,200′ depth a shoot 400′ long, carrying $30 to have been cut. About 15,000 tons of ore was broken in stopes b and shipments were from 60 to 75 tons daily.

Reported that merger arrangements between this company and t Gold Mining Co. have been completed. If this is true, company sh the Last Dollar mine, an adjoining property.

MODOC MINING & MILLING CO. C

Property operated by Modoc Cons. Mines Co., which see.

MOFFAT TUNNEL & TRANSPORTATION CO. C

Address: care War Eagle Consolidated Mines Co., Cripple

Company will operate the Moffat or Ophelia tunnel which is t public transportation outlet from Raven Hill properties at Cripple C of which have deeded right-of-way through them. At present, a d driven from the Blue Flag Company's 1,200′ level to connect wit to perfect ventilation, after which tracks will be re-laid and wo This is expected to be finished by 1920.

NEW GOLD DOLLAR MINING CO. C

Mine office: Cripple Creek, Colo.

Directors: A. E. Carlton, Colorado Springs, R. J. Gaffney, Quentin, Denver.

Inc. in 1919. **Cap.,** $150,000; 5c par. Is a reorganization of Consolidated Mining Co.

Property: 62 acres, patented, being part of the Arequa t eastern slope of Beacon hill, Cripple Creek district. Gold occurs in wide, said to average $20 per ton. Property was purchased at S in 1919 by the judgment creditor, First National Bank of Cripple deeded by the Bank to present company.

Development: 1,050′ Mabel M. and Union shafts, from whic able drifting and crosscutting has been done.

NEW GOLD KING MINES C

See Gold King Leasing Co.

OCEAN WAVE MINING CO. C

Address: Matt. Edwards, supt., Cripple Creek, Colo. C. Springfield, Ill. pres.

Cap., $100,000. Controlled by Eastern parties.

Operating under long-term lease the Ocean Wave and Little Ma Battle mountain, Cripple Creek, owned by Portland Gold Mining Co.

Development: by 400′ shaft. Mine said to have vein 4′ w with streaks of gold-bearing quartz. The ground has been sub company operations were to be resumed late in 1919.

OSTON LEASING CO. C

Frank Crawford, supt. Company has leased the Howard dump McKinney Mining Co., Cripple Creek, and is shipping about 2,000 ton

PATTERSON-BRADLEY LEASING CO. C

H. MacDonald, mgr., Cripple Creek, Colo.

Operating under lease the Specimen claim of the Stratton C Mining & Development Co. Ore developed by 300′ Pratt shaft through the Orpha May claim.

GOLD MINING CO. **COLORADO**

Carlton, pres.; Thos. J. Ward, v. p.; V. H. Mann, sec.-

12, in Wyoming. **Cap.**, $15,000; shares 1c par. In treas-
,000 shares and $437 cash. Stock listed on Colorado Springs
ge Registry & Guarantee Co., Colorado Springs, Colo., trans-
idends to Feb., 1910, $7,500; none since.
patented acres on Bull hill, Cripple Creek district, Teller

rts received. One or two lessees were working and making
ent, at last accounts.

LD MINING CO. **COLORADO**

ining Exchange Bldg., Colorado Springs, Colo. Mines
ill at Victor, Colo.
g Howbert, chairman; Frank G. Peck, pres.; Dr. D. H.
. Burns, sec.-treas., with J. H. Parker, Jr., directors. T. F.
. Geo. M. Taylor, gen. mgr.; Fred Jones, mine supt.; Thos.
. at Victor; L. W. Lennox, asst. supt.; V. G. Hills and F. G.

Iowa. **Cap.**, $3,000,000; reorganized 1905, in Wyoming,
; shares $1 par; all issued. Colorado Title & Trust Co.,
ansferred at company's office. Listed on Colorado Springs
meeting, third Monday in February, at Cheyenne, Wyo.

General Balance Sheet:

y 1st—

			Sec't's, Ins.		
perty	Equip.	Supplies	Furn., etc.	Current	Total
1,894	$220,382	$215,632	$78,158	$180,335	$4,166,401
4,477	211,608	256,938	85,452	338,483	4,636,958
2,639	193,284	287,970	74,841	460,867	4,799,601
3,771	165,915	189,522	68,628	564,303	4,812,139
7,408	184,509	141,702	40,344	592,883	4,678,846

	Capt. Stock	Current	Surplus	Total
.....	$3,000,000	$14,053	$1,152,348	$4,166,401
.....	3,000,000	13,478	1,623,481	4,636,958
.....	3,000,000	14,157	1,785,444	4,799,601
.....	3,000,000	8,695	1,803,444	4,812,139
.....	3,000,000	14,968	1,661,878	4,678,846

Profit and Loss Account, on Jan. 1st.:

Optg.		Balance	Deduct's		
it	Total	prev. yr.	Deprec.	Divid's	Balance
96	$212,733(a)	$1,623,481	$383,865	$300,000	$1,152,349
54	663,998	1,785,444	465,962	360,000	1,623,481
10	772,571	1,803,444	370,571	420,000	1,785,444
60	799,739	1,661,878	298,172	360,000	1,803,444
94	591,046	1,767,789	336,957	360,000	1,661,878

surplus, $171,132.

% per year, paid quarterly, from Jan. 15, 1907, to and
5, 1909: April 15, 1909, 3%; July 15 and October 15, 1909, 2%
912, 8% each; 1913, 10%; 1914, 12%; 1915, 12%; 1916, 14%;
%. Total dividends to October 20, 1919, were $11,497,080.
Portland and Independence mines, 253 acres, in Cripple
r county, carrying gold ore in quartz veins. The Independence
prising 110 acres on Battle Mountain, were purchased from
ndence, Ltd., a British corporation, in July, 1915, for $325,000.
mine has over 16 miles of workings and is credited with a
July, 1915, of $23,621,728.

For geology of the district, see U. S. G. S. Prof. Paper, No. Vindicator Cons. G. M. Co.

Development: the Portland mine, which has been continuously for 25 years, has a total of over 62 miles of workings; 8,071' of new w done in 1918, compared with 12,506' in 1917.

Mine has 2 shafts. No. 2 shaft being 2,280' deep. The Roosevel drains the mine, a branch from the Roosevelt tunnel will connect with Shaft No. 2 when completed. The company's share of the cost of the velt tunnel and the lateral to its own shaft is $144,591. In December, 1 ore was opened on the 21st level of No. 2 shaft, and at 2,280' a year late 2 pumps on No. 23 level are lifting 1,000 g. p. m.

The No. 2 vein at the tunnel-level has been opened for 1,200', all in

Company also operates the Independence mill at Victor, Colo., wh treat 1,400 tons of ore daily. Since the mill was acquired in July, 191 been completed remodeled and is now an up-to-date cyanide plant. was tried, but was discarded.

In March, 1918, the company's Colorado Springs mill was closed d cause the output of high-grade ores from Cripple Creek had declined that operations were no longer profitable. The Victor mill, which compa operated at Victor, was closed down July, 1918, due to labor conditions. of the machinery has since been moved to the Independence mill. The C Springs mill will be reopened if conditions improve.

Chilean-mill practice at the Portland mill was described by L. W. in Bull. 153, September, 1919, of the A. I. M. & M. E. The primary consist of six 6' Chilean mills, taking as feed the product from two 20 Garfield type rolls. Secondary grinding on the classified sand from the done by six 6 by 6' ball mills. These discharge to Akins classifiers, which the sand in closed circuit. The mills were put in as the result of 8 ye perience on Cripple Creek ores at the Victor plant. Fine grinding costs were 30.82 cents per ton, for 441,435 tons treated.

Production: from the Portland mine in 1912, 44,562 tons, gross $987,416; in 1913, 53,245 tons, gross value, $1,380,713; in 1914, 62,997 ton value, $1,467,005; in 1915, 72,192 tons, gross value, $1,710,277; in 1916 tons, gross value, $2,236,842; in 1917, 86,668 tons, gross value, $1,768,9 1918, 53,887 tons, gross value, $1,120,851; with a grand total from April, January, 1919, of 1,620,682 tons, gross value, $42,961,390.

In addition the Victor mill produced from 1910-1919, 2,328,566 tons value, $5,811,987.

Management estimates from 12 to 15 million tons of low-grade ore mines and on dumps.

Company has a co-operative insurance fund and maintains a hosp Victor, jointly with the Vindicator company, for the benefit of the emp The management is excellent, and the outlook is still promising for many of profitable operations.

PRIDE OF CRIPPLE CREEK MINING CO. COLO

Address: W. H. Trask, gen. mgr., Denver, Colo.

Company has leased its Pride of Cripple Creek mine, on Ironclad Cox, Beebe & Nelson, who mined ore running 2 oz. gold from the 600' lev

Mine is near the Jerry Johnson, Forest Queen and W. H. P. mines.

PRINCE ALBERT MINE COLO

Formerly owned by the Prince Albert Cons. Mining Co., and pur at foreclosure in December, 1914, by Frank Johanningmann, of Cincinn $31,496.

Property: on Beacon hill, near Cripple Creek, Teller county operated under 3-year-bond and lease from 1916 by Frank Vetter, who o the Albert Beacon Gold Mining Co. which see.

QUEEN BESS MINE COLO

A fractional claim on Tenderfoot hill, owned and operated by Hahoewald, Cripple Creek, Colo. The mine is developed from the 500 levels of the El Paso Gold Mine.

cars per week, averaging $50 per ton, in 1917. In 1918, pro-
mine being under development. Ore is of 2 oz. grade.

MINING CO. **COLORADO**

a Lind, supt., Cripple Creek, Colo. A close corporation
es.; Thornton Brown, sec.-treas.
patented acres on Butte mountain, and Raven hill, includ-
ne, between the Elkton and Cresson mines, at Cripple Creek,
erly owned by the El Oro Mng. & Dev. Co., and purchased by
1915. Mine is said to show 2 parallel veins, carrying $15 gold

by 1,000' shaft, with levels every 100'. Equipped with
t, pumps, and electric power. Shipped 2 cars of milling ore
f 1916. No recent information.

ON HILL GOLD MINING CO. **COLORADO**

dle.
change Bank Bldg., Colorado Springs.
V. Price, pres.; John T. Hawkins, v. p.; W. B. Price, sec.
shares 10c; in treasury Jan. 1, 1917, 328,000 shares stock
Listed on Colorado Springs Exchange.
cres of the Arequa townsite and 7 acres of the Cameron
Creek crosscut by the Roosevelt tunnel. Developed by 554'
as been blocked out for leasing; the Elkton Cons. M. & M.
s 1 and 2 from the Roosevelt level of the Elkton main

n to date, $85,691; none in recent years.

E MINES CO. **COLORADO**

Arequa-Savage Gold Mining Co.
Tejon St., Colorado Springs, Colo.
Geyer, pres.; J. Yeomans, v. p.; A. Schumacher, sec.-

November, 1915, as original incorporation had expired by

shares; 1c par; 393,000 shares in treasury, Jan., 1917, also
1,713. Stock listed on Colorado Springs Exchange. Total

nan, Savage and Trojan claims, on Beacon hill, and 1
Cripple Creek district, Colo. Developed by several shafts,
100' tunnel. Production to 1917 was $161,378. No recent

INING CO **COLORADO**

Nicholls, supt., Cripple Creek, Colo.
rating under 6-year lease, the Rose Nichol mine of Rose
Co., Battle mountain, Cripple Creek, Teller county.
started in March, 1919, after company had spent $105,000 in
n past two years. Ore has been opened on No. 6 and 7
,000' below the surface, respectively. Ore was also reported
tunnel-level about 2,100' below the collar of shaft.
cludes aerial tram extending from mine to Midland Ry.
eated at Golden Cycle Mng. & Red. Co., at Colo. Springs.
s are made.

OLD MINING CO. **COLORADO**

xchange National Bank Bldg., Colorado Springs, Colo.
Aitken, pres.; Ira Harris, v. p.; A. D. Aitken, sec.-treas.;
directors.
do **Cap.**, $1,500,000; $1 par; all outstanding. Colorado
olorado Springs, registrar. Expenses in 1918 were $1,033.
cres on Battle mountain, between the Portland, U. G. M.,
Cripple Creek, Teller county, Colo. Property was reported
e Camp Bird Mining, Leasing & Power Co. for six years.

The lease on the Rose Nichol mine of the company was transferred Reva Gold Mining Co., which see.

Development: by lessees for 8 years. Workings aggregate ove with a depth of 1,032'. The Roosevelt deep drainage tunnel, whicl through the property at depth of 2,000', cuts a vein 3' wide, that sho Lessees have installed an ore-house and an 1,800' aerial tram.

Production: company expected a big production in 1919, but no have been received as yet. In past two years, nearly $100,000 has been opening the Hidden Treasure, Dexter and Rose veins.

RUBY MINING & MILLING CO. COLO

Company reported dissolved early in 1918. Had a 5-year lease on R Lafayette mines, Bull hill, Cripple Creek, Teller county, owned by Eri Company.

SCHOOL SECTION LEASING CO. COLO

Address: Victor, Colo. Operated under lease from the State, of School Section 16, on Bull hill, near Cameron. Company was repo have operated for 15 years consecutively and to be a steady produce 1917. No recent reports received. Presumably idle.

SEEMANN INVESTMENT & FINANCE CO. COLO

Address: Box 1375, Denver, Colo.

Officers: Henry I. Seemann, pres.; K. R. Seemann, v. p.; W. pincott, sec.-treas.

Inc. July 12, 1904, in Colorado. **Cap.,** $100,000; $100 par.

Property: company owns the following claims at Cripple Creek, county: Black Crow Lode, Mayflower Lode, Pride of Grassy Lode, W E. F. C. & Rittenhouse, the 4-11-44, Idlewild & Mexican, Dark Cloud an Lodes; and in Clear Creek county: Golden Star Lode, Ace of Diamond Deuce of Diamonds Lode, Jack of Diamonds Lode, and ½ Surprise Ext Vindicator Lode.

The company is not a mining company, but wishes to lease or sell, or p form a mining company, and turn the properties over to such company.

STRATTON CRIPPLE CREEK MNG. & DEV. CO. COLO

F. M. Keeth, supt., Cripple Creek, Colo. (Stratton Estate.)

Property: about 600 acres including the American Eagle, Abe L Longfellow, Orpha May and other mines on Bull hill and Globe hill at Creek, with the typical veins of the district. Company is operating the A Eagle mine and has 30 sets of lessees at work on other properties.

Matoa Gold Mng. Co. is a subsidiary, and there are a half dozen o incorporated leasing companies working on Stratton ground.

Litigation with the Findley Mines Co., over extra-lateral rights to the and Luce vein in the American Eagle mine continued during 1918. An ment has been reached whereby lessees can work the vein, placing the r in escrow pending settlement.

STRATTON'S INDEPENDENCE COLO

Out of business. See Vol. XIII.

STRONG GOLD MINING CO. COLO

Address: Victor, Colo. Is a close corporation, owned in C Springs.

Property: the Jolly Tar claim, 7½ acres near Victor, in the Creek district, shows a cluster of veins in granite, carrying large shoots The yield of gold per acre is said to be the richest of any mine in the camp closed in October, 1918, owing to labor shortage and high costs. Reporte to Owen Roberts in April, 1919.

Development: by 1,700' shaft with extensive levels and drifts 20-drill compressor. Production reported in excess of $10,000,000.

TENDERFOOT HILL CONS. MNG. CO. COLORADO-SO. DA

Office: 317 Exchange Nat'l. Bank Bldg., Colorado Springs.

Officers: W. A. Otis, pres.; L. L. Aiken, v. p.; A. D. Aiken Russell H. Forbes, sec.

Cap., $1,500,000; $1 par. 20 assess. Listed on Colorado Spring

lities and no production. Cash in treasury, January 1, 1919, $3,675.

cres on Tenderfoot hill, Cripple Creek district, and 93 Hills, South Dakota.

main shaft on Cripple Creek property, 511′ deep with ack Hills property has drifts, tunnels and crosscuts totaling idle, 1919.

G CO **COLORADO**

ipple Creek, Colo. C. G. Jackson, supt.
ing the property of Gold Sovereign Mining & Tunnel Co.,

MINES CO. **COLORADO**

ge Nat'l Bldg., Colorado Springs, Colo.
. Carlton, pres.; H. McGarry, v. p.-gen. mgr.; H. D. s.; Lynn Richmond, supt.; R. Roelofs, A. E. Carlton, H. right and C. S. Davis, directors.
do. **Cap.**, $5,000,000; par $1; in treasury, 9,159 shares 919, 990,931 shares. Total dividends to date, $561,179; last ary, 1920, amounted to $40,000. Stock listed on Colorado inge.
subsidiary mining companies at Cripple Creek, Teller county, H., Damon and Montrose Co., Ironclad Hill, May B., Squaw d, Wild Horse, Requa Gold Mining & Milling Co., B. H. & hill. In October, 1917, the B. H. & S. Co.'s property was for $31,642.
its mines. Receipts for year 1918 were $53,644; develop- other expense, $10,165, gain, $20,213. Balance sheet showed 7,546, which included cash assets of $79,383, and ore reserves, s received in 1919 totaled $60,326.
r 1918 totaled 4,694′ compared with 4,538′ in 1917.
r 1918, 21,069 tons gross value of $393,839, of which 09,015. Average per ton, $18.69. The heaviest production lerson & Benkelman lease in the Trail mine, which expired ince 1915 this lease has yielded gold worth $1,500,000. The d to the Granite Gold Mining Co., is also a big producer.

S MINING CO. **COLORADO**

02 Majestic Bldg., Denver, Colo.
do. **Cap.**, $50,000; shares $1 par. "No individual lia- o operate leases in the Cripple Creek district. Company also ims in the Boulder-Gilpin counties tungsten belt. Is a stock- promotion.

N & REFINING CO. **COLORADO**

rced sales in 1916, the entire assets (1,500 acres of land, etc.) olden Cycle Mining Co., Colo., which in turn sold the ex- Morse Bros., of Denver. The plants contained 15,000 tons tons of structural steel and buildings, 12,000,000′ of lum-

MINING CO. **COLORADO**

ple Creek, Colo. Controlled by Moffatt-Smith estates. ne, with reported production of $2,250,000 to 1900. Operated Math Korff. Mine had been inactive for many years and austed when lessees began operations.
00′ deep, has 14 levels. For geology of district see U. S.

ried from 200 to 500 tons monthly, of milling ore yield- on. No recent reports received.

MINING CO. **COLORADO**

upt., Cripple Creek, Colo. H. J. Newton, president, pro- "slush writer."
to have title to 45 acres, patented, in Cripple Creek mining

district. A consolidation of the Albert Beacon, Cripple Creek General and Exploitation and Gold Camp Syndicate companies in May, 1917, headed the notorious promoter, Harry J. Newton, with a capital of 5,000,000 shares 10c par. Some of the claims have produced a good deal of gold.

In September, 1917, said to have bought a 1/3 interest in the Leora V also at Cripple Creek, and in 1918 company purchased the Smith lease Howard shaft of the Mary McKinney mine. The Howard is credited $2,000,000 production. Four sets of sub-lessees at work.

VINDICATOR CONSOLIDATED GOLD MINING CO. COLOR

Office: 603 Symes Bldg., Denver, Colo. **Mine office:** Independe

Officers: G. S. Wood, pres.; A. F. Zang, v. p.; P. A. Zang, treas.; Stahl, sec. and gen. mgr., with A. E. Carlton, C. Sigel, Jr., and D. W. land, directors. W. E. Ryan, gen. supt.; T. H. Sheldon, purch. agt.

Inc. Nov. 20, 1896, in Colorado. **Cap.**, $1,500,000; $1 par; all non-assessable; no bonded indebtedness. Annual meeting second Thurs February. International Trust Co., Denver, transfer agent and registrar. on Colorado Springs Stock Exchange.

General Balance Sheet:

Assets—

	Property	Equip.	Ore Res.	Secur.	Current	Surp.	
1919	.....	.....	.....	.....	$625,541	.....	
1918	$1,269,613	$537,641	$870,129	$4,935	$574,928	.....	$3
1917	1,229,069	452,823	1,423,216	4,935	165,747	$565,237	3
1916	2,430,491	212,694	.....	202,589	217,044	.....	3

Liabilities—

	Capital Stock	Surplus	Res. for Dep.	Other	
1919	$1,500,000	.....	.....	$59,683	
1918	1,500,000	1,516,955	116,378	123,913	3
1917	1,500,000	.....	66,552	2,274,476	3
1916	1,500,000	878,580	628,226	56,012	3

Other income includes credit arising from valuation of ore deposits dicator, March, 1913, which in 1917 was $2,245,539, and in 1918 it is the less charges for subsequent depletion to December, 1918, amount being

Comparative Income Account:

	Mine Receipts	Mine Expense	Operating Profit	Other Receipts	Dividends	Other Deduc.	
1919	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.....	
1918	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1917	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1916	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1915	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1914	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] and [illegible] to 1919.

Dividends: [illegible] 235; 1903, 14%; 1904, 9%; 1905, 13%; [illegible] 1909, 7½%; 1910, 1911, 1912, 1913, 12% each; [illegible] 1917, 12%; 1918, 4%; 1919, 4%; 1920, 1%.

Property: [illegible] acres, at [illegible] dence on Bull [illegible] forest [illegible] ings of the Key [illegible] Hale [illegible] Christmas Gold [illegible]

In September [illegible] Wyoming [illegible]

he plateau on which Cripple Creek is located is mainly made
ite. Breaking through this is a plug of volcanic breccias and
of phonolite, and including many granite fragments torn off
from below. This volcanic core is cut by dikes and intrusive
te and phonolite, and latest of all, the basalt dikes.

ccur in veins which follow a system of steep fissures, the veins
ures with a central film or streak of ore filling and an impregna-
l rock on both sides. The low-grade ores are formed by min-
he country rock adjacent to such narrow seams. Most of the
heeted zones ranging in width up to 40'.

ccurs chiefly as the telluride, calaverite, with but little silver, but
it there are small quantities of iron, copper, zinc, and molybdenum
gangue is either quartz and fluorite with some carbonate or merely
The greatest horizontal extension of any pay shoot thus far
1,300'. Such pay shoots are many and usually vary from 4' to 40'
vertical extension has not yet been reached in some shoots. For
y, see U. S. G. S. Prof. Paper No. 54; "Nature of Ore Deposits,"
eed, or Lindgren's "Mineral Deposits."

ent: by Vindicator shaft, 1,950' deep, and Golden Cycle 2,200';
of workings, about 265,000'. Mining methods, filled stope and
Development in 1918 amounted to 5,112' of which 2,899' were
es, which compared with 10,327' in 1917, 5,514' of which driven
commercial ore had been opened on No. 20 level of the Golden
916-1917 and work was discontinued there in 1918. Only a small
. 19 of the Vindicator; but only 25% of the mineralized area has
d. There is no geologic reason why ore-shoots should not be
points. The present condition is a repetition of the experience of
the Cripple Creek district, but management believes there would
commercial ore to warrant the expense of deeper sinking and
the Golden Cycle mine. Reserves are estimated at 104,230 tons
1919. In addition are 2,000,000 tons of ore-house reject dumps,
from 50 to 75c per ton profit. Mining cost $2.81 per ton hoisted.
1919, the shoot on the 18th level of the Vindicator shaft had
r over 250', showing good ore.

expected the Cripple Creek drainage tunnel to reduce pumping
ie tunnel reached the neighboring Portland property in 1918 and
t is apparent, the indications are that there is an impervious dike
Portland and Vindicator properties and tunnel will not assist in
cator. Three 4-stage centrifugal pumps were installed in 1916
l of the Golden Cycle shaft, but when operations were discon-
mps were placed, working on the 18th level.

t: includes two hoists, Sullivan electric and Ingersoll-Sargent
electric triplex 175-h. p. pumps, electric locomotive on No. 17
sharpening shop on No. 16 level. Power is steam and electric.
ts consist of one 300-ton washing and concentrating mill, which
a total of 127,947 tons of ore $1.68 ore at a cost of 17.4c per ton.
e reject from the Golden Cycle ore house, averaging about $2 per
ed, with the 2,000,000 tons mentioned above, in a 500-ton flotation
October, 1916. Ball-mills and the Minerals Separation flotation
oyed. On $2.26 ore the recovery in January, 1917, was 84.4%
emed a success. This plant reported closed late in 1919.

1917, 252,810 tons, sorted down to 86,918 tons, yielding
7 tons crude ore, or 45,712 tons sorted ore, valued at
tons crude ore, yielding 19,922 tons sorted ore, valued
from lessees amounted to $153,683 in 1917; $151,265
The mill was closed for several weeks in September,

es, the Vindicator has passed its zenith, although
time; the future lies in a profitable treatment

...DATED MINES CO. COLOR

...Colo.

...; M. E. O'Bryan, sec.-treas.; with S. J. ...
...Tully Scott and T. R. Countryman (cons. engr...

...par value not reported; in treasury at last ...
...quiring and developing additional property. Fi...
... Denham Bldg., Denver.
...originally 12.3 acres, since increased to 41 acres, in C...
...upon which in January, 1916, there was a bond of $50,0...

...mainly by lessees. The Scott shaft was sunk ...
...Vein, clean and $10 to $15 ore was opened in this ground. ...
...is 119 long, and shipments were made. Great result...
...connections with the Moffat tunnel on Raven hill, whic...
...In August, 1919, an arrangement was made with the Blu...
...Co., whereby the properties were to be connected by means ...
...ventilation would be improved; it acts as a public transpo...
...During this work, in December, a new shoot had been opened a...
...Ore was 2' wide and 70' long, assaying $24 in gold and 15 oz. of ...

W. H. P. LEASING CO. COLOR

...under lease the W. H. P. mine, on Ironclad hill, Cripple ...
...Colo., owned by the United Gold Mines Co. Company said to have op...
...thousand tons, with some calaverite ore worth about $40 per t...

YELLOW BIRD GOLD MINING CO. COLOR

...reported sold at Sheriff's sale in November, 1918, to H...
...the judgment creditor.

...about 40 acres, on Gold hill, Cripple Creek, Teller ...
...the Yellow Bird, Red Bird, Cottontail, Volcano, Round Rock an...
...which had been idle for years.

...in 1919 lessees operating the Yellow Bird mine reported open...
...of commercial ore 25' below the surface.

LEADVILLE DISTRICT

ARKANSAS VALLEY SMELTER COLOR

...of ...Smelting & Refining Co.
...with 6 blast-furnaces, capable of treating over ...
...and adjacent ...daily.

A. Y. & MINING CO. COLOR

...Mining Co., which ...
...S. D. Bradshaw, pre...
...at Soda Springs, Ida...

SANGUIS... COLOR

...

2 to 16 oz. per ton had been encountered. During 1917, the prop-
ver ore assaying over 3,000 oz. per ton. The discovery of gold in
e first evidence of persistency in the gold veins of the Sugar

COLORADO

e: East Second St., and Toledo Ave., Leadville, Colo. Peter
Property situated on Carbonate hill, Leadville.
ent: a large manganese deposit of blanket type, estimated to
' wide, and 30' thick, was exposed. The work completed had not
its of the ore-shoot at last advice. Ore assays 35% Mn.
during April and May, 1918, averaged 600 tons.

NING CO. **COLORADO**

, 5th Ave., New York, N. Y. **Mine office:** Breece Hill, Lead-

E. B. Schem, pres.; C. G. Raynor, v. p.; W. J. Walworth,
hter, treas., with T. W. Wagner, H. P. Chilton and R. J. Spettel,

lew York. **Cap.,** 200,000 shares, par $25; all outstanding.
n Stock Exchange. Transfer office: 734 Fifth Ave., N. Y. Regis-
Exchange National Bank, New York. Annual meeting, second
er first Monday in October.
in Breece hill, Leadville, leased to several individuals whose
all company expenses.

ING & LAND CO. **COLORADO**

R. F. Lafferty, gen. mgr.
it, 1915, in Colorado. **Cap.,** $100,000.
er land near Leadville, on which Derry Ranch Gold Dredging
) operates a dredge.

NCH GOLD DREDGING CO. **COLORADO**

Rector St., New York. **Operating office:** R. F. Lafferty,
, Colo.
A. C. Ludlam, pres.; R. F. Lafferty, v. p.; George Sommer,
John Nisbet and N. D. Wanless, directors.
olorado. **Cap.,** $100,000; $100 par; all issued.
1,800' acres of placer ground near Leadville, Colo., owned by
ng & Land Co., and under lease to the Dredging company.
ent: drilling proved an average depth of 30', containing 25c

t: modern 5½ cu. ft. dredge, digging 75,000 yards per month,
ower. No work is done during the winter.
roduction of gold throughout 1917 is said to have averaged $15,000
with $10,000 in 1916. Dividends are reported to total $50,000 or
ization.

NG CO. **COLORADO**

C. J. Dold, Leadville, Colo.
the old Northern mine of 8 acres, adjoining the Coronado
old under a 10-year lease from the Leadville Basin Mines Co.,

two 640' shafts. There are three ore horizons at as
porphyry and limestone. Early in 1918 the Newell
opened, and plans had been made to sink the Northern
was 25 tons of manganese ore daily. Rich lead car-
opened at 640' in July, 1919.

THE **COLORADO**

adville, Colo.
and mgr.; Geo. Bennett, v. p.; Florence

Cap., $100,000; $1 par; 75,000 issued.
Poverty Flats, Fryer hill, Leadville,
ow owned.

Development: $10,000 was expended in 1918 deepening the
500'. The ore-zone is reported to be extensive and to contain 30% n
30% iron and 8 oz. silver. Company expects to sink 100' more an
vein by drifting. This new work to be financed by selling more stock.

DOWN TOWN MINES CO. COL

Offices: Chemical Bldg., St. Louis, Mo., and 129 West 8th S
ville, Colo.

Officers: J. C. Waldeck, pres.; H. W. Mann, v. p.; C. J. Wal
treas.; Jesse F. McDonald, mgr., with W. T. Nardin, directors.

Inc. March, 1914, in Colorado. **Cap.,** $600,000; $10 par. Stock
owned by Western Development Co., which see. Company has 20-y
on several of the Down Town mines at Leadville.

Property: 400 acres, includes 15 old mines which have produ
eral millions of dollars. These mines had been idle for many years; a
thought that all the valuable ore had been extracted, but in former r
zinc ore was taken out.

Unwatering was started in May, 1915, at the Penrose shaft with
vertical, centrifugal pumps. Property was drained to the 875', or lo
in the summer of 1916.

Development: by shafts 400' to 875' deep, and 158,400' of und
workings.

Production: for the year ended June 30, 1918, company produc
tons of ore valued at $755,000. Operating expenses were $350,000.
planned in 1918 to reopen the Coronado shaft.

Equipment: compressor, 175-h. p. electric hoist, electrically-drive

Early in 1919 the company's output was reported to be 200 tons
copper, silver and manganese ore daily. In September, it was do
quantity.

DUBUQUE MINING & TUNNEL CO. COL

Out of existence several years. Described, Vol. XIII.

EDNA MINING CO. COL

Company was operating the Carbonate mine at Leadville, Colo.,
through the Hagerman shaft. Said to show large bodies of silver-bea
pyrite. No later information.

FAIRVIEW MINE COL

M. L. Buchanan, mgr. Property situated near Leadville, Lake cou
In 1918, mine was producing a low-grade manganese ore containing
in 1919 the management reported the property shut-down on account
and labor conditions.

FANNY RAWLINGS MINING CO. COL

Office: 6 N. Nevada Ave., Colorado Springs, Colo.

Officers: John A. Himebaugh, pres.; Charles D. Hart, v. p.;
C. Frost, sec.-treas.; W. R. McConihay, mgr.

Cap., $1,000,000; par value $1; cash in treasury, Jan., 1920, $1,
$5,700 loaned at 5½% and secured by lien on first-class improved
U. S. savings stamps, $1,000; stock, 5,551 shares. Last stockholders'
held June 29, 1912. Listed on Colorado Springs Exchange. Total
dividends paid to date, $55,000; last dividend, $5,000 paid Feb. 10, 1920
since Dec., 1908. All taxes paid and company has no debts.

Property, the Fanny Rawlings lode mining claim, about 10
Breece Hill, near Leadville.

Development: on south half of claim said to have
The entire plant and shaft, costing about $13,000, was burned
A new plant, costing over $20,000, using electric power to
erected. This has been
leased to Charlestown

Shipments in 1917
The Fanny Rawlings
made by the lessee. In

LD MINING CO. **COLORADO**

Chas. J. Fox, Philadelphia, Pa.

patented claims in the Lackawanna gulch section, 6 miles , near Leadville, developed by several tunnels. A 4' vein of opened up on the 1,200', or lowest tunnel level, reported to n in gold, with silver and copper values. In September, 1919, ore running 3 to 7 oz. gold and 100 oz. silver in an old tunnel. f high-grade ore were 6 to 10" wide in a vein of 48 to 60".

NE **COLORADO**

n McNeece, mgr., Leadville, Colo. The mine is an old- Evans gulch, developed by 2-compartment shaft, which con- tunnel at depth of 1,000'. Ore carries mainly lead-zinc, with er.

sses reported operating, 1917, but no recent information con- has been received.

SING CO. **COLORADO**

n Cortellini, mgr., Leadville, Lake county, Colo.

oining the famous Little Jonny mine on Jonny hill, has a cing copper with good gold-silver values. Ore milled said to n.

ncludes a steam hoist and 15-drill air-compressor. A 200- gned during 1916, but whether erected or not is not known. partnership and does not divulge results of its operations.

INING CO. **COLORADO**

K. McDaniel, gen. mgr., Denver, Colo., and Hugh Watson, k, Leadville, Colo.

Graham Park, Leadville, Lake county, Colo. In April, that Patrick Mulrooney had sold the mine to the Western Denver. Property is reported to have a big reserve of low quite pure iron pyrite, carrying a little silver. Most of the o the Western Chemical Co. for acid manufacture. 1,350' shaft.

CO. **COLORADO**

quitable Bldg., Denver. **Mine office:** Leadville, Colo.

. Hunter, pres.-treas.; John A. Ewing, v. p.; Chas. Caven- mpion, mgr., with Gerald Hughes, F. L. Smith, J. C. Mitchell irectors. Geo. Becker, supt.

891, in Colorado. **Cap.**, $100,000; $1 par; all issued. An- Monday in June. Company is operated as a close corporation. claims, patented, 52 acres, on Breece hill, Leadville, Lake e Little Jonny claim, which has produced about $25,000,000 e occurs in blanket deposits carrying silver, lead, copper and ntact metamorphic ore encountered at depth were low-grade Vein structure is very complicated, owing to faulting. by 4 vertical shafts to depth of 1,250'. On the 900' level el for 2,000', is reported to be 70' wide and 55' high and to 30 oz. gold per ton. Reported to have a zinc content of 23%. zinc carbonate ore was discovered on the fourth level. ncludes 18 machine-drills, breaking about 350 tons of ore worked by lessees, the Garbutt and C. D. G. being the employing 100 men jointly. Operations were normal in 1918, throughout 1919. No production figures are available.

MINING CO. **COLORADO**

926 No. 52 Broadway, New York City, and 615 Stevens . Mine near Leadville, Lake county, Colo.

[illegible] Henry G. Stevens, v. p.; Homer A. Hoit, [illegible] corresding, with Bruce G. Broad, R. H. Webber, [illegible] H. C. DuVal, Samuel E. Reinhard and Chas. [illegible] gen. mgr.; Philip Argall & Sons, cons. engrs. [illegible] New York. **Cap.**, $10,000,000; shares $20 par;

Stock listed on N. Y. Consolidated Stock Exchange and the Detroit
Farmers Loan & Trust Co., New York, registrar. Annual meeting, fi
in March.

Net earnings were $267,034 in 1904; $515,127 in 1906; $65,366 in 1
in 1908; $183,121 in 1909; $138,308 in 1910; $187,639 in 1911; $274,3
$123,927 in 1913; $174,629 in 1914; $184,199 in 1915; $210,595 in 1916;
1917, and $186,143 in 1918.

In 1917 and 1918, equipment depreciation and ore depletion wer
from net earnings. In 1917, these amounted to $41,574, and in 1918
leaving no surplus to be transferred for either year.

Dividends: $400,000 in 1906; $300,000 in 1907; none in 1908;
1909; $200,000 in 1910; $100,000 in 1911; $200,000 in 1912; $200,00
$100,000 in 1914, 1915, 1916 and 1917; $50,000 in 1918, with total div
January, 1919, of $5,300,000.

In 1917, company mined 29,976 tons of ore net value of $293,889
mined 10,099 tons with net value of $74,850. Total income was $3
expenses, $284,535. Balance sheet, December 31, 1917, showed an oper
plus of $268,187.

In 1918 company mined 33,226 tons of ore of net value of $372,196
mined 23,207 tons, net value, $171,212. Total income was $427,183 and
$241,040. During 1918, adjustment on account of additional depletion
by the Treasury for years 1916-1917 amounted to $165,378; leaving an
surplus, December 31, 1918, of $52,809.

Property: the Moyer, Tucson and Blind Tom mines, on Iron h
2 miles E. of Leadville. Also controls through stock ownership, the
Cons. Mining Co. and the New Marian Cons. Mining Co., which see.
company purchased an undivided ½ interest in the Proserpine and C
Lode mining claims, U. S. Survey No. 5214, which secured for the I
Co. a ⅜ interest in these claims, consisting of 9.9 acres, adjoining the
property on the N. W. During 1917, company secured a 5-year lea
Alleghany group, consisting of about 19 acres adjoining property on
located on trend of Mikado fault.

The Moyer mine yielded 12,784 tons of ore in 1917, net value of $95,
mine had over 2 miles of workings and contained large orebodies of
grade complex lead-zinc ore from which large tonnages have been extr
several years past. The "East" orebody opened and stoped in 1912, 18'
wide, and 360' long, was completely exhausted in 1915, and ore produ
secured from other workings. Mine was closed on October 13, 1917,
mercial ore being exhausted. Lessees were extracting from narrow s
last reports.

The Tucson yielded 3,094 tons of ore, worth $30,905 net, in 1918, wh
pares with 9,708 tons valued at $126,487 in 1917. Exploration amounte
in 1918 and 2,288' in 1917. In July, 1918, mine was closed owing to la
The Tucson had a 1,200' aerial tram, of 12 tons hourly capacity from th
the railway siding, which cut the cost of ore-transportation from 60c
12c per ton.

To drain and develop an old area in the Graham Park basin of
Colo., the company erected in 1916 a plant costing $500,000 at the Mika
This shaft was widened and sunk to 1,135' in 1917. Two 1,000-gal. p
pumps were installed.

In 1918, company reopened the old Pyrenees shaft on the Pyrene
southwest of the Mikado, in which it owns an interest, besides havin
term lease on the property. The Pyrenees shaft has been enlarged an
bored to 1,200' and will hereafter be the main shaft. When finished,
will connect with the Mikado workings. The project was taken up
difficulty and expense of keeping the Mikado, and also to develop the
end of property.

Lessees mined 9 claims of ore [illegible] tons, valued at $177,
1918; which contrasted with 7 claims, 20,000 tons and a value of $274,5
In 1918, lessees produced [illegible] tons of ore valuable for [illegible]

l tons of iron oxide ore, 4,688 tons of zinc sulphide ore, 3,331 sulphide ore, 2,433 tons of manganese ore, 4,748 tons of iron tons lead sulphide, which compares with 5,350 tons zinc car- lead carbonate, 219 tons iron oxide, 459 tons of zinc sulphide, ead sulphide, 738 tons manganese ore, and 376 tons iron sulphide

in Marian mine in 1918 was 3,758, in 1917, 2,439', and on leases 917, 1,665'.

uction: of the mines as a whole:

pper lb.	Gold oz.	Silver oz.	Lead lb.	Zinc lb.	Iron lb.
902	402.04	163,809	2,661,131	21,847,947	6,446,825
,914	689.25	163,493	1,893,020	13,342,256	5,956,671
,713	134.5	336,277	2,401,089	12,994,318	5,597,605
,694	575.	136,674	4,205,616	16,674,848	2,957,235
,751	923.1	327,976	10,608,734	17,396,362	5,247,433
,230	509.	391,603	12,105,921	25,658,913	2,745,511
3.543	323.92	470,403	12,874,099	21,601,428	2,816,079

ell equipped and well managed.

COLORADO

P. Goodier, owner, 302 Majestic Bldg., Denver, Colo.
l, supt., Leadville, Colo.
claims, 40 acres, on Poverty Flats in N. E. part of Lead-
.

es shipped $10,000 worth of ore from a 14' vein on 180' level to l & Iron Co., Pueblo, Colo., to be used as flux. Ore is reported oz. silver, 26% iron, 30% manganese. There are two deposits e under development on the 250' level; one 22 by 17', and the aid to carry 34% manganese and 5% silica.

G CO. **COLORADO**

arence Jarbeau, mgr., Leadville, Colo.
he Home Extension and Cloud City mines in the Down adville. Daily shipments in 1917 averaged 75 tons of manganese- No recent report received.

LD MINING CO. **COLORADO**

ned; no late information obtainable.
rty at Guyot Hill, Leadville, Lake county, operated under lease s Mining and Milling Co. Chas. Warden, mgr. Work stopped threatened apex litigation.

COLORADO

Yankee Hill, Leadville, Colo.
ine is said to be in an ore-belt that has yielded lead-zinc ores, on both sides of the Keen. Mine is developed by 335 shaft. includes electric hoist. Reported in 1918 that Austin J. P. Hepburn had reopened the Keen shaft on Yankee hill.

BASIN MINES CO. **COLORADO**

M. Carleton, Leadville, Colo.
K. Carleton, pres.; S. W. Eckman, treas.; S. M. Carleton, lumphreys, directors.
ie Northern mine (leased to Dold M. Co., which see) and Congress and Castle claims at Leadville, Colo.
t: the porphyry-lime contacts were to be explored by deep er-bearing lead carbonate has been mined by former owners. obtainable from company.

COLORADO

Clarence Hersey, mgr.; R. I. Hughes, supt., at last reports.
Printer Boy Hill, between Iowa Gulch and head of Cali- ke county, Colo.; developed by a tunnel, ½ mile long and Ore carries gold, silver, lead and zinc.
lessees in 1916 and output estimated at 250 tons per month.

Oxide ore from the Lovejoy claim containing lead-gold values, was s
the Ohio-Colorado smelter at Salida. Zinc carbonate ore from the L
sold to the Western Zinc Oxide Co. No recent report.

LUEMA MINING CO. COL

Address: Leadville, Colo. Warren F. Page, mgr., at last acco

Property: the Valley and Forest Rose mines, on Prospect m
developed by a 500' shaft and 2,000' tunnel, said to show silver-bearin
and lead ores. On the 1,500' point in the tunnel, drill-holes down to
proved valuable ore-bodies and management plans sinking interior sha
course of the drills. Has electric power, hoist and all necessary m
Surface buildings, destroyed by fire in 1914, were re-built the follow
No recent returns.

MATCHLESS MNG. & LEASING CO. COL

Address: Dr. Bailey, Leadville, Colo.

Reported late in 1917 that Edward Huter was operating the Matchl
erty on Fryer hill, near Leadville, Lake county. The old shaft had bee
bered throughout its 246' depth and deepened through quartzite and
A diamond-drill was being used for exploration as it is believed that wh
stone exists under the porphyry, forming the sulphide zone. A vigorous
ment policy is being pursued.

MAY QUEEN LEASING CO. COL

Dave Harris, mgr. P. C. Madsen, supt. Operating on Yankee
Leadville, Lake county, through the Hayden shaft. On the 150' level,
bonate was opened in a body 30' long and 18' deep. Reported to have sh
tons ore daily to the Western zinc oxide plant at Leadville, in 1918.

MILLER GOLD MINING & MILLING CO. COL

Address: Mrs. M. Miller, mgr., Twin Lakes, Lake county, Colo
Buehler, pres.

Reported late 1917 to have cut a vein 2' thick, yielding a gold ore a
$75 per ton.

Development by 1,200' tunnel. Company has a 100-ton mill a
to erect a compressor plant at last accounts. The plants and upper w
of the mine were leased to the Mt. Champion Company in September, 19

MT. CHAMPION MINING CO. COL

Address: 55 Congress St., Boston, Mass., and Leadville, Colo

Officers: C. H. Huff, pres.; C. Q. Adams, v. p.; W. E. McKee,
A. Wentworth, treas.; all of Boston. Lucien W. Smith, mgr. Compa
close corporation, incorporated in Maine, 1910.

Property: 12 patented, several unpatented claims, in Larkawa
Half Moon gulches, near Leadville, Lake county, and 4 miles from M
railway and loading station. The Colorado Power Co.'s transmission l
nects with mine and mill. The Ozark mine is under lease to company
sibilities are considered good.

Geology: ore zone is a granite intrusion in gneiss, accompanied
alaskite dike with several branches passing through the granite, the latt
mineralized and faulted. Ore contains gold, a little silver, and an occasion
carrying some copper and lead. About 30% of the gold is amenable to am
tion. Values are mainly in the sulphides, which assay $200 per ton. S
averages $8.42, other ore, $75.25.

Development: by tunnels, mostly in ore. Total workings 10,0

Equipment: 1,000 cu. ft. compressor, 6,600' aerial tram, and
using breaker, Hardinge and tube-mills, and concentrator.

On account of abnormal conditions mine was c
in April, 1919. Company planned a new mill
tember, company leased the mill, tram, and upp
Co. No production figures obtainable.

NEW MARIAN CONSOLIDATED MINING

Company dissolved and property taken over
Leadville, Colo. See Vol. XII for description of

H MINING CO. **COLORADO**

C. Kortz, pres. Cuyahoga Bldg., Cleveland, Ohio. **Mine** Lake county, Colo. Frank Fuller, supt., at last accounts. New Monarch and Cleveland mines carrying lead and veloped by shafts and crosscuts. A crosscut to the N. E. was gin ground at the bottom of the Monarch shaft. included a steam plant, compressor, etc. Operated by nd at last accounts were producing over 1,000 tons of ore per aged $20 in gold, silver, lead and zinc. company unanswered.

NSOLIDATED MINING CO. **COLORADO**

ough stock ownership by Iron Silver Mining Co. Grant, pres. J. A. Ewing, v. p.; Fremont Woodruff, sec.;

Leadville, Lake county, worked by two sets of lessees in

new body of lead-silver ore was opened up that was 8' wide assaying 15% lead and 11 oz. silver per ton. n 1918 was 1,569 tons of manganese ore, 169 tons iron carbonate ore, with a total value of $15,029, compared with , and 24 tons, $21,999, respectively, in 1917.

ER & GREEN MTN. LEASING CO. **COLORADO**

and Hector McDonald, of Leadville, Colo., lessees, at last 1916.

ar the head of Iowa gulch, Lake county, was discovered dited with past production of $80,000. Strong flow of water

916, and 300' lower tunnel was extended to 700', where a 4' ing $20 to $40 ore. Values are in silver, lead, gold and copper. in 1917; no recent returns.

INE **COLORADO**

E. Bowden, mgr., Leadville, Colo. Yankee Hill near Leadville, Lake county. Lessees re- covered a body of sulphide ore, 70' long and 15' high, on the ng 23 to 31% zinc, 19% lead, 6 oz. silver. Were shipping at daily in 1916. No recent information.

COLORADO

M. McGinniss, Leadville, Lake county, Colo. e leased the P. O. S. properties, on Carbonate hill, Leadville, ese and iron-silver ores. Mine was idle for several years and e Down Town Mines Co., which see.

OUNTAIN MINES & EXPLORATION CO. (THE) **COLORADO**

Garrett, Bank Annex Bldg., Leadville, Colo. Cortellini, pres.; W. G. West, v. p.; A. A. Garrett, sec.; reas., with P. F. Hart, Frank Zaits, and M. A. Nicholson.

Colorado. **Cap.,** $500,000; shares $10 par; non-assessable. acked by influential Leadville residents, and was organized unnel through Cantebery hill, opposite Big Evans gulch, to dikes believed to [illegible] e west and south [illegible] ed), and of [illegible] n Leadville [illegible] The first [illegible] he Minnesota [illegible] g Evans gulch [illegible] uld also [illegible] e mails each [illegible] ected is expected [illegible]

ore-bearing ground. The Roseville tract itself yielded rich gold-silver ore 1882. This is another project, the fourth in the past 6 years, to revive Lea by draining a large area of old workings, and to prospect virgin ground.

SILVER MINING & REDUCTION CO. COLOR

Mine office: Leadville, Colo.

Officers: A. P. Craft, pres.; W. B. Brooks, treas. and gen. mgr.; J Smith, sec., preceding with J. L. McLean and J. F. Cleveland, directors.

Inc, in Colorado. **Cap.,** $1,000,000; shares $1 par; non-assessable. tional Security Co., New York, registrar and transfer agent.

Property: company holds bonds and a lease on several prope around Leadville, one being the Resurrection lease; also owns nearly stock of the Colorado Concentrating Co., which has a lease with option pu chase, on the Pingrey mill at Leadville, a plant with a 100-ton daily capacity

Company will separate the zinc-iron minerals from the silver-lead ore then extract the zinc by a magnetic separation system known as the Cam Ethington process, by which the iron is removed from the concentrate product that runs 25% zinc, raised to one running around 50% zinc.

Management predicts net profits of between $400 and $700 per day solely mill operations.

In October, 1919, a Wall St. house made a pre-organization offer o stock at 50c per share, issuing a 24-page booklet, "Silver, the Opportunity of day," describing the district and marketing of ore, including much extra matter interwoven with what the company plans to accomplish.

SMALL HOPES-BOREEL MINING CO. COLORA

Property: the Robert Emmet mine at Leadville, a great produce lead-zinc ore, is now owned by the Empire Zinc Co., which see. (See New J Zinc Co.)

STARS CONSOLIDATED MINING CO. COLORA

Operating properties on Carbonate Hill, Leadville, Colo. Have erected first 100-ton unit system of a 300-ton mill, which will be used to dress low- iron-manganese ore deposits. Properties being worked for most part by le

WESTERN MINING CO. COLORA

Office: Leadville and Lake City, Colo.

Subsidiary of the Am. Smelters Sec. Co. Is an important producer of carbonate ores from Big Chief, Maid of Erin, and other mines through Wolfton shaft, Carbonate hill, Leadville, Lake county.

The Leadville unit of the U. S. S. R. & M. E. Co., unwatered the Fryer section and carried on extensive operations through the Harvard shaft. W started February, 1916, and was discontinued August, 1918. The company h to discover a second contact in that section. In 1917 the Western Mining was shipping about 200 tons daily, but all from the upper contact. Company hausted all available ore-bodies in July, 1918.

WESTERN ZINC OXIDE CO. COLORA

Office: C. H. Collins, pres.; W. A. Young, sec.-treas., Leadville, C

Formed in 1915 to take over and operate the 50-ton plant of the We Zinc Mining & Reduction Co., west of Leadville.

Employs the Wetherill process of producing zinc oxide by volatilization collecting fume in flues. Plant operated continuously. Late in 1919 it decided to double the capacity. Improvements have been made in metho hauling residue.

YAK MINING, MILLING & TUNNEL CO. COLORA

Office: Marbridge Bldg., W. 34th St., New York. **Mine office:** L ville, Colo.

Officers: Myron T. Herrick, pres.; Harry C. James, v. p.; Walter Davis, v. p. and gen. mgr., Leadville and New York; J. C. Mitchell, sec.-t Denver National Bank, Denver. J. G. Hardy, mine mgr.; E. L. Hartwell,

Cap., $1,000,000; reduced Jan. 10, 1918 to $500,000, when the comp declared a distribution of liquidation capital which amounted to $500,000; al $1 par; all outstanding and assessable.

In December, 1917, company sold an undivided half interest in the pro

S. & R. Co. By the terms of the sale, the American S. & R. for the half interest; this full amount, $500,000, although not a rned to the American S. & R. Co. out of the profits of opera- both companies will shares in the profits equally. The A. S. ry on the company operations. The mining department of the s been at work since January 1, 1918.

Comparative General Balance Sheet:

	Tunnel & Prop.	Equip.	Cash	Other Current	Total
.	$485,119	$49,621	$105,227	$222,446	$862,415
.	1,094,676	73,759	77,221	330,992	1,576,650
.	1,126,934	61,011	184,310	313,529	1,685,785
.	977,543	66,386	.....	724,383	1,768,312
.	1,087,013	81,139	276,571	181,678	1,626,401
.	1,000,611	85,582	259,705	93,889	1,439,789

	Capital Stock	Accounts Payable	Undiv. Profits	Reserve	Total
.	$500,000(b)	$13,013	$349,402	.....	$862,415
.	1,000,000	67,758	513,892	.....	1,576,650
.	1,000,000	101,935	511,360	$72,490	1,685,785
.	1,000,000	.....	768,312	.....	1,768,312
.	1,000,000	96,331	530,070	.....	1,626,401
.	1,000,000	29,022	410,765	.....	1,439,789

er 31, 1918. (b) Capital stock, $1,000,000, less, liquidation divi- otal capital stock, $500,000.

Comparative Income Account:

	Mng. Co. Acct.	Total Net	Div.
.....	$59,690	$141,611	$140,000
.....	382,588	503,046	760,000
.....	268,264	428,568	160,000
.....	217,949	306,545	110,000
.....	154,928	210,985	80,000
.....	69,247	120,216	80,000

1918 amounted to about $200,000 and to $15,000 for the first 919.

uarterly, commenced March 31, 1904, and were continuous 30, 1918, when the amount distributed totaled $3,497,685. Divi- discontinued until July 1, 1919, when 1½% was declared. The les a stock dividend of 12½%, declared October 31, 1904; it tribution of liquidated capital, January 10, 1918, of $500,000.

wns 250 acres and controls an additional area of 1,133 . Also holds agreements covering several hundred additional h agreements company has the right to drive the Yak tunnel at its option.

iel is a 4-mile transportation and drainage tunnel which drains of the Leadville camp, including the White Cap and Cord prop- ill. The portal of the tunnel is in California Gulch, about 1 lle. In March, 1917, the surface track to switches, dumps, etc., in Yak tunnel, by way of Louisville and North Moyer, equipped and trolley line for operation of 50-h. p. locomotives, was quipped with trolley line, 6,207′; laterals equipped with track ine, 1,922′; miscellaneous laterals suitable for equipment for es, about 5,912′.

loped by the tunnel are chiefly a complex sulphide containing nd zinc. For geology of the Leadville district, see U. S. G. S. Emmons and J. D. Irving.

in 1918, there were mined 34,152 tons of iron-silver ore;

22,653 tons of lead-zinc ore, and 1,802 tons of pyrites for acid-burne
of 58,607 tons.

CONNECTICUT

NEW HAVEN COPPER CO. CONNE

Inactive, and probably defunct

Property at Seymour, Conn., shows a copper-bearing band of h
schist, carrying chalcopyrite with some bornite. Operations were
intermittently for several years, the last work being done in October, 19
pany had power plant on the border of the Naugatuck river.

TUNGSTEN COMPANY OF AMERICA CONNE

Owns a tungsten property at Trumbull, Conn., long famous for its
Company organized in 1916, but became involved in litigation soon
and is now inactive. See Vol. XIII for description. The deposit is
well worth exploitation.

GEORGIA

AMERICAN VENTURE & MINES CORPORATION G

Office: 351 Bullitt Bldg., Philadelphia, Pa.

Officers: Meyer Schamberg, pres.; H. Hoopes, v. p.; N. S. K
treas.

Inc. 1914, in Arizona. **Cap.**, $2,500,000, of which $1,000,000 is
and $1,500,000 common. Outstanding $275,000 preferred and $750
mon; shares $1 par. Registrar, Corporation Guarantee & Trust C
delphia, Pa. Transfer agent, office of corporation.

Property: the Columbia mines, 1,705 acres consisting of 40
Parks tract, Wyllie tract, Mountain lot, Hamilton tract, and mine
to Walker and Mote tracts, all situated 11 miles north of Thomp
Duffie county, and 45 miles N. W. of Augusta, Ga.

Geology: the property shows a number of fissure veins, of u
mont type, carying up to 20' in width. The ores are quartzose
sulphides containing gold, silver and traces of copper and lead.
are mica schists with some gneiss cut by veins with 45° dip. O
to run $10 in gold and silver, principally gold, which seems high fo
age assay. Company reports 30,000 tons blocked out.

Developments: by shafts and 5,000' of workings, the deep
450'.

Equipment: 40-h. p. steam hoist, 100-h. p. compressor, 75-ton m
uses a continuous current cyanidation method.

Mine has been under development since 1916, and output, fro
mental work reported as $3,500. Property said to have produc
$2,000,000 before 1861. Expected to ship early in 1919.

ARIZONA & GEORGIA DEVELOPMENT CO. G

Inactive. **Address:** Wm. Tudor, Temple, Haralson county, G
office: Drakestown, Ga.

Organized in 1916 to operate the Tallapoosa mine of the Ge
rites Co., under lease and bond expiring March, 1919, and not
Corporation apparently still alive.

Production: for past 3 years was 30,000 lb. of cement copper
above 50% copper content), and 500 tons pyrite concentrate
49.7% sulphur, total proceeds $10,000. Company said to have spe
reopening mine.

It was hoped "that 500,000 tons could be mined yearly from wh
tons of shipping ore could be sorted that would average 45%
3.12% copper and $2.50 in gold and silver; also 150,000 tons of co
that will average 47% sulphur, 4% copper and $3 in gold and sil
remaining 200,000 tons should, after roasting, give 150,000 tons cin
aging 5% copper and $3.50 gold and silver. The pyrite of this mi
to bring 5 cents a unit above market price, due to its purity."

Is a property of merit if properly financed and developed.

NG & MANUFACTURING CO. **GEORGIA**

. Dobbins, agent, Cartersville, Ga.
) the Republic Iron & Steel Co., Birmingham, Ala.
acres, known as Dobbins mines, 4 miles N. E. of Car-
county. Mine first opened 1866; has been operated by
imes up to present.
ner quartzite, strike being N. 45° E. Overlying the quart-
d reddish yellow clays, showing a decomposed formation.
omposed mass depends on irregularities of underlying
posit is in the decomposed material on surface varying
and manganiferous nodules, to masses of manganese
h grade manganese ore with pyrolusite and psilomelane
1916. Present lessee concentrating on production of
See Bull. 35, Geol. Survey of Ga.
six shafts, 50′, 80′, 100′, 106′, 110′ and 190′ in depths, and
g, 50′ wide and 25-30′ deep. Ore produced by Republic
averages 15.84% manganese, 25.71 iron and 0.188 phos-

IE **GEORGIA**

Westerman, Woodstock, R-3, Ga.
ts, 222 acres, in Cherokee county, known as Bell-Star
n Woodstock; shipping point, Kenshaw, 6.7 miles away.
ry rock is mica gneiss, with bands of horn-blende gneiss.
ite vein, about 100′ wide containing iron, sulphur, man-
The gossan is silicious, indicating a low-grade ore. There
e E. and a schistose zone belt called the Sandstone vein
ossan, the last named worked for gold from 1846-1860.
Sandstone vein carries magnetite and garnet; vein is
of 900′. See Bull. 33, Geological Survey of Ga.
een worked in many years, owing to lack of money.
6 shafts, including an incline, 200′ deep, a second 200′
150′, and four others varying from 40′ to 60′ in depth.
fts have considerable work on the vein.

NG CO. **GEORGIA**

Dorn, mgr., Cartersville Poor Farm, White, Ga.
acres, 12 miles W. of Cartersville, Bartow county, ship-
¼ miles away. Mine was leased, 1918, to J. W. Brock-
orn of Birmingham, Ala., by the Bartow County Com-
in charge.
d shows Cambrian formations of gray quartzite, schist
se folds and faults are obscure. Manganese ore occurs
both as a soft, granular material and a hard concre-
over 5″ in diameter. This is treated in log washers
ore carrying 40% metallic manganese. An average sam-
ys 17.41 manganese, 0.40 phosphorus, 5.54 alumina, 5.60
. See Bull. 35, Geol. Survey of Georgia.
5 open cuts, from 60′—100′ long, 20′—80′ wide and

am shovel, double log washer, steam engine boiler, 600′
d motor-trucks. Several hundred tons of manganese
during 1917-1918.

ING CO. **GEORGIA**

Padgett, mgr., Blue Ridge, Ga. E. L. Hertzog, pres.
North Carolina firm, operating the McKinney property
in county, since 1918. Mine was worked long ago for
but present company produces manganese ore from old
gravelly, occurring in pockets and veins in clay, schist
deposit is not believed to be over 20′ in width. Several
ntaining about 34% manganese are reported to have
1918.

CHEROKEE OCHRE CO. GEO

Office: Cartersville, Ga., J. T. Norris, pres.-mgr.

Inc. Dec., 1904, in Georgia. **Cap.,** $30,000; $100 par, all outsta

Property: about 170 acres, including the Freeman property; ... side Cartersville, contains streaks of yellow "Peruvian ochre," and ... sandstone. This is reported to assay: iron peroxide, 52.53%; ... 11.75; silica, 22.05.

Company has 15-ton mill with flotation unit. Mine opening ... 40' deep.

CHESTATEE PYRITE & CHEMICAL CORPORATION GEO

Office: Third National Bank Bldg., Atlanta, Georgia.

Officers: N. P. Pratt, treas.; G. L. Pratt, v. p.-treas.; Palmer Pra... T. H. Tulloch, supt.; C. E. Julihn, cons. eng.

Property: the Chestatee pyrite mine, in Lumpkin county, 6 mile... Dahlonega, and on S. side of the Chestatee river, on which mine... started in 1892.

Geology: Mica gneiss and hornblende gneiss, are cut by granite ... is also metamorphosed. The important pyrite and gold deposits ... district all occur in a belt of more basic rock that lies within a ... the granite contact. At the Chestatee mine the granite border is ha... hundred feet S. E. of the vein. The orebody has a gossan outc... commercial iron ore 5,800' long. This exposure runs N. 45° E., and ... is 60° N. W. A parallel vein occurs not far away. The ore occu... tabular mass, showing a number of rolls or minor folds.

The ore is classed as either lump or concentrating material, acc... to the pyrite content. The first named occurs as lenses or shoots, ... sive, and consists mainly of pyrite and a little chalcopyrite, in a ga... quartz, garnet, and sericite. It averages 43.52% sulphur, 39.70% iron, ... copper, 9.26% silica, 2.53% alumina, and 0.72% zinc. The concentrat... is lower grade, but of similar mineralogic character.

Development: by 205' incline shaft and main haulage-level over ... long, with crosscuts to the vein every hundred feet. The levels are ri... with ore pockets. Reserves are estimated at 1,300,000 tons.

Equipment: electric power-plant, loading bins, crushing and sorting ... for 800 tons of run-of-mine ore daily, and mill for concentrating 40... daily. The mill employs a 24 by 12" crusher set at 3", one dry tr... washer, picking belt, lump ore being shipped at this point; crusher ... 1½", 9 mm. trommel, rolls, 2mm. trommel, Hancock jig, tables, and ... bins for concentrates.

Production: no figures are available. In 1919, the company appl... the War Minerals Relief Commission for $900,000. Of this, $221,0... awarded, but the company was not satisfied, as it alleged that it ha... $914,000, partly at the request of the Government.

COGGINS & SMITH MINING CO. GEO

Address: R. R. Smith, mgr., care C. E. Reed Oil Co., Atlanta, G...

Inc. March, 1918, in Georgia.

Property: Mt. Tabor mine, 77 acres, in Paulding county, 3 mi... of Dallas. Shows granite cut by a pyrite vein, 25' wide, ... silver and copper values and reported to assay 41.40% sulphur, 1.1... per ton and 1.8% copper. Vein dips about 70° S.E.-S.W.

Developed: by 50' shaft. **Equipment:** ... Little work has been done since 1917. ... posit in 1919.

COLLEY MINE GEO

Address: J. D. Colley, ...

Property: ...

alumina, 3.28 iron and some barium. Production, 1918, ...undred tons of manganese.

...AIN M. & P. CO. **GEORGIA**

...nclaimed, March 11, 1919, from last address, Dahlonega, ...a. W. D McGinniss, mgr. Had planned to erect 100-... treat $6 gold ore.

...LOPMENT CO. **GEORGIA**

... Munford, gen. mgr., Cartersville, Ga.

...n iron and manganese mines, embracing several thou... ...tersville, and including the Iron Hill and Hebble mines. ... runs through the land, giving a river frontage of four ..., with a fall of 70', giving 12,000 h. p. energy that can

...een worked at intervals since the early forties, mainly ...; present company developing iron ore at the Iron Hill ... were mining manganese on other sections of the prop... ...tant property is Hebble mine, 2 miles east of Carters... ... Hebble and producing ore with 45% metallic mangan... ...veloped by shaft 36' deep, tunnel 150' long, some under... ...d considerable open cuts. See Bull. 35, p. 78, Geol. Sur...

... property includes 4 steam shovels, 8 log washers, 3 jigs ...tandard gage railroad and locomotives.

...ING & POWER CO. **GEORGIA**

...aley Bldg., Atlanta, Ga.

... Given, pres.; J. H. Simms, v. p.; C. H. Butts, sec.; D. S. ...

...916, in Georgia. **Cap.**, $500,000; $10 par; 26,496 issued, ... Co., transfer agent and registrar.

...d claims and water rights near Atlanta, Fulton county.

...PECTING & DEVELOPMENT CO. **GEORGIA**

... F. Aldrich, pres., Birmingham, Ala. **Mine office:** Drake-...

... was reported that company was to reopen the Douglas ...res 2 miles north of Draketown, the mineral rights to ...by J. W. Douglass, Temple, Ga.

... by 3 shafts, the first 96' deep, exposing a quartz vein 12' ... cut at 56' and extends to bottom of workings. There ...fts, one 40', the other 25' deep. Analyses indicate a good ...se ore, intimately mixed with an amount of silica, neces... ... crushing and jigging.

...NG CO. **GEORGIA**

... Baker, mgr., Higdons Store, Fannin county, Ga.

...pper prospect on Mt. Pisgah, 1 mile of Higdons Store, ...y in 1917. Average strike is E. with dip of 45° N., the ...al is chalcopyrite with some pyrrhotite.

... 150' tunnel, three shafts, some test pits and open cuts.

... MINE **GEORGIA**

... Dowler, Chattanooga, Tenn. **Mine office:** Tunnel Hill, ...

... 7.50 acres and the mineral interests on two lots, 3 ... Tall built in Catoosa county. Property had been ... Mining Co.; this company made large open ... the deepest workings being 225' ... Ga.

... zone, in Knox dolomite, the ore ... and chert breccia. Some ship-

ments made in 1918 were said to be high in silica, but containing m manganese. Prospecting under way.

FREEMAN MINE GEO

Address: Cartersville, Ga. Owned by M. J. Freeman, Dallas, J. L. Smith and F. L. Smith, Cartersville, Ga.

Property: located just outside Cartersville, Bartow county, oper 1918 by Cherokee Ochre Co., which see

Geology: manganese occurs as gravel, nodular and boulder ore. has been worked at intervals by hand methods and several hundre have been reported produced. According to the Geol. Survey of G (Bull. 35), the whole ore deposits should assay: silica, 71.02; alumina manganese, 2.40; iron, 5.15; phosphorus, 0.073%.

GEORGIA COPPER CO. GEO

Office: Washington, Ga. **Mine office:** Lincolnton, Ga.

Officers: M. N. Whittaker, pres.-gen. mgr., Lebanon, Tenn.

Cap., $1,000,000; par $1.

Property: the Magruder or Seminole mine, 24 acres, held in fee and mineral rights to 901 acres in Wilkes and Lincoln counties miles from Washington, Ga., within a mile of Lovelace, on Wash and Lincolnton R. R., which connects with Georgia R. R. Show sericitic schist intruded by eruptive dikes of 2 different ages, with in schist and between schists and eruptive rocks. Lodes have an a strike of N. 30° E., to N. 40° E., and dip of 50° to vertical, averagi 14' in width, and traceable 2,200'. The ores contain pyrite, chalc some bornite, cuprite and melaconite, and are estimated by comp average 7.3% copper, 32% lead, 7 oz. silver and $5 gold per ton.

The mine, opened 1852, and closed 1862, on account of Ar Civil War, reopened 1880-1884, as Magruder Mine and operated 18 by Seminole Mining Co., which company was succeeded by Linerd & Copper M'g Co. The Georgia Copper Co. purchased the [illegible] 1917.

Development: by 4 shafts, the main being 220' deep, the others from 40'-80', a 100' air shaft and 1,200' underground workings.

Equipment: includes 175-h. p. boiler, 2 hoists 15 and 20-h. p. drill Rand air-compressor. During 1918 a 250-ton mill with W was erected. Company expected to ship in 1919.

GEORGIA IRON & COAL CO. GEO

Office: Atlanta, Ga. **Mine address:** White, Ga. Joel Hurt Center of operations is Aubrey, one mile south of White.

Property: about 12,000 acres, 8 miles N.-N.E. of Cartersville. Th Belt R. R., owned by the company, connects the various mines main railroad at McCallie, 1½ miles S. W. of Aubrey. Holdings Bishop, Peachtree, Chimney, Moccasin and Red Mountain mines.

Geology: property shows brown iron and manganese deposits 1918 only manganese was produced. Manganese properties are by 3½ miles in area. Ore is found in quartzite and limestone high percentage of barium oxide. The deposit is reported to be extending from Bishop mines, one mile south of Aubrey to Sa mines, six miles away. Bull. 35, Geol. Survey of Georgia.

Development: by open cuts at [illegible] brev tracts, each [illegible] shafts have been [illegible] complished.

Equipment: 9 [illegible] motives, dump cars [illegible] in operation.

Daily output of [illegible] velopment has been [illegible] production rate, for [illegible]

NGANESE CO. **GEORGIA**

nes Weisel, pres., 1720 12th Ave., South Birmingham, Ala.
. E. Hill, Birmingham, Ala.
e mining rights to 1,150 acres on Greene-Taliaferro county
E. Union Point, Greene county, and 4 miles N. of Robinsen,
y. Robinsen is on the Georgia R. R. Shows two parallel
mile apart, each one 3' wide, striking N. 62° E. and with
.. carrying high-grade tungsten ore readily separated from
1917 shaft was sunk 80' on main vein.
includes 12-h. p. hoist and 12-h. p. engine and boiler, be-
19.

NING CO. **GEORGIA**

Mining Co. **Address:** 727 Union Central Bldg., Cincin-

C. Collins, pres.; R. L. Tilton, v. p.; T. S. Doheman, sec.-
L. Kirkpatrick and S. Hickenlooper, directors.
il, 1917, in Kentucky. **Cap.,** $7,500; $1 par; all outstanding.
zed $75,000, outstanding $71,500; interest 7%. **Dividends:**
d 33 1-3% in 1918.
36 acres at Copper Mine Station on Seaboard R. R., Pauld-
cludes the Little Bob mine, which is owned by the American
leased to the Georgia Mining and sub-leased by them in
to the Hanna Minerals Co., 1300 Leader News Bldg., Cleve-
Produces pyrites, with average composition of 40% sulphur
per; developed by 175' incline shaft.
t: includes 500 ton mill, compressors and pumps.
n: 9 months 1917, 7,500 tons; 9 months 1918, 7,700 tons.

PYRITES CO. **GEORGIA**

d by Georgia and Tennessee Copper Co. **Mine office:** Drake-

: 400 acres, including the Tallapoosa mine in Haralson county,
Buchanan and same distance from Morgan. Property owned
was first opened in 1856 and developed at different times up
ctically unworked from that time to 1916. (Bull. 33, p. 68,
, of Ga.)
: main lode 180' wide on surface has a dip of 30°. This ex-
ith average width of 50' workable ore. A second lode lying
main lode is said to be 10'-15' thick, but no work has been
good surface assays have been reported. Outcrops trace-
0' over the tract. Ore is iron pyrite, carrying low values in
and copper with a general average of 17½% sulphur, 1.15%
$1 in gold and silver values. Eighty per cent. of the ore will
oncentration about a 2½ to 3 into 1 ton concentrate. Experimen-
tion work using Harz jigs only, gave an average close to 50%.
mined by extensive underground workings and by 2 shafts, one
a [illegible] shaft 800' N. E. of old shaft.
[illegible] a small plant costing $50,000, to handle surface ore and
[illegible] developments.
[illegible] 1916-1917 to Lessons and Georgia Development Co.; of
which

PYRITES CO. **GEORGIA**

[illegible] Pyrites Co., which see.

GEORGIA

[illegible] Cartersville, Ga.
[illegible] Cartersville and

[illegible] on 32' of ore.
[illegible] pyrite.

LANSKI MINE

Address: Samuel Lanski, 110 S. Dearborn St., Chicago, Ill.

Property: 6 lots, over 1,000 acres, near Parnell on Georgi Whitfield county, Ga. Property said to show manganese ore, mostly and some red iron ore.

Developments: carried on by G. M. McKinney in 1918, cons open cut, said to show 57.50% manganese ore.

LIBERTY PYRITES CO.

Address: J. F. Ryon, Healy Bldg., Atlanta, Ga., or L. S. Be St., N. Y. City. D. S. Leonard, supt., Hiram, Ga.

Property: 3 lots, 100 acres, 3 miles north of Hiram and sa south of Dallas, Paulding county, and within a few hundred feet o Southern R. R. property adjoins the Shirley mine.

Developed by two shafts, 70′ and 100′ deep, put down in 1910. C as medium grade pyrite in gangue of siliceous material. Company w to start operations in 1919.

LINCOLN GOLD & COPPER MINING CO.

Lincolnton, Ga. Property purchased, 1917, by Ga. Copper Co.,

Inc. June 11, 1906, in Oklahoma. **Cap.**, $2,000,000; $1 p dividend, of one-half of 1%. Was practically the successor of t Mining Co., which was a sad failure.

MARKSTEIN-DORN MINING CO.

Address: Phil. Dorn, mgr., Birmingham, Ala. **Mine addr** Bartow county, Ga.

Reported to have a lease on the mineral rights on a part of owned by W. B. Vaughan, White, Ga. This tract consists of 9 lots, in Bartow and Cherokee counties, near Pinelog Mountain, about 3 Rydal on Louisville and Nashville R. R. Mine contains manganese niferous iron.

Developed: by 150′ shaft, 180′ underground passages and so test pits, the deepest 75′.

Equipment includes steam shovel, concentration mill, double 35 h. p. boiler, 15 h. p. engine and jigs.

PAGA MINING CO.

Office: Cartersville, Ga.

Reported to have a lease on the Wyvern mine, near Wyvern, a north of Cartersville and the White mine, about 1 mile S. E. of on the Louisville and Nashville R. R.

In 1916-1917 company shipped many carloads of hard mangan said to contain 20 to 25% manganese, low iron and high chert sili Wyvern mine.

Development: on Wyvern, by open cut, hand method. C 75′ long, 70′ wide and varies from 20-30′ in depth; on White mine, shafts, 40′ and 100′, an incline shaft 100′, and about 300′ of work

REPUBLIC MINING & MANUFACTURING CO.

Reported to be operating the Sweetwater mine, two miles W. of Sumpter county.

Mine contains bedded deposit of bauxite running 56.3% alu silica, and 1.8% ferric oxide. Outcrops about 1,300′ long, average

Work done by manual labor. Production said to be about 1,000 t

SHIRLEY MINING CO.

See Georgia Mining Co.

Office: 727 Union Central Bldg., Cincinnati, Ohio.

Officers: D. C. Collins, pres.; R. L. Tilton, v. p.; T. S. Dol treas., with M. L. Kirkpatrick and S. Hickenlooper, directors.

Cap., $1,500; shares $1 par

Property: a lease on the Shirley mine, adjacent to Southe Seaboard Air Line Ry., 3 miles N. W. of Hiram, consisting of abo produces pyrites for sulphuric acid; is located about a mile from th mine. Property owned by American Minerals Co., and sub-lease

anna Minerals Co., Cleveland, Ohio, from August, 1918, to

2 shafts and considerable workings. Equipment: includes compartment Hartz jig, boiler, drills and pumps.

EASING CO. **GEORGIA**

C. Sloan, Cartersville, Ga.

out 80 acres, south of Etowah river and two miles north d from R. R. Rhea of Cartersville; also some manganese prop- son, from the Pittsburgh-Georgia Mining Co. During 1917 nts were reported from the Rhea properties, but no production r 1918-19.

includes a 15-h. p. boiler, pump and a log washer.

ANGANESE CORPORATION **GEORGIA**

ingham, Ala. **Mine office:** Doogan, Ga.

rating 160 acres owned by A. H. Green of Doogan, Ga. Mine om Doogan, near Conasanga river. Deposit is yellow clay with owing manganiferous iron ore with some phosphorus.

: in 1918 amounted to test pits and an open cut. See Bull.

EORGIA COAL & IRON CO. **GEORGIA**

teger Bldg., Chicago, Ill.

H. Kluender, pres.; P. W. Butler, v. p.; E. D. Edgerton, rts, sec.; A. L. Roberts, mgr., with J. H. Nullamore, directors. vare. **Cap.**, $800,000.

out 200 acres, at Cohutta, Whitfield county, Georgia, near ssee line, showing manganese and brown iron ore.

open cut 175′ long, 40′ wide and about 20-25′ deep. Some een made.

PERTY: **GEORGIA**

, agent, 217 Broadway, New York City.

0 acres, about three miles N. E. of Cartersville on Row- owned by the Wm. Zeigler Estate.

rty, operated by W. C. Satterfield during 1918, showed high- ore and some manganiferous iron. Operator planned to install r and a 4-cell jig.

IDAHO

nes of the State are in the Coeur d'Alene region in Shoshone roperties of that section are grouped under that name. All d alphabetically. The value of the gold, silver, copper, lead and no in 1918 was $38,140,000, or $16,700,000 less than that of 1917. d no decrease, while the silver output was $600,000 less in value, sed price per ounce. Many of the mines, particularly the e handicapped by a scarcity of labor, and even the larger mines xpense on account of the increases in cost of freight, treatment, e total production of the principal metals for 1919 was as fol- 37,800 lbs.; gold, $710,400; silver, 6,042,016 oz. In 1918 the 00,274,000 lb. lead and 47,000,000 lb. zinc. Dividends paid by in 1918 totaled over $7,000,000. The Hercules Mining Com- ip dominated by the Day family, is the largest producer; the ., second, and the Bunker Hill & Sullivan Mng. & Concen- in size.

rst half of 1919, mining in Idaho, as in other Western mining ctive than it had been for many years. This general decline used by the drop in prices of metals and the high cost of labor the first six months of 1919 the mines of the Coeur d'Alene ing at the rate of only about 250,000 tons per year, or at 60% te. The following table, from the records of the State Mining he metal output of Idaho over a period of years:

Metal	1918	1917	1916	1915	1914
Gold, oz.	36,308	41,326	53,079	60,746	62
Silver, oz.	9,572,214	12,496,017	12,205,132	12,933,619	13,621
Lead, lb.	290,848,425	395,883,000	366,594,000	369,242,000	345,334
Zinc, lb.	51,691,000	96,123,000	98,700,740	93,410,000	49,289
Copper, lb.	5,240,000	7,282,000	8,052,725	7,365,000	5,176
Antimony, lb.	.....	.....	.....	70,950	.....
Tungsten, lb.	.....	.....	.....	54,000	.....
Total value	$37,320,082	..56,292,210	$49,102,693	$39,315,312	$24,976

The grand total value in 59 years is $846,829,076.

AEOLIAN COPPER CONSOLIDATED MINING CO., LTD. IDAH

Idle. Described in Copper Handbook, Vol. XI.

ALLIE MINING CO., LTD. IDAH

Officers: E. C. Ross of the Ross Syndicate, Gilmore, pres.-gen. m T. B. Cook, v. p.; H. R. Hyde, sec.-treas.

Inc. 1905, in Idaho. **Cap.,** $300,000; $10 par.

Property: 6 claims, including the Allie mine in the Texas district, n Gilmore, Lemhi county.

Geology: lead-silver ores occur in fissure veins in flat Devonian li stone underlain by Cambrian quartzite. The Allie vein, closely parallel t lead veins, has gangue of iron oxide with no lead and only a trace of silver ore averaging 1 oz. gold and 50% iron. For geologic features see Umpl Bull. 528, U. S. Geol. Survey, 1913, p. 107.

Development: a 4,500′ tunnel has been driven into Gilmore moun by the Gilmore, and the Pittsburgh-Idaho companies jointly. This tu crosses a dozen silver-lead veins and one carrying gold ore. Development w on the Latest Out lead vein is 800′ below the outcrop. Ore reserves w claimed 1914 to be 15,000 tons, averaging $12 per ton in gold. Extensive pr pecting has not yet shown any commercial silver-lead deposits, though it opened up good gold ore.

Production: first shipment in Feb., 1914, of 26 tons of gold ore sm smelter returns of $11,060. Total production for that year was 50 tons av aging better than $300 per ton. Yield in 1917 reported to be $25,000. No r returns available.

ALPINE COPPER MINING CO., LTD. IDAH

Address: Wallace, Idaho.

Officers: C. W. Beale, pres.; A. H. Featherstone, sec.-treas.

Cap., $100,000; 10c par.

Property: 6 unpatented claims, 2½ miles N. of Adair, in St. Joe trict, which show veins containing copper ore.

No recent returns.

ALPINE MINING CO. IDAH

Address: Charles H. Treacy, mgr., Banks, Boise county, Idaho McNeill and T. Harrington, supts.

Officers: Judge Charles Kerr, pres.; R. J. Colbert, sec.-treas.; P. Nevin; J. J. McCarthy, and W. H. Maloney, directors.

Inc. 1919, in Idaho. **Cap.,** $600,000. Capital was raised in Lou ton, Kentucky.

Property: the Three Sisters claims near Banks on the Idaho N branch of Oregon Short Line. Ore carries silver and lead. An 8-mile road to be constructed. Shipments were expected to start in summer of 192

ALTA COPPER MINING CO. IDAH

Probably dead. Fully described Volume XII.

ALTA-IDAHO GOLD & COPPER MINING CO. IDAH

Probably dead. Fully described Volume XI.

ALTA MINING CO., LTD. IDAH

Address: W. B. Horn, pres., Salmon, Idaho.

Cap. $500,000; $1 par.

Property: 3 unpatented claims on [illegible] near Salmon, county.

t: by tunnels totaling 1,100', revealing a considerable quan-
r-lead ore.
curable regarding shipments.

NG CORPORATION **IDAHO**

) West Pratt St., Baltimore Md., or Bellevue, Blaine county,

H. Mencken, pres.; J. R. Kelly, v. p.-mgr.; Christopher
as.
ware: **Cap.**, $1,000,000; 10c par. Listed on New York Curb.
e Hidden Treasure and Idaho Central claims, 4 miles S. E.
half mile from railroad between Hailey and Shoshone. Ex-
r Lakes, whose report is rather non-committal. A fissure vein,
slate is said to outcrop for 2,200'. Ore consists of iron oxide
atter averaging $100 per ton in silver. A 1,000' crosscut tunnel
ation.
f Thompson & Co. of Philadelphia, has published a circular
y company has "10 special advantages over the average mine."
blic interest and support the stock in the market until it will
, a syndicate has been formed, details of which will be supplied
in 'Playing the Game from the Inside.'"—*Caveat emptor.*

EVELOPMENT MINING & REDUCTION CO.
IDAHO

E. Edwards, mgr., Gibbonsville, Idaho.
00 acres of gold lode, placer, and mill-sites at Gibbonsville,

t: by tunnels and shaft. **Equipment:** 15 stamp mill, tables,
de plant.

INING CO., LTD. **IDAHO**

Monroe Ave., Helena, Mont.
H. Kleinschmidt, pres.; Maria Kuphal, sec.; and A. H.
eas.
1910, in Montana. **Cap.**, $50,000; $1 par; issued 25,000
1.
half interest in the Blue Jacket and Queen mines in Seven
ear Landore, Adams county. The Blue Jacket mine has a
he Queen has a 1,500' tunnel; these properties said to have
$250,000 in ore, with smelter returns up to 47% copper.
include a five-eighth interest in the Peacock, White Monu-
rd interest in the Helena mines, held jointly with A. M.
Houser; and a one-half interest in the Blue Jacket No. 2,
Norman, Legal Tender, Copper Crescent and Calumet mines,
A. C. Johnson and Amelie H. Kleinschmidt.
mine, discovered 1869, is the most noted property and has
producer in the Seven Devils district, having 1,500' of
have produced 25,000 tons of high-grade ore, estimated to
s of 4½% copper ore with about $5 combined gold and
lumps now. Shipments, 1903, returned 13.3 to 18.3% cop-
oz. silver and $1.33 gold per ton; and 11 shipments to the
& Refining Co. gave returns of 20.5 to 40.2% copper, 1.15
nd $1.20 to $3.40 gold per ton. Production, 1905, was 5,000
about 45% copper tenor, equal to 750,000 lb. fine copper,
ce 1909 owing to litigation. A reorganization was to be
effected by the people who operate the East Spring Hill
Montana.

Vol. XII.

MILLING CO. **IDAHO**

Gen. Mgr., Walker Bank Bldg., Salt Lake City.

miles S. W. of Arco, Blaine county.

Ore also carries small values in silver and gold. Vein 4' wide, op
70'. A second vein cut 30' from portal of tunnel, said to show ore

ARKANSAW LEASING CORPORATION

Address: F. D. Smith, Landore, Adams county, Idaho.

Property: the Arkansaw mine of the Seven Devils Copper C
Landore. Contact deposits occur between diorite and limestone, a
copper, silver, and gold.

Development: by tunnels.

ARMSTEAD MINES INCORPORATED

(Formerly the Blacktail Mining Co.)

Address: Talache, Bonner county, Idaho.

Officers: Major H. H. Armstead, pres.-mgr., Washington, D. C
Burroughs, v. p.; Karl Junghluth, 2nd v. p.; H. D. Kingsbury, treas
Brown, sec., with C. C. Dula and J. Peterson, directors. Daniel
Lachlan, supt.

Property: the Keystone, or Blacktail mine on Blacktail mountain
side of Pend d'Oreille lake, near Talache landing. Originally ow
the Keystone Mines Corporation (See Volume XII of the Mine
book). Property sold by Blacktail Co. (Volney D. Williamson) fo
000 in June, 1917, and 13½c per share was paid on the 1,746,440 o
ing shares of the old company.

Development: by 4,000' Rainbow tunnel, intersecting vein at 3,
vertical depth of 1,000'; a 1,200' raise and about 3,000' of drifting are
expose between 60,000 and 75,000 tons of gold-silver-copper ore, av
$25 per ton, mainly in silver. Milling ore persists to 1,200' vertica
the vein is up to 7' wide. A 60° three-compartment raise at 3,800'
with No. 2 level 600' above. A concentrator is planned for 1921
men employed in 1919.

ATLANTA MINES CO.

Address: Daniel Kirby, mgr., Atlanta, Idaho.

Cap., $2,000,000; $1 par.

Property: 10 patented claims, mill-sites, and water-rights i
district, carrying gold-silver ore.

Development: by 600' shaft and extensive workings.

Equipment: hydro-electric plant, hoist, compressor, aerial tra
ton concentrating mill and cyanide plant. No recent data obtainab

AURORA-SAMPSON MINING CO.

Consolidated Jan. 14, 1916, with H. E. M. Mng. Co. to form the
Union Mining Co., which see.

BACHELOR MOUNTAIN MINE

Address: C. L. Kirtley, Challis, Idaho.

Property: 4 claims on Estes mountain, said to show gold an
ore in a strong fissure vein in andesite, that runs E. W., and dip
to the north. Developed by 300' tunnel, depth on vein 200'. No ore
or milled.

BANNER AND CROWN POINT MINES

Address: Charles Hussey, Empire State Bldg., Spokane, Wash.

Property: 2 old silver mines said to have produced $3,000,000
in 1918, after being closed 25 years. One shoot stoped said to be
by 500' [illegible] to have averaged 102 oz. per ton.

[illegible] from 650' shaft, 375' below
[illegible] miles.

quartz, carrying gold and silver. **Development:** by tun-
(Nissen)-stamp mill, using pan-amalgamation and con-
ssor and electric power. Developing at last accounts.

OLD MINES, LTD. **IDAHO**

rwood Bldg., Spokane, Washington.
y Dudman, pres.; J. I. Springer, v. p.; with Dr. E. A. C.
ley, Clay Lavinder, and J. H. Vehrs, directors. G. H.
as.; C. W. Beckley, mgr.; C. A. Lowe, cons. engr.
ngton and registered in Idaho. **Cap.**, $1,500,000; **$1** par.
aims on Tungsten mountain, 20 miles N. E. of Bonners
y county, and 4½ miles E. of Copeland on G. N. R. R.
C. A. Low. Veins consist of quartz fissures cutting
show near surface, and include iron pyrite, chalcopyrite,
rite. There is also some tungsten and molybdenite.
400′ of surface trenches exposed several large veins and
gers paralleling and running into the Dora vein. These
unnels, revealing fair ore in places. The main tunnel
for over 100′, showing 2 to 7′ of ore, and is being ex-
being sunk in 1920.
d development to April, 1919, cost $35,000

& M. CO. **IDAHO**

Petikan, pres.; G. W. Sommer, sec., Old Nat'l. Bank
Vash.
0; 50c par.
gold quartz and 3 placer claims in Buffalo Hump district,
ped by 600′ of workings.

MINING CO. **IDAHO**

okery Bldg., Spokane, Wash.; and Hailey, Idaho.
nond Guyer, pres.-mgr.; Wm. Black, v. p.; J. M. Bengel,
J. Clark and K. J. Dixon, directors. E. G. Bowen, mgr.
1917, in Idaho. **Cap.**, $1,500,000; $1 par; all outstanding.
claims, 4 patented, 280 acres in Mineral Hill mining
unty Ore contains gold, silver, lead and zinc with iron
n quartz fissure veins in limestone.
consists of 2,700′ of workings, including tunnels, 600′,
ngth. Reported 10,000 tons of ore blocked out in 1917.
ver ore was opened in 1918, also 1919, on the 550′ level.

PPER & GOLD MINING CO., LTD. **IDAHO**

DuBois, Pa.; and 807 Newhouse Bldg., Salt Lake City,

E. DuBois, pres.; Chas. J. North, v. p.; F. O. Frick, sec.;
s. and gen. mgr.; with L. N. Morrison, directors.
Virginia. **Cap.**, $2,000,000; $1 par. Bonds, $500,000, at 6%.
ourth Tuesday in January. Is a close corporation.
wn Bear mine and adjoining ground, covering 29 claims,
s, in the central part of the Blackbird district, Lemhi

3 shafts, with drifts and numerous short tunnels. Ore-
r replacements along fracture zones in schist and quartz-
n one of the best mineralized sections of the state and is
zones of disseminated ore carrying 2½% copper and 5
h per cent of copper. Said to have spent $1,000,000 on
and ore testing.
owns 97 claims, 87 patented, adjoining the Cactus mine
co district of Utah. This property has considerable de-
as explored by diamond-drilling. Development of the
old shaft disclosed a vein of chalcopyrite.

BLACK PINE MINING CO.

Office: 926 W. Lehigh Ave., Philadelphia, Pa. **Mine office:** I
Idaho.

Officers: S. J. Rieben, pres.; Louis H. Michel, v. p.; Dr. Wm. F
treas.; R. T. Moyer, sec., with J. B. Shourds, Dr. Fred Bridg
Thompson and Jas. McGrath, directors.

Inc. Feb., 1913, in Arizona. **Cap.**, $1,000,000; $1 par.

Property: 41 claims, 700 acres, includes Black Pine and Crow
mines, at Elk City, Idaho county.

Ore: carries gold and silver, in veins believed to be a contin
the Mascot lead vein, and averaging $12 per ton in gold, silver,
zinc.

Development: by 1,400' tunnel.

Equipment: compressor, drills, 5-stamp mill, and concentrat

Production: 40 tons of ore daily early in 1918.

BLACKSTONE MINING CO.

Address: J. H. Hawley, pres., Boise, Idaho.

Cap., $1,000,000; $1 par.

Property: 5 patented claims in Volcano district, carrying go
copper ore. Developed by 400' tunnel.

Idle for years.

BLACKTAIL MINING CO.

Address: W. L. Wakeley, sec., Grangeville, Idaho.

Cap., $200,000; $1 par.

Property: 6 unpatented claims, 9 miles from Grangeville, Idah
Ore carries copper, gold, and silver. Developed by short tunnel.
of $7.60 silver ore opened in November, 1919.

BLAINE & EMMETT MINING CO., LTD.

Address: M. Hebblethwaite, pres., Union, Idaho.

Cap., $1,000,000; $1 par.

Property: 4 unpatented claims near Union, Shoshone county,
copper and lead ore.

BLUE GROUSE MINE

Owned by V. W. Brasch, Paulsen Bldg., Spokane, Wash.

Property: in the Orogrande district, 1½ miles N. W. of O
Idaho county, said to have the extension of veins opened up in
ing Umatilla mine.

Development: 600' of tunnels, said to show veins 4½ to 10' w
aging $12 per ton in gold and silver.

BLUE JACKET COPPER CO., LTD.

Company has discontinued operations. Fully described Col
per Handbook.

BLUE JACKET MINING CO.

Address: Lucile, Idaho county, Idaho.

Officers: W. B. Clark, pres., Johns Hopkins University,
Md.; B. N. Baker, v. p.; J. M. Lockard, sec.-treas., with E. T.
Frank E. Johnesse, mgr., directors.

Inc. Oct. 20, 1908, in Idaho. **Cap.**, $50,000; $1 par; fully pa
meeting, first Monday in January. Company is a close
Property: 7 claims, patented, about 140 acres, in Orogra
district, Idaho county.

Geology: ore occurs as
osite porphyry. Ore body

.5 oz. silver, and $1.80 gold per ton. Reserves estimated at 542,000
operty has no mill, hoist, or reduction plant of any kind and has
ed down since 1909 awaiting railroad transportation, which is still
away. Property is a good one and officers able and responsible.

KING PLACERS CO. **IDAHO**

ess: Wm. MacLeod, pres., Boise, Idaho.
$1,250,000; $1 par.
rty: 740 acres, gold-bearing ground, on middle fork of Boise river,
ounty.
ment: 4-mile flume, 4 giants and 2 elevators.

OCHESTER MINING CO. (INC.) **IDAHO**

rty sold. See Vol. XIII.

A MINING CO. **IDAHO**

s returned unclaimed from Montpelier, Bear Lake county, Idaho.
s at last accounts: Col. E. J. Parrish, pres.; E. M. Stewart, v. p.;
ng, sec.; H. H. Hoff, treas., with Chas. Sweet, M. F. Whitman
affin, directors.
ov., 1905, in Idaho, successor of Montpelier Copper Mining &
o. **Cap.**, $5,000,000; $1 par.
ty: 25 claims, unpatented, 500 acres, 9 miles S. W. of Mont-
he Oregon Short Line.
y: the U. S. Geological Survey report (Bull. 430-B, p. 49)
he geological occurrence of the ore as an impregnation of sand-
anderlying shale, only 4' thick in all, with copper carbonate stain
with carbonized fossil plant stems. There is no well-defined
Good specimens are obtainable but average value is very low.
r bed is traceable for 8 miles on the east side of a red bed ridge
a rocks.
pment: includes a shaft 350' on a dip of 50° and a 50' shaft
th. Property regarded as of doubtful value.

IDAHO GOLD DREDGING CO. **IDAHO**

s: E. Walker, sec., Idaho City, Idaho.
ty: placer ground in Boise basin, Boise county, on which a
operating, but as gravel was exhausted the boat was dismantled

old Hill lode mine at Quartzburg was then acquired. It has
producer for 54 years, and the new owners are increasing de-
and output.

DAHO MINING CO. **IDAHO**

720 Scollay Bldg., 40 Court St., Boston, Mass. **Mine office:**
lvine county, Idaho.
Levi Diamond, pres.; Joseph Briggs, v. p.; Winthrop, Me.;
lle, sec.; E. M. Schwarzenburg, treas., with A. H. Bailey,
e; David A. Calhoun, Portland, Me.; J. H. Hickey, Boston,
C. Smith, directors; C. Fred Howe, supt., Ketchum, Idaho.
28, 1907, in Maine **Cap.**, $2,500,000, in 1,000,000 common; $1
preferred, $10 par. In treasury $200,000 common, $1,300,000
mited debt, $125,000 authorized, $110,000 issued.
the consolidated with another company of same name, operating
s on Elk and Moore creeks, near Idaho City, which has a
Napoleon mine.
320 acres, 9 claims, 7 patented, 12 held by location, 8 leased
collaters at Royle Min. Idaho, comprising one zinc and
deposits.
over a granite-limestone contact showing fissure
feet wide, cutting across the granite. Veins
containing argentiferous galena, zinc blende
and replacements. The ore ship-
and 18 oz. silver to 79% lead and

36 oz. silver, per ton, with 19% to 54% zinc. Over a million doll of ore is reported to have been taken out by former owners.

Development: 3,000' tunnel work with depth of 900'.

Mine is said to have been taken over by the Wood River M

Property large, and company thus far has not been able to de lead-silver and to explore the zinc deposits.

Equipment: includes 100-ton Traylor mill. Buildings include laboratory, 2 warehouses, boarding house, bunk house, 2 smithies, 2 powder houses, a 5,000' sawmill, 2 ore houses and 8 dwellings.

BOULDER CREEK MINING CO.

Address: A. F. Stevens, sec., Silver City, Idaho.

Cap., $5,000; 1c par.

Property: 7 unpatented claims, 12 miles S. of Silver City, county, has been opened by 500' tunnel. Ore carries gold and sil

BROADFORD MINE

Address: William Sowden, Box 92, Bellevue, Blaine county, I

Property: 2 patented silver-lead claims near the Mare mine district. Said to show a fissure vein in limestone with S. E.-N. V

Development: a drift, tunnel and a shaft 50' deep. Is a pros

BUFFALO HUMP-CRYSTAL LAKE MINING CO.

Address: W. B. Chandler, sec., Paulsen Bldg., Spokane, Was

Cap., $100,000; $1 par; assessable.

Property: a gold quartz prospect in Robbins district, Idaho

BULLION MINING CO., LTD.

Address: James H. Taylor, pres. and mgr., Wallace, Idaho.

Inc. 1902, in Idaho. **Cap.,** $1,500,000; $1 par; all issued; 9 ass one-half cent a share, levied up to Nov. 1, 1912, yielding $39,229.

Property: 16 claims, 2 patented, 320 acres, in Shoshone cou Lookout, 2 miles from the C. M. & St. P. railway, and 4 miles fr station, on the No. P. line, on the Idaho slope of the Bitter Ro with a good wagon-road to Borax. Property has a quartz vein o width, with average of 6 to 12', and nearly vertical dip, carrying copper ore, 2-4' wide, mainly chalcopyrite.

Development: by shafts and crosscut tunnels, one 200' vertic the other. The upper one has 130' crosscut and 186' drift on vein. drilling in 1919 indicated a large orebody, and in November a revealed 3-4% ore. One 40-ton shipment early in 1918 carried 6 with some gold and silver.

Equipment: includes steam power, 12-h. p. hoist, Pelton wh air-compressor, drills and dwellings.

BURNS M. & M. CO.

Address: David Farmer, mgr., Nampa, Idaho.

Cap., $500,000; $1 par.

Property: 7 claims in Canyon county, carrying gold, silver, Opened by short tunnels.

Idle at last accounts.

CARBONATE CENTER MINING CO.

Mine office: Mullan, Shoshone county, Idaho.

Officers: Archie Gillis, pres.; John H. Foss, v. p.; John E. sec.-treas., with John Erickson and Hans J. Rice, directors.

Inc. 1912, as successor of Tombstone Mining Co. **Cap.,** $1 par. Last assessment of 1 mill per share called Nov. 5, 1914.

Property: 8 claims, near the Carmen mine, on Stevens gulch, Mullan, shows a promising vein of [illegible] silver-lead ore. The zone has a [illegible] workings, showing ore that has [illegible] silver per ton. Idle at last [illegible]

CARIBOU GOLD & COPPER [illegible]

Office: Idaho Falls, [illegible]

H. Wakeman, pres.; Joseph Empey, v. p.; with A. J. Arave and Frank A. Putnam, directors. A. V. Scott,

1903, in Idaho. **Cap.**, $2,500,000; $10 par; assessable; d, 189,000 in treasury. Annual meeting, 3rd Monday in

Monte Cristo mine, near Bonanza, Custer county. nd silver. On 150' level vein said to be 12' wide. Late reported having given a lease on the mine.

MINES CO. **IDAHO**

Fanning, Pocatello, Idaho.
shares 1c par; all outstanding.
claims and a mill-site, 2 claims and mill-site patented, in rict, Bonneville county, 42 miles from Soda Springs. The erated in the early 70's, but was closed down on account ent, after an accredited production of $200,000 from free-

by tunnels and 280' shaft.
were said to be 12,000 tons in 1915, averaging $6.14 gold

0-stamp mill, 100-h. p. engine, air-compressor, and hoist.

K MINING CO. **IDAHO**

ion City, Lemhi county, Idaho. J. W. F. Halcombe, pres.-arlan, v. p.; Wm. Wallace, treas.
5, in Washington. **Cap.**, $1,000,000; $1 par; 999,500 issued.
laims, about 140 acres, 16 miles from Salmon, said to carry ving gold, silver, and copper. Assessment work only was recent returns.

ER CO., LTD. **IDAHO**

llan, Shoshone county, Idaho.
Martin, pres.; A. P. McRae, v. p.; C. D. Miller, sec.-Richardson and Gust Almquist, directors.
daho. **Cap.**, $1,500,000; shares $1 par; assessable; 1,400,000

claims, 4 fractional, 175 acres, carrying a good water-e Reindeer, on the northern slope of Stevens peak, about lan. Vein is in quartzite.
by 3 tunnels, the uppermost showing a body of chalcopy-not been found in the lower tunnel. The upper, or No. ong, with 3 crosscuts; No. 2 tunnel, 1,500' long has 1,300' drifts; No. 3 tunnel was 350' long, 1917, at last accounts. veral open-cuts and pits, showing ore of about 3% copper show up to 4' of solid ore, carrying chalcopyrite, with nd bornite. No. 1 tunnel shows an ore shoot up to 40' 175' long, averaging about 2% copper, with small values , with a paystreak of 6 to 18" assaying 5 to 35% copper. upper levels in 1917, but mine was closed in 1919.

NING CO **IDAHO**

17.
T. Badger, sec.-treas., Utah National Bank Bldg., Salt **Mine office:** Mackay, Custer county, Idaho.
. R. Hall, pres.; C. T. Mixer, v. p.; with O. D. Mallory lirectors; H. A. Brown, supt.
Utah. **Cap.**, $100,000; non-assessable
claims, unpatented, in the Alder Creek district, 6 miles Developed by tunnel, with 1,500' of workings, showing

CLARENCE RAY-BUFFALO HUMP GOLD MNG. CO.

Address: Fred. Hasbrook, sec.-treas., E. 2629 First St., Spok

Cap., $100,000; 10c par.

Property: 8 claims in Robbins district, Idaho county, de tunnel.

CLARINDA COPPER MINING CO.

Secretary's office: 50 Broad St., New York. **Mine office:** Cl Idaho.

Officers: J. E. White, pres.; J. P. Delaney, v. p.-sec.; C. I. W with Thomas Compton and J. E. White, directors.

Inc. April 1, 1916, in Arizona. **Cap.,** $1,500,000; $1 par; 875, U. S. Corporation Co., New York, registrar and transfer agents.

Property: 5 claims, 102 acres, in Pend Oreille district, 3 m Clarks Fork, Bonner county. Examined Sept., 1919, by J. K. As

Geology: country rock is quartzite and slate, cut by a d which forms hanging wall of the Lone Pine vein. Ore consists c quartz gangue with sulphides of iron, and copper carrying gold Property also contains the Woodman vein.

Development: the Lone Pine vein has been opened by 3 t being 590' long. Tunnel No. 3 cut 2' of silver-lead ore, said t per ton. A crosscut tunnel with back of 1,200' is expected to c in 1920. An 8" vein of rich silver-copper ore was opened below No. 3

Equipment: includes electric power, motor, compressor a machinery.

CLAYTON MINING & SMELTING CO.

Address: L. Greene, managing director, care Utah Fire Cla Lake City, Utah; also, the agent at Challis, Idaho.

Property: consists of extensive holdings near Clayton, Cus 60 miles N.-W. of the Oregon Short Line terminal at Mackay, in Ella group at Clayton, Red Bird group on Squaw Creek, Silver on Slate Creek, Skylark group at Bayhorse, and a 100-ton smelt ton. The Red Bird mine is the principal property, containing copper-gold ore. Ore occurs in well-defined veins opened to depth of 900' by shafts and crosscuts. The smelter was closed d 1915, after an unsuccessful run of one month, during which it 2,700 bars of bullion, containing high silver values. Developme now being done under lease system. About 50 cars of ore ship 1918, averaged 40% lead and 30 oz. silver per ton.

CLEARWATER GOLD & COPPER MINING CO.

Mine office: Wallace, Idaho.

Officers: Samuel Seidenfeld, pres.-mgr., 1027 W. 10th Ave Wash.; Herman A. Bush, v. p.; J. H. Wourms, sec.-treas.

Inc. August, 1907, in Idaho. **Cap.,** $2,500,000; $5 par, assv outstanding.

Property: 16 claims, 13 patented, including the Cunningham the north fork of the Clearwater river, 50 miles south of Wallace county; nearest rail point Amador, with 6 miles of wagon-road a of trail. Property shows a vein in quartzite said to be traceab 1 mile on company's land, carrying oxidized ores near surface, copyrite and chalcocite at depth assaying up to 3½% copper 60c and 1½ to 2 oz. silver per ton.

Development: by 3 tunnels, lower tunnel, 1,900' long, cuttin at the face 300' below surface. Management estimated 18,000 on dumps, June, 1915, and total reserves at 300,000 tons.

Equipment: includes hoist and air compressor. $ $250,000 was contemplated in 1917 to provide funds for aerial tram, new ment and [illegible] but latest [illegible]

CLEVE[illegible] MINING CO.

Addr[illegible]

of Grangeville and 8 miles S. of Elk City, Idaho county. A and water supply are available. No recent returns.

OOD MINING CO. **IDAHO**

10 Gunn Block, E. 152nd St., Cleveland, Ohio. J. C. Northrup, se, Wash.

: F. G. Garrett, pres.; Gustav Kirchner, v. p.; E. N. Conrad, with F. C. Lohiser, A. L. Cornwall, H. O. Hess and H. A. ectors.

gust 29, 1917, in Ohio. **Cap.**, $12,500; $1 par; all issued. An- g first Tuesday in September.

y: 300 acres, (the Mizpah mine), 17 miles from Harvard in ty, leased for 3 years (to March, 1922), from Merger Mining see. Ore carries copper, with some precious metals.

tion: in summer of 1918 was 3 carloads of high-grade ore, 38 g for $3,921. A mill is contemplated.

ed by W. H. Linney, of Spokane.

L MINING & MILLING CO. **IDAHO**

l. XII for details of fake promotion.

A COPPER MINING CO. **IDAHO**

s: J. F. Andrieux, Paulsen Bldg., Spokane, Wash.

: Jos. Huber, pres.; J. F. Andrieux, sec.-treas., with O. D. Houle,

ay, 1914, in Idaho. **Cap.**, $2,500,000; $1 par; assessable.

y: a consolidation of the properties owned by the Aeolian Cons., the Marguerite Mng. Co. and the California group, all near oshone county, Idaho, and all long idle.

oment: by tunnels. Said to have spent $60,000 on property. grade ore opened.

TION MINE **IDAHO**

: Judson Spofford, principal owner, Boise, Idaho. A company organized early in 1919.

y: 5 unpatented claims near Profile, Valley county, Idaho. nite carry gold, silver, copper, and lead, opened by 300′ work-

WEALTH MINING CO. **IDAHO**

01 Empire State Bldg., Spokane, Wash.

J. F. Sexton, pres.; M. A. Phelps, v. p.; C. H. Williams, treas.; l, sec.; H. W. Wolfe, asst. sec.; all of Spokane, directors.

500,000; $1 par. Annual meeting in January.

: 140 acres, on Hayden creek, 2 miles from Hayden lake, unty. Ore carries silver, lead and copper, but chiefly silver.

nent: by shaft, winze, and sump, 585′; tunnel, 740′; drifts and ′. Engineer reports 15′ of ore, assaying $30.17, and 8′, assay- ith total width of milling ore on lower level, 24½′. Estimate 80,000 tons, worth from $9.84 to $36.70 per ton. A strong 90′ high and 60′ wide above the surrounding country, is ugh three claims, engineers pronouncing it a contact fissure zite and chlorite slate. Oxidized zone extends to 185′ level. ad gave $30 per ton.

: 120-h. p. steam plant, 100-h. p. water heater; 2 air-compres- mps and drills. Operations have been conducted for two ree of from 15 to 30 men.

IN MINE **IDAHO**

W. Weiler or F. A. Stacy, Mackay, Idaho.

5 claims, formerly owned by Copper Basin Mining Co., akay, Custer county. Ore shipped assayed 10½% copper, me silver. A large quantity of ore was said to be ready 1919. Transportation difficulties have been a drawback. ctor of Mines reports that the deposit is encouraging.

COPPER BASIN MNG. CO.

Described in Volume XIII. Property passed to new own 1919. See Copper Basin mine.

COPPER CHIEF MINING & MILLING CO.

Office: Troy, Idaho. P. Johnson, v. p.

Cap., $1,000,000; $1 par; assessable.

Property: 2 unpatented claims, 10 acres of homestead E. of Troy, Latah county.

Undeveloped. Idle since 1917.

COPPER GIANT MINING CO.

Officers: Rev. J. G. Lake, pres.; Rookery Bldg., Spokan M. McKinnon, sec.-tras.; with H. F. Thibadeau, Dr. H. J. Bet Young, directors. B. Haberman, supt.

Cap., $1,500,000; $1 par; 1,100,000 issued.

Property: 5 claims and 3 fractions, 3 miles W. of Clarks county. Ore is chalcopyrite, carrying some silver.

Development: by 3 tunnels aggregating over 1,500′ in le in Nov., 1918, were said to be good.

COPPER QUEEN MINING & SMELTING CO.

Office: 608 Lonsdale Bldg., Duluth, Minn. **Mine office:** S county, Idaho.

Officers: Geo. H. Crosby, pres.-gen. mgr.; Emerson Hil McLennan, sec.-treas., with C. W. McFadden, W. M. Harris Clarke, directors. A. F. Bennett, supt.

Inc. June 12, 1905, in Arizona. **Cap.,** $500,000; $1 par; is Absorbed 1908, the Copper Queen & Crescent Mining & giving 1 share for 8.

Property: the Queen of the Hills mine, 17 claims, 320 Eureka district, 7 miles N. W. of Salmon, is said to show 3 fissure veins in granite and schistose quartzite, with a ge strike. The Eva, or westernmost vein, shows an 8 to 14″ q the wall of a brecciated zone 5′ wide. The central, or Q Nellie veins show 12 lodes of granite breccia partly cement The ore is coarsely crystalline quartz, carrying pyrite, cha some galena, with $3 to $5 in gold occurring in 5 known or the Nellie, 2 in the Queen and 1 in the Eva vein.

Development: by shafts of 105′ and 400′ with 5 levels and longest 450′ with 4,700′ of workings.

Equipment: includes 100-h. p. electric plant, 24-h. p. h 700′, 5-drill air-compressor, gyratory crusher, 15 stamps, a tables.

Property idle at last accounts.

COPPER & URANIUM MINING CO.

Letters returned unclaimed in 1919 from Clyde, Butte Co

Officers: N. P. Hansen, pres.; M. H. James, v. p.; A sec.-treas. and mgr.; and James Shail, directors; H. Hill, su

Assessment of 1/5c a share levied July 30, 1917.

Property: known as the Automatic mine, near the Wil the Hamilton district, 40 miles from Arco, has a 125′ shaft on vein between limestone and quartzite, said to show copper ores.

Development: by 800′ tunnel at a vertical depth of 400′, are reported to have been driven on 15′ vein with a narrow s 7% to 17% copper. A new tunnel was contemplated, but no received.

CORONA MINING CO.

Office: 833 S. 9th St., East, Salt Lake City, Utah. **Mine** ton, Idaho.

race Lewis, pres.; Clyde A. Torrey, v. p.-mgr.; J. A. Bar-
e Lewis, treas.
. **Cap.**, $50,000; 5c par.
unpatented claims in the Bay Horse district, Idaho, 5 miles
Custer county.
t; by 200' tunnel being driven to encounter a 4' fissure
with N. W.-S. E. strike and dip, 45°. Sample as reported
40 oz. silver, and $5 gold.

LD & COPPER MINING CO. **IDAHO**
ad. See Croesus Mining Co.

NING CO. **IDAHO**
C. Robertson, Spokane, Wash.
e Croesus mine, 4 miles west of Hailey, Blaine county, has
mpartment vertical shaft, on a 20 to 60' fissure vein of
ip, in granite; pay streaks on both walls said to carry chal-
alue mainly in gold. There also is a nearly vertical blind
joining the main vein at depth, carrying silver-lead ore at

includes steam and electric power, and a 12-drill electric
The 100-ton concentrator has 10 stamps, crusher, rolls, and
s.
me time. Under previous owners, output was $75,000 in

E MINING & DEV. CO. **IDAHO**
00 acres in Yankee Fork district, Custer county, Idaho, in-
ntana and Sunbeam groups, also mill, power plant and
beam Cons. Mines Co. An aerial tram connects the mine
am. The Montana mine was operated during 1916 and
ore is said to have been found. Mine is an old producer.
ations began in 1917, but were suspended in January, 1918.
company was forced into bankruptcy proceedings, and in
mine was bought by G. Von Brecht and J. I. Love, of
s for $30,000. A new company is to be formed, and work

LD MINING CO. **IDAHO**
B. Ellis or G. R. Caustin, Bonners Ferry, Boundary county,
gue Ave., Spokane, Wash.
Cap., $3,000,000; $1 par.
hat of the Deer Creek Gold Mining Co., 20 miles E. of
A cyanide plant was to be erected in 1919. In November,
l offices in Spokane, where the Redemption gold machine
d stock sold.

MINING & MILLING CO. **IDAHO**
orest, Lewis county, Idaho.
. J. Orr, pres.-gen. mgr.; Philip Myers, v. p.; E. C. Orr,
S. Q. Orr, B. F. Pool, J. P. Lorang, W. K. Noble, A. J.
B. Frysinger, directors.
,000; $1 par.
7½ claims, 17 miles S. W. of Winchester, in the Salmon
shows orebodies 10 to 20' wide, carrying copper ore with
ne vein has 4' of chalcopyrite ore developed by a tunnel;
d to have been spent in development and equipment, latter
of flume, water wheel, and compressor, and 125-ton mill,
gamation, gravity concentration and flotation.

INES CO. **IDAHO**
: Nampa, Idaho. **Mine address:** care M. T. Rowland, Dem-
hy, Idaho.
T. Payton, pres.; M. T. Rowland, v. p. and gen. mgr.; A.
-treas.; with E. A. Drake, W. L. De Remer, directors

E. W. Rowland, 1st asst. gen. mgr.; Harold Rowland, 2nd asst. J. H. Winchell, assayer; A. F. Mattern, met. eng.

Inc. in Idaho. **Cap.**, $15,000,000; $5 par. Bonds, $250,000 iss

Property: 38 claims, 600 acres, 38 miles S. E. of Murphy county, shows fissure veins in granite that run N. E.-S. W. a by cross fissures 5 to 12' wide. Ore is sulphide carrying gold

Development: by tunnels and shaft. Over 4,000' of new work June, 1918. Reserves in No. 1 were estimated as worth $400,000

Equipment: hoist, compressor, 100-ton mill using ball-mill, ney flotation machine, 4 Senn tables, Oliver filter, roasting furna plant, auto-trucks, etc.

Production: several carloads of concentrates were shipped during 1918. Producing 100 tons of concentrates daily in 1919.

DENVER COPPER CO.

Address: H. M. Ross, incorporator, Spokane, Wash.

Property: 200 acres, in Pine Creek district, Shoshone coun on which the Admiral vein is said to be exposed by surface wo 3,000'. A 15' shaft opened 8 to 10" of 6% ore. No recent returns

DREADNAUGHT MINING CO.

Address: W. J. J. Smith, Wallace, Idaho.

Officers: M. P. Flannery, pres.; J. E. Codd, v. p.; C. P. Lin

Property: 7 claims near the New York and Manhattan cla Cons. Interstate-Callahan, Coeur d'Alene district, Idaho.

Development: by tunnels. At depth of 730' No. 1 shoot is and said to contain 10 oz. silver, 12% lead, and 4% zinc. All ore little copper and gold. In May, 1918, a shoot of fair-grade ore w

DRILLING DEVELOPMENT CO.

Address: C. W. Sherwood, mgr., Salmon, Lemhi county, Idah

Property: the Gold Dyke group of 18 claims, 13 miles E. Deposit consists of porphyry dike, estimated to contain 3,000,000 $5.50 per ton in gold and silver, with some zinc and lead. Mini by open-cut.

Equipment: a 200-ton cyanide mill employing the Koering p completed July, 1919, and was enlarged in August. A hydro-elect plant was also under consideration. Costs are expected to be per ton.

DULUTH-LEMHI MINING CO.

Company out of business. Described in Vol. XII.

EAGAN COPPER MINING CO.

Address: Wallace, Idaho.

Officers: Roy A. Henkle, pres.; J. T. Dickinson, v. p.; L. L. sec.-treas.; above with Tom Eagan, F. E. Rice and F. C. Blakely

Inc. 1916, in Idaho. **Cap.**, $125,000; 10c par.

Property: 2 miles from Adair in the St. Joe district, unde ment by Tom Eagan since 1892. Claims reported to show copper 220' upper tunnel, and for 420' in lower tunnel. In December, was reported to be 5' of 50-oz silver ore showing in a stope.

ELMORE COPPER CO.

Address: 137 South La Salle St., Chicago, Ill. Wm. O. Reu

Inc. in Idaho. **Cap.**, $5,000,000; $1 par.

Property: 8 claims, 160 acres, 10 miles from the Boise cor said to show ore throughout entire holdings.

Development: by 980' of drifts and crosscuts and 300' shaft of 150' there was reported to be 8' of 16.5% copper and 15.3 oz. A compressor and machine drills were to be installed.

EMPIRE COPPER CO.

Office: T. J. [illegible]

Utah. Mine [illegible]

Officers: [illegible]

ree, directors. Morton Webber, gen. mgr. and cons. eng.
supt.
1907, in Maine. **Cap.**, $1,200,000; shares $1 par; 1,000,000
Stock listed on Salt Lake City and Kansas City Stock Ex-
al meeting 3d Tuesday in May.
as free from debt at end of 1919.
23% in 1913; none in 1914; 18% in 1915; 17% in 1916;
d 10% in 1918; a total of $880,000.
he White Knob Copper Mine, 3 miles south of Mackay
River branch of the Oregon Short Line, with 39 claims, 18
res, also mill and smelter sites of 480 acres, and a railroad
the Alder Creek district, Custer county, Idaho.
roperty carries a great number of lenticular contact replace-
z porphyry and granite porphyry. The property is remark-
uliar ore deposits, varying greatly in size and shape, occurring
phosed garnetized margin of contact, garnetization existing
ces for fully six hundred feet from the contact. The geol-
arefully studied and is described by Kemp in Transactions
for 1917, and in Genesis of the Mackay Copper Deposits, by
y, Econ. Geol. The ore is largely a cupriferous pyrite with
lla derived from its alteration. The average assay of the
ore mined in 1916 was copper, 4.008% gold, 0.04 oz.; silver,

nt: mine has a glory hole, 125 to 200' wide, but mining is
nel. The property is opened by 46 tunnels and five shafts,
al of underground workings in excess of 17 miles. The
al depth has been attained in the Cossack tunnel, which is
ving a depth of 1,800'. This tunnel opens ore at 900' below
oducing level. Levels are at 125' intervals, and the cost of
ne level is $100,000. Only shipping ore is mined, the last 9
averaging 5.5% Cu., 2.5 oz. Ag., and $1 gold per ton.
: includes steam driven air-compressors having a capacity of
ine-shop, blacksmith shop, bunk-houses, boarding-house and

the mine is reached by an 85-mile branch of the Oregon
R. Co., running from Blackfoot to Mackay, and is connected
les Empire Railroad, owned by the company, of 36" gauge,
two 33-ton and one 35-ton Shay mountain climbing locomo-
ars. The line has a maximum gradient of 9%, with a rise of
one 6% grade on a 34° curve. A 3-mile aerial tram of 100
apacity was erected in 1918 to replace this railway, and reduce
es 80%.
mine is not operation, ore being shipped to the A. S. &
at Garfield, Utah, for treatment:

Tons Mined	Lb. Copper	Oz. Gold	Oz. Silver	Value
66,807	.....	.....	.....	$1,139,110
69,475	4,990,147	2,860	123,253	.....
54,295	4,702,119	3,155	125,135	.....
18,251	2,012,244	962	53,768	.....
34,222	3,565,479	1,812	92,805	.....

ines, employing 100 men, are extracting 1,500 tons of 4 to 8%
0.
of men employed has been from 150 to 225. The Empire
is the principal copper mine of Idaho.

EVELOPMENT CO., LTD. **IDAHO**

W. S. [illegible] pres. treas., Dooly Bldg., Salt Lake City; Judge
[illegible] Browne, sec., with Judge Wm. Bradley, directors.
[illegible] shares in treasury.
6 claims and 5 millsite and a ¼ interest in the Bay State

group of 4 claims, also a ¼ interest in the Idahoan and a ½ in Richmond claims, located in Mineral Hill mining district, B 7½ miles from Haley. Said to show a fissure zone in limestor with strike N. 40° W. and dip 70° N. E.

Ore: silver-lead, and a little copper and zinc. Reported shipped, assayed 60 oz. silver and 50% lead; gold in the ore sel ing 20c a ton.

Development: by a 425′ incline shaft with 6 levels, and sev Idahoan claim has a 750′ shaft, 1,800′ from the incline shaft on claim. More than half the ground between the shafts is unde possibility of finding new ore-shoots is said to be good.

The Eureka is said to have produced $300,000 and t $1,500,000.

Equipment: includes hoist, boilers, and a 75-ton mill.

Property has been idle for some time, but company plannin development.

FALLS CREEK MINING CO.

Address: W. C. Ames, pres., Sandpoint, Bonner county,

Cap., $500,000; $1 par, assessable.

Property: 4 claims, 3 miles E. of Pend Oreille Lake, near Ore carries lead, copper, and silver.

Development: by tunnels. A 50-ton mill was erected in A Over $50,000 had been spent on property to that date. The was being extended late in 1919.

FERN QUICKSILVER MINING CO.

C. H. Richmond, mgr.

Property: a quicksilver mine at elevation of 9,000′, in Yello trict, Valley county, 70 miles from Cascade, which is 40 miles over bad roads. Freight costs about $100 per ton.

Surface work and tunneling has been done, and a 12-cylind McKay type retort furnace was treating 3 tons of 5% ore d accounts.

FORT HALL MINING & MILLING CO., LTD.

Address: C. W. Pomeroy, sec., Pocatello, Bannock county

Officers: Wm. A. Hyde, pres.; C. W. Pomeroy, sec.; L. F with M. A. Hendricks, W. H. Witty, and T. H. Doane, directo

Cap., $350,000; $1 par. Stock listed on Salt Lake City Ex

Property: 23 unpatented claims, 7 mines from Pocatello, sa Bell, State Mine Inspector, to show big, low-grade deposits of sulphide ores, not as yet profitably mined.

Development: by 6,000′ of tunnels, 300′ shaft, 200′ winze, 1 and 300′ of crosscuts. Equipped with steam power and 50-ton

No recent information.

GILMORE MINING CO.

Offices: 222 Kearns Bldg., Salt Lake City, Utah; and Gilm county, Idaho.

Officers: Edgar C. Ross, pres. and gen. mgr.; Frank H. Harry R. Hyde, treas.; Clarence Warnock, sec., with E. B. directors.

Inc. Feb. 10, 1912, in Utah. **Cap.,** $1,000,000; shares $1 par, outstanding $800,000. Bonds authorized, $100,000; none issued. a close corporation. Annual meeting, January 2. All receipt spent in development work. Has levied 2 assessments, last one 1918, payments to run until August, 1919.

Property: 12 patented claims, 250 acres, in the Texas minin Gilmore, was purchased from the Allie Mng. Co., Ltd.

Ore: gold-silver in fissure veins in limestone, said to have value of $14.50 per ton. Veins strike N. 10° E. and dip 60°. Se Bull., 528, p. 107.

ent: by a 60° incline shaft and tunnels, greatest depth of the vein is 850'. Total workings, 8,800'. This company in ith the Pittsburgh-Idaho and Allie Mining companies has evelopment and transportation tunnel into Gilmore Moun- said to cut a number of lead-silver fissures and one important

n: shipments early in 1917 totaled $72,084, ore averaging 0.025 oz. silver, and 23.16% lead.

K MINING & MILLING CO. IDAHO

A. Kirby, sec.-treas., Paulsen Bldg., Spokane, Wash.
E. V. Thompson, pres.; A. G. Crum, v. p.; Paul Boekmier g with J. H. Fussy, C. C. Burr, directors.
in Gold Creek district, Latah county, considered promising. lition said to be satisfactory and work proceeding at last

ATION DEVELOPMENT CO. IDAHO

O. W. Lewis, Wallace, Idaho.
V. H. Haylin, pres.; Harold Williams, v. p.; H. G. Loop, sec.- hn Brizel and O. W. Lewis, directors.
9.
the old Singiser gold mine, a group of 18 claims in Lemhi es from Salmon, idle for past 12 years. The property has nd is equipped with compressor, drills, and stamp-mill with which was kept in good order during the shut-down, and is l by adding tables and flotation machines.

& IOWA MINES CO. IDAHO

by Boston-Idaho Gold Dredging Co. of Idaho City, Idaho. Quartzburg, Boise City, Idaho, E. E. Carter, mgr.
Gold Hill and Iowa group, at Quartzburg, also the New- otal of 43 claims, veins consist of porphyry, carrying quartz ging $10 to $12 per ton.
nt: by 20,000' tunnel work and a 350' shaft.
: includes electric power, compressor, drills, and 150-ton Hardinge mill, tables, and cyanide plant.
: total to date is given as over $7,000,000.

CO. IDAHO

V. H. Stowell, H. G. Twomey, or J. W. Higgins, managers
er of Commerce Bldg., Spokane, Wash.
n old-time gold producer at Rock Bar, in Elmore
Mountain Home.

E JUNIOR MINING CO.

R. Koering, cons. eng., Grimes Pass, Idah
00; $1 par.
00 acres in Boise Basin district, Boise co
lver ore.
t: by a 1,700' tunnel; a second tunnel
mining ore and shipping concentrate
15-stamp mill. A 300-ton mill is
3,000 tons, also 1,000 tons of concen

an Investment Co. of Grand Rapids, Mi
mpany.

ST MINE

vian Green, gen. mgr., 45 W. 34th St., New

claims, 1 mile E. of Murray, Coeur d'Alene
artz vein in Prichard slate. Ore from
the gold easily recovered
Gold and tungsten occur

is confined to the disturbed part of the vein and is almost free
The gold shoots are free of tungsten, though in mining, both bec
to some extent.

Development: consists of over 13,000' of workings.

Treatment: in Bull. 128 of the A. I. M. E., R. R. Goodrich
Holden described tests made on this ore, tungsten with a little g
siderable clean scheelite is sacked direct for market. It was
gravity concentration gave 53.7% tungstic oxide concentrate,
pyrite, not a marketable product; flotation does not clean the c
properly and loses tungsten in the overflow; roasting and magne
tion of the pyritic tungsten material yields over 60% grade; a
extraction of WO_3 is about 90%. A new mill was erected in 19

GOLDEN GATE PLACER MINES

Office: Pendleton, Oregon.

Officers: C. E. Penland, pres.; B. Parlett, sec.; J. T. Lambi
with C. H. Norris and H. M. Elder, directors.

Cap., $75,000; $1 par.

Property: in Idaho county.

GOLDEN GLOW MINING CO.

Office: 403 Commercial Bldg., Portland, Ore., T. Papworth,
and treas. R. J. Haynes, supt.

Cap., $750,000; shares 50c par.

Property: 18 miles N. of Ketchum, Blaine county, contains
silver-lead-copper ore, opened by tunnels. Operated intermitte
ing 1918 a small force of men was employed, and in July, 1919,
tons of high-grade ore was mined ready for shipment.

GRAY COPPER MINING CO., LTD.

Mail returned in 1919, from former address: Osborne, Shosho
Idaho. E. F. Hull, pres.; W. H. Herrick, sec. and mgr.

Cap., $375,000; shares 25c par.

Property: 7 claims, 2 miles from a railroad, on McFarren
miles from Osborne, shows a vein of 6 to 20' surface width, deve
combination crosscut and drift tunnel, showing mainly gray c
said to average 17% copper, 20 oz. silver, and $10 gold per ton.
idle.

HAMILTON MINING CO.

Office: 307 Benton St., Portland, Oregon.

Officers: R. E. White, pres.; A. N. Hamilton, sec.

Cap., $2,400; shares $1; all outstanding.

Property: on the South fork of Salmon River, Idaho coun
pany reported, October, 1917, to have purchased the Grand Ce
consisting of 2 claims in Cable Cove district, near Sumpter, Bak
Oregon, formerly owned by Mollie Gibson Gold M. & M. Co.

Development: by 500' of tunnels, said to show an ore-bearing
2-4' wide. The tunnel was to be extended 400' at last report.

HARMONY MINES CO.

Offices: 605 Hearst Bldg., Chicago, Ill., and Salmon, Idaho

Office: A. W. Nieman, pres.-gen. mgr.; C. F. Nast, v. p., O. G
asst. sec.; with C. Nickelsen, Henry Cohen, A. C. Shafyard, C. V
Morries D'Hoare and Richard de Sinet, directors. Gladys Niem
W. Reihman, treas.; E. F. Nieman, cons. eng.-gen. supt.

Inc. Jan. 22, 1916, in Nevada. Cap. $1,000,000; $1 par. Treasury
issued. Annual meeting, third Thursday in January.

Statement for 1916 shows income from stock sales, etc., $
ing expenses, $1
In 1918 $
1917, $50,490
$50,000 o

998. The only debt was $10,000 on the property reported

claims, being patented, in Washington Creek mining unty. Examined by J. A. Herndon and J. F. Inglis of W. Coples of Leesburg, Idaho, and R. O. Clifford of

osit consists of shear-zone in schist, dipping 70° with e. Orebody is from 2 to 12' wide, and shoots average 4' n length. The principal mineral is chalcopyrite assaying per.

by 750 and 180' tunnels, and various crosscuts, with workings. Ore reserves estimated at 53,840 tons. The er tunnel is to be driven along the Contention vein to ength of the shoot.

aerial trams, one a jig back two-bucket plant of 50 tons nd 2,400' long; the other a friction grip tram of 100 tons 0' long. Also 2 fuel-oil driven compressors of 10-drill transmission-line, and 100-ton concentrating mill con- Tests show that the mill recovery should be 77%.

2 tons of ore and 5,376 lb. of copper in 1916; 500 tons and and 100 tons and 20,000 lb. in 1918. Total value of output as $15,798. Last two carload shipments averaged 9.5 and

00 has been spent on the Harmony mine, which seems able merit.

NING CO. **IDAHO**

ess. See Vol. XIII for description of property.

LITE CO. **IDAHO**

lmon, Lemhi county, Idaho.

group of claims in the Blackbird district, 36 miles W. of e ore-zone shows disseminations of cobalt-sulphide ore in changing to the northwest granite, both rocks being in- dikes. This district has long been known for its copper p concentration mill was in operation in 1919, testing out

ING CO. **IDAHO**

ayton, Custer county, Idaho.

L. Carpenter, pres., 800 1st Nat. Soo Line Bldg., Minne- E. Smith, v. p.; Wm. M. McCrea, sec., with S. C. Sherrill, City, directors; W. E. Smith, supt.

group of claims 15 miles from Clayton, on which develop- vein 20' wide has disclosed an ore shoot 2½' wide, the ore 3% lead, 114 to 211 oz. silver, and $3.80 to $6.80 gold per report. One carload shipped to the smelter netted $1,700. ore can stand the long haul to the railroad.

IDAHO

olle & Woolfolk, Burgdorf, Idaho county, Idaho.

gold mine in the Marshall Lake district, on which there is cted 1918. Total output said to be $300,000.

ER M. & D. CO. **IDAHO**

C. Brower, pres., 1329 Old Nat'l Bank Bldg., Spokane.

43 claims, 19 miles E. of Coeur d'Alene, Kootenai county. claims leased in 1916 said 200,000,000 tons of ore were exposed d shoot carried gold, silver, copper, uranium, cobalt, zinc, arsenic. A reduction plant was planned 1918. The the mine cause suspicions as to its value.

MILLING CO. **IDAHO**

Kootenai county, Idaho.

Officers: G. H. Martin, pres.; A. W. Bowen, treas.; John L
F. S. Hayes, supt.

Inc. June, 1916, in Idaho. **Cap.**, $1,500,000; $1 par.

Property: 11 claims and a fraction, total 225 acres, lying
miles E. of Hope, on main line of N. P. R. R. Ore said to contai
copper, 3 to 10 oz. silver, and up to 69% lead. Is a prospect, de
a short tunnel.

HORSESHOE COPPER CO.

Address: D. J. Archibald, sec., Mackay, Custer county, Idal

In August, 1919, it was reported that the U. S. S. R. & M.
lease and bond on the mine until December and was mining an
3 carloads of copper ore per week, with a force of 25 men.

IDAHO ANTIMONY MINING CO.

Letters addressed to H. L. Williams, Seattle, Wash., managin
returned in 1919.

Property: in Yellow Pine mining district, near Cascade, Vall
shows stibnite ore 18 to 30" wide, developed by 4 tunnels. T
shipments, 1915-16, are reported to have yielded 47% antimony,
returns.

IDAHO CONTINENTAL CO.

Address: Porthill, Idaho.

Officers: A. Klockman, pres. and gen. mgr., 711 Paulsen B
kane, Wash.; J. B. Whitehill, v. p.; R. Schacht, sec.-treas., w
Robinson, Wm. Wraith, directors. James Wilson, supt.

Inc. 1909, in Washington. **Cap.**, $1,500,000; shares $1 par;
John D. Ryan, through the International Smelting & Refining Co.
$325,000 for the development of the property on condition that
a 10-year contract to treat the company's ores.

Property: 20 patented claims, 26 miles from Porthill, Bounda
Idaho, N. of head of Priest lake, said to show a strong vein i
with a succession of ore-shoots, 8' to 20' wide, carrying galena.
shoots have been opened to a depth of 700' and on that level ex
in length.

Development: by 3 drift tunnels on the vein, the lowest (No
1,600' long with a back of 500'. Reserves above No. 4 tunnel
mated to be 250,000 tons at the end of 1918, including 20,000 tons
ore in stopes.

Equipment: a hydro-electric plant 12 miles from the mine, s
drill compressor, assay office, shops, 1,750' ground tram, 150-to
trator, replacing that burned in 1915, 2,000' aerial tram across the
river, and 13 motor-trucks. A narrow-gage railway from the
Porthill, 26 miles is to be built.

Production: total shipments to Sept., 1919, exceed 19,000 ton
ore and concentrate. Daily output of concentrate is 13 tons. D
the ore shipped contained 7,000,000 lb. of lead and 129,000 oz.
Output from July to September, 1919, 2,400 tons of concentrate
$62 per ton. About 100 men are employed, when property
operation.

The Idaho Continental is considered to be one of the impo
mines of the State, and has been rapidly developed despite its iso
tion and high cost of operation.

IDAHO COPPER MINING & SMELTING CORP.

Address: Simpson, Thatcher & Bartlett, 62 Cedar St., New

Property: the I. X. L. copper group, 60 claims, in the Hea
Adams county, 75 miles N. of Boise, 10 miles from the Huntingt
of Oregon Short Line, and 16 miles by road from Pacific & Idaho
Line, a branch of the O. S. L. at Weiser. (Described by R. N.
Inspector of Mines, in E. & M. Journal of September 6, 1919.)

Geology: the district embraces Cudday mountain, 8,000' hi

uartz hornblende diorite, or monzonite. The mountain is S. and E. by horizontal lava flows of basalt. The western ountain show monzonite, cutting large bodies of green- with included masses of marbleized limestone containing netamorphic minerals and lenses of characteristic sulphide mountain slopes show slate, shale, and limestone, with ons of andesite, basalt, and other igneous rocks. The I. X. large part of an erosion basin; near the crest of the moun- a well-defined zone, 400′ wide and a mile long, of more ed monzonite, in which the numerous shallow pits and pper carbonate stains and threads of chalcopyrite. Wide- ation is indicated by large patches of brown stained rock. slope a second zone 800′ wide and a mile long traverses claims. This also shows a carbonate and sulphide ore. Mr. his property a possible 'porphyry copper,' in spite of the ous well-known engineers. Mr. M. R. Straight, of New od to be prospecting the deposit for local people.

t; includes numerous surface cuts, and crosscut tunnel ary, 1920. Drifting both ways 500′, in 100′. In this tunnel n by Mr. Bell, from the 350′ to 650′ points averaged 1% nts in gold and silver. Combined samples from a 40′ sec- 3%. The values occur in chalcopyrite.

ORATION CO. **IDAHO**

iley, Idaho.

group of patented claims in Kelly Gulch, W. of Hailey, A rich strike made in 1915, said to have disclosed an ore- wide, assaying 110 oz. silver and 70% lead per ton. Under il interrupted by the war.

MINING CO. **IDAHO**

Idaho Carbonate Hill Mining Co., which see.

COIN CO. **IDAHO**

by the Salger Seed Co., La Crosse, Wis. at last accounts. t., Landore, Idaho.

the Black Lake section of the Seven Devils district, arries gold ore assaying from $12 to $16 per ton. Company 0 in 12 years development work and built a 50-ton cyanide e. No recent news.

& RUBY MINING CO. **IDAHO**

nia, Boundary county, Idaho.

M. Schnatterly, pres.; S. A. Deardorf, v. p.; M. L. McCor- 2628 Dalton St., Spokane, Wash.; with A. B. Babb, di-

000; $1 par.

,500 acres of placer ground and quartz claims near Lenia. ny's engineer estimated 300,000,000 cu. yd. of gravel avail-

company spent $12,000 in 1917 on a plant capable of ,000 cu. yd. of gravel daily. Work in 1918 was confined to ditch by steam-shovel, erecting a pipe-line, flume, sluice- 9-in. giants for hydraulicking. In the summer of 1919, 35 rk and property was about ready for sluicing.

LOS ANGELES M. & M. CO. **IDAHO**

J. Dunn, Wallace, Idaho.

00; $1 par; assessable; last assessment levied Oct. 15, 1919. claims, 7 patented, in Beaver and Placer Center mining ne county, said to show a well defined vein containing lead- opper ore. Developed by 250′ tunnel with various crosscuts.

RAL MINING CO. **IDAHO**

ox 326, Spokane, Wash.

Officers: D. W. Cassidy, pres.-treas.; C. E. Adams, v. p.; B. B. [illegible] sec.; with C. H. Pugh, M. C. Guilbert, and O. E. Cushing, directors.
Inc. Oct., 1909, in Washington. **Cap.,** $150,000; 10c par; 1,350,000 [illegible]. Annual meeting 1st Monday in October.
Property: 4 claims, 80 acres, on east side of Lake Pend d'Oreille [illegible] ner county. Group contains a fissure vein in quartzite, with silver-le[illegible] having some copper and gold.
Development: by 350 and 600' tunnels, and a total of 2,300' of [illegible] ings with a maximum back of 350'. A long crosscut tunnel being [illegible] in 1919 will give a back of 550'.
One car of sorted ore shipped in 1918 netted $48.60 per ton. [illegible] output to date is 2 carloads. Is regarded as a good prospect.

IDAHO MINES SYNDICATE [illegible]
Address: 120 Broadway, New York.
Controls the Unity Gold Mines Co., which see.

IDAHO-MONTANA AMALGAMATED MINING CO. [illegible]
Letters sent to Bonner's Ferry returned unclaimed.
Owns the Idaho-Montana mine, near Kalka station on the [illegible] Northern R. R., 7 miles E. of Bonner's Ferry, Bonner county.
Developed by a 400' incline shaft which discloses a 2 to 4' [illegible] diorite with ore containing lead and silver values associated with [illegible] phide, expected to develop copper with depth. Has 50-ton concen[illegible]
Considered promising.

IDAHO-NEVADA EXPLORATION CO., LTD. [illegible]
Address: Wallace, Idaho.
Officers: M. J. Mahoney, pres.; Jos. Peila, v. p.-gen. mgr.; E. [illegible] sec.-treas., with A. B. Livingston and August Holst, directors. [illegible] Lively, mgr.; S. L. Shonts, cons. engr. at last report.
Inc. 1914, in Idaho. **Cap.,** 1,500,000 shares; shares given to those [illegible] ing to pay an assessment of 1 mill per share every 2 months.
Property: 3 lode claims, the Castle Rock, Smart Alec and Arl[illegible] and a mill site, formerly owned by the Castle Rock Mining Co., [illegible] miles S. E. of Wallace on Placer Creek. Ore occurs as chalcopyrite [illegible] vein in quartzite.
Developed to depth of 250', by a crosscut driven to intercept the [illegible] vein.
Equipment: includes compressor and hoist. A carload shipped [illegible] Tacoma smelter in 1915 said to have assayed .04 oz. gold, 10.8% [illegible] 10.5% silica, 35.7% iron. Surface equipment and buildings destroyed [illegible] snowslide, January, 1916; since re-built.
In June, 1919, mine was sold at forced sale for $60,000 to [illegible] mortgage and interest amounting to $73,916. The original owners [illegible] the property.

IDAHO NORTHERN MINERAL CO. [illegible]
Mine office: Murray, Idaho.
Officers: F. Swanson, pres.; Vina Burton, sec.-treas., with A. [illegible] and J. A. Sangren, directors.
Inc. in Washington. **Cap.,** $1,500,000; shares $1 par.
Property: 18 unpatented claims, on the [illegible] from Murray, shows copper, lead, silver and gold [illegible]. Developed to depth of 400' by 1,500' tunnel. [illegible] stage.

IDAHO-SEATTLE MINING CO. [illegible]
Office: [illegible]
Officers: [illegible]
Margett[illegible]
Inc. [illegible]
ing and [illegible]
dation and [illegible]

3 claims, 2 patented, 60 acres, known as the Copper Queen
cy creek 8 miles from Tendoy, Lemhi county. Claims show
pyrite, copper glance and quartz in fissure veins dipping at
. Ore occurs in shoots 20" to 16' thick, reported to average
½ oz. gold, 1 oz. silver per ton. One shoot is 500' long.
,600' of workings to depth of 300'. Ore is mined by overhead

t: includes a 20-ton concentrator whose output assays 30 to
to 2½ oz. gold and 8 oz. silver.

NDARD MINES CO. **IDAHO**

E. H. McAuly, mgr., Warren, Idaho.
5 claims in Warren district, Idaho county, showing veins of
re developed by 2,000' tunnel work, etc.
t: includes a mill with crusher, Huntington mill, vanners,
ine.
n: about $4,000 monthly for past two years.

GSTEN CO. **IDAHO**

ear lease on the Ima Cons. M. & M. Co. (which see). No

ING CO., LTD. **IDAHO**

1918 by Sunshine Consolidated Mining Co., which see. De-
. XIII.

LIDATED MINING & MILLING CO. **IDAHO**

Ima, via Landore, Adams county, Idaho, but letters returned.

in Idaho.
21 patented claims near Ima, on Patterson creek, 31 miles
lore, Ida. Tungsten was discovered on this property in 1903,
ined until 1911.
ly hulnerite with some wolframite, occurs in white quartz
1-10' thick in a formation of pre-Cambrian sedimentaries,
ling silicious schist. The quartz gangue shows lead, zinc and

ent: aggregates about 2,500' of tunnels and drifts.
t: includes a 50-ton concentrator with flotation unit. Prop-
ked under a 1-year's lease by the Idaho Tungsten Mining
shipped about 12 tons of 60% tungsten concentrates. Under
Jeffs and E. W. Johnson in 1916.

NCE MINING CO. **IDAHO**

in Wood River district acquired by Federal M. & S. Co., for

ONAL MINING & METALS CO. **IDAHO**

Hyde Bldg., Spokane, Wash.
embraces the former holdings of the Silver Tip Mining Co.,
st Coeur d'Alene region, on the Montana side of the
from the Snowstorm mine. This prospect had 800' of tun-
counts.

MINING CO. **IDAHO**

[illegible] pres.; Lenn Demers, v. p.; P. Martin, sec.-treas.;
[illegible] and O. J. Boringertner, directors.
Cap., $1,000,000; shares $1 par; $500,000 outstanding.
2 and 7 mills per share levied June, 1913.
well timbered and watered, 3 miles from rail, in St.
[illegible] concentrating ore, with an 18" vein of

[illegible] of about 700', and 2,400' of
[illegible]. The workings show silver
[illegible] percentage of copper.

Equipment: includes gasoline power and necessary mine buil
Apparently idle.

I. X. L. GOLD MINING CO., LTD.

Address: H. W. Dorman, Caldwell, Canyon county, Idaho.

Inc. in Idaho. **Cap.**, $200,000; $1 par; all issued.

Officers: Douglas Fleming, pres.; L. S. Diller, sec.; W. H. treas.; H. W. Dorman, mgr.

Property: 120 claims in the Westview district, near Pearl. a 4' contact vein between granite and porphyry, carrying sul lead and silver with some gold.

Development: by 3,000' tunnel giving a back of 550'. Idle t years.

JACK WAITE EXTENSION MINING CO.

Address: J. T. Ellarson, sec., Murray, Idaho.

Officers: Chas. McElroy, pres.; M. Schuelman, v. p.; J. T. sec.; Theo. Bedard, mgr. and director. John T. Pollock, supt.

Inc. in Idaho. **Cap.**, $1,000,000; $1 par; 823,000 issued. Annua first Monday in July.

Property: 53 claims on Big Beaver Creek, adjoining the Ja on the E., 9 miles from Whitepine, on the N. P. R. R. 3 claims balance on Montana side of the divide, in Sanders county, reporte the extension of the Jack Waite veins.

Geology: fissure vein 6-12' wide cuts slate and granite.

Development: by crosscut tunnel on Idaho side, which will c one at 650', a second at 1,000' from portal, claimed to be 6' wide an gold-silver values.

Equipment: includes a 12-h. p. gasoline engine and compres

JACK WAITE MINING CO., LTD.

Address: Union, Shoshone county, Idaho.

Officers: E. Winsby, pres.; Robert Shuffuls, v. p.; C. E. Ch sec.-treas.; C. I. Grimsmoe, supt.

Inc. Nov. 26, 1909, in Idaho. **Cap.**, $1,500,000; $1 par; asse assessments. Stock listed on Spokane Stock Exchange.

Property: 3 patented claims on Tributary creek, 10 miles fro said to show a vein in slate dipping 60° S. W. and pitching N. 70° of orebody is given as 300' by 10' and average of ore from 8 to 15

Development: by 2 tunnels, 1,400' and 2,900' long, respectiv greatest depth of workings, which total 5,000', is 1,300'.

Production: in 1917 was $76,465; ore was also shipped during

KENT PLACER GOLD MINING CO.

Address: S. W. Kent, Montpelier, Idaho.

Officers: S. W. Kent, pres.; Chas. Barber, v. p.; H. M. Mc treas.

Inc. in Idaho. **Cap.**, $500,000; shares 10c par; 4,000,000 issue

Property: 640 acres gold placer ground on south fork of Sn near Alpine, Bonnerville county, 80 miles from Montpelier, neare point. It is said that the gravel averages $5.60 per cu. yd. Inf tion from uninterested sources indicates a value of 90c a yard. I idle.

KING DAVID CO.

Address: 446 Peyton Bldg., Spokane, Wash. **Mine office:** Ne

Officers: A. R. Tunnisch, pres.; F. C. Dolke, v. p.; P. A. Hug L. A. Smith, [illegible] with J. A. Brown and T. W. K. Whitlam, dire

Inc. Aug. [illegible] in Washington. **Cap.** $1,500,000; $1 par; issued

Prop[illegible] Creek district, L

t: 165' shaft with 135' drift on vein, and several crosscuts. includes steam hoist, compressor, pump, etc. A prospect.

OUP **IDAHO**

L. Kirkham, owner, White Bird, Idaho county, Idaho.
claims, 61 acres, in Camp Howard district, Idaho county, ntact vein in granite and diorite. Ore contains copper sul- gold, silver values and is said to assay $25 per ton.
t: by 60' tunnel.

ER CO. **IDAHO**

W. Emmens, Hailey, Blaine county, Idaho.
claims in Lake Creek district, worked by company during vith shipments of 200 tons of 36% zinc ore, to company's oma.

ETALS CO. **IDAHO**

Mabry, pres., Hutton Bldg., Spokane, Wash. T. C. Cun-

00; 10c par; assessable.
patented claims, the Conjecture mine, 4½ miles E. of er county, Idaho.
t: by 2,000' tunnel and 230' shaft, said to have blocked out e.
oncentrating plant was to be finished during 1919. Hydro- s also to be developed and transmitted 3 miles to the mine.

PER CO. **IDAHO-WASHINGTON**

A. Patrick, pres.-mgr.; T. E. Coleman, v. p.; Luther as.; with E. E. Younge, Charles Zeige, V. C. Hill, and tors.
000; shares $1 par; 2,175,000 outstanding.
claims, 40 acres, in Deadwood mining district, 3 miles n, Boise county, Idaho; and 4 claims, about 25 miles N. of n county, Wash. The Idaho property has free-milling ore, ing granite-porphyry and giving assays of from $48 to $76 roperties inactive, but work was to be started late in 1919. roperty reported held under lease and bond. Company also ares in Lakina Kennecott Mining Co.

ER MINING CO., LTD. **IDAHO**

tah county, Idaho. Idle since 1907. See Vol. XI, Copper

MINING & SMELTING CO. **IDAHO**

lmore, Lemhi county, Idaho.
lph Nichols, pres.; D. L. Nichols, v. p.-sec.-mgr.; F. A. vith A. C. Cherry and F. B. Watson, directors.
1910, in Idaho. **Cap.**, $500,000; $1 par.
m ore sales in 1918 was $163,293, and operating expenses **Dividends:** $10,000 paid in 1918.
he Latest Out mine, 1 and a fraction patented claims, at is a lead-silver-gold producer. (See full description by s. Am. Inst. M. E., Vol. XLVI, pp. 937-9, 'Lead-Silver Mines

sure veins that cut limestone beds at right angles, contain nonite and hematite replaced by lead ore. Sulphides appear h depth. Ore reported to average 25% lead, 25% silica, sulphur, 10 oz. silver and 0.03 oz. gold per ton. Ore-shoots 1' wide, and have a southerly rake.
t: by 900' shaft, and total of 16,000' of workings. Reserves: ked out with an equal quantity of possible ore. In Decem- l orebody was being mined on the 600' level.
includes a 40-h. p. gasoline hoist and 750' gravity tram.

Production: $163,293 of ore shipped in 1918, and about $1 date. Average grade was $22.50 per ton.

Apparently a good mine.

LAWRENCE MINING & MILLING CO., LTD.

Office: 427 Eagle Bldg., Spokane, Wash. **Mine office:** C Idaho.

Officers: Jos. Reed, pres.-mgr.; W. W. Wood, v. p.; S. Hi treas., with O. A. Turnbow and A. Loding, directors.

Cap., $75,000; 5c par; 1,426,815 outstanding.

Property: 10 claims, 1½ miles from Clark Fork, Bonner c to carry gold-silver-copper-lead ore in fissure veins 2" to 9' thick

Development: 3,000' of tunnel and drifts and a 160' incline

Equipment: 60-ton concentrator, pump, and compressor. C assay 75% lead and 17 oz. silver per ton. A carload in Dece was settled for $2,526. Total net receipts were $55,000 to that dat

LEAD KING MINING CO.

Merged August, 1917, into Eclipse Mining Co., which see.

LEESBURG GOLD DUST MINING CO.

Office: 420 Constitution Bldg., Salt Lake City, Utah.

Officers: D. H. Wenger, pres.; W. C. Burton, v. p.; W. S. B treas.; with E. W. Stifel and T. H. Pollick, directors.

Cap., $1,500,000; $1 par; 1,096,705 issued.

Property: 4 claims, 2 patented, at Leesburg, Lemhi county, I posit is a contact vein between granite and quartzite, containi to average $7.50 per ton in gold and silver.

Development: by 150' shaft and tunnel, with workings totali

Equipment: includes steam plant and a 10-stamp mill and cy Development only reported done in 1919.

LEESBURG MINING & POWER CO.

Address: M. H. Phillips, supt., Mackinaw, via Leesburg, Le Idaho.

Cap., $1,000,000; $1 par.

Property: 29 claims in Mackinaw district, carrying veins silver ore.

Development: by 165' and 200' shafts with over 2,500' of w

Equipment: hydro-electric plant, hoist, 40-stamp mill, sawmil duction reported to total $125,000 up to 1915. No recent returns.

LEMHI GOLD MINING CO.

Formerly operated the property of the Virginia Cons. Minin Baker, Lemhi county, Idaho, which is now worked by the Mines & Leasing Co., which see.

LIBERTY BELL GROUP

Address: E. M. Griffith, owner, Grangeville, Idaho county,

Property: 3 claims in Buffalo Hump district, which contain to 35' wide. One vein has a shoot showing 5' of rich gold o some galena and petzite (a telluride of gold and silver).

Development: by 400' tunnel, and considerable surface wor

Reported that $7,000 was spent on property during 1918, b resulting from the discovery of such rich ore on the surface, stop development.

LITTLE NORTH FORK COPPER M. & M. CO., LTD.

Address: T. R. Mason, Kellogg, Idaho.

Officers: T. R. Mason, pres.; J. E. Jones, sec.; John Locke, Archie McDonald, J. Koldenbaugh, and H. S. Savage, directo Huskins, supt.

Inc. Sept., 1903, in Idaho. **Cap.,** $1,500,000; shares $1 par 1 mill per share called September, 1914.

Property: 10 claims, known as the Handspike mi[illegible] on L

e North Fork, 12 miles from rail, in Kootenai county. the Horst-Powell holdings.

: by the 2,320′ No 1 upper tunnel, showing ore assaying per, 1 oz. silver and $1.20 gold per ton, and the No. 2 ,500′ showing a 12 to 18″ paystreak of argentiferous copper s $8 to $30 per ton. Property claimed to have $200,000 ore blocked out.

R MINING CO. **IDAHO**

. First South St., Salt Lake City, Utah. **Mine and works** ter county, Idaho.

Ivers, pres.; J. T. Finlen, v. p.; Henry Welsh, sec.-treas., dge and H. A. McCormick, directors; J. P. Boyle, mgr., at

Utah. **Cap.,** $150,000; shares $1 par; changed 1916 to c par; assessable. Stockholders privileged to purchase new f 3 for each old share held. Dividend of 25c a share, paid Stock listed on Salt Lake City Exchange.

Co. was incorporated June, 1917, as a holding company to more of the Lost Packer Mng. Co. stock.

claims, 4 patented, in the Loon Creek district, 112 miles the nearest rail point. The mine and smelter are in the above sea-level, but an auto road runs to the mine. Claims number of iron outcrops, covering two contacts, two miles estone diorite contact, the other between limestone and e outcrops are of favorable character.

t: by drift tunnels, No 1 having a back of 450′, No. 2 a No. 9 a back of 870′, latter showing rich ore, and planned of 2,000′, ultimately. Tunnels show vein to be 2 to 7′ wide, idth of 15 to 18′, carrying ore said to average 9 to 16% cop- gold per ton, with a paystreak of 2″ to 5′ width, proven to for a distance of 500′, and depth of 400′. Mine is developed See U. S. Geological Survey Bull. 530 G.

one time employed 80 men at the mines and 400 horses were le supplies and output.

about $225,000 has been expended on surface improvements ncluding the smelter, but excluding the 50-ton oil flotation ilt in 1915. The property has water power, with an elec- assay office and necessary mine buildings.

has a 100-ton water-jacket blast furnace, making matte of r, 25 oz. silver and 8 to 10 oz. gold per ton, with slags run- 0.2% copper. The smelter ran 24¾ days in the summer of ,800 tons of ore, and producing 380 tons of matte. Total d of 1915 was $800,000 Management estimated 20,000 tons pes expected to net $4.97 per crude ton.

ably idle, due to remote location and economic conditions.

R MINING & SMELTING CO. **IDAHO**

Vyoming. **Cap.,** $3,000,000; $5 par, as a holding company, uire the outstanding stock of the Lost Packer and other es.

GOLD MINING CO. **IDAHO**

ire Bldg., Boise. **Mine office:** Idaho City, Idaho.

os. Brown, pres.; E. W. Barry, v. p.; Fred V. Tinker, mgr., note, F. E. Johnesse and John G. Huber, directors; T. E. s.

0, 1914, in Idaho **Cap.,** $500,000; shares $1 par; 320,000 ng. Annual meeting second Tuesday in January.

claims, 120 acres, in Gambrinus mining district, 6 miles City, Boise county, said to show a shear zone, 3-40′ wide.

of granite porphyry, carrying some quartz streaks and considera
The orebody runs E.-W. and dips about 60°. Ore is free gold.

Development: by 300' shaft and 840' tunnel to depth of 360'
of drifts and crosscuts.

Equipment: includes 12"x14" compressor, electric power, 10
oil engine direct connected to 55 k. w. electric generator, 100-to
mill and electric hoist.

Ore reserves: estimated Feb., 1916, 130,000 tons of ore. C
production of $130,000 under former owners. Present manag
petent and property considered promising.

LUCKY BOY MINING & CONCENTRATING CO., LTD.

Address: Mullan, Shoshone county, Idaho.

Officers: M. D. Needham, pres.-mgr.; F. O. Morrison, v. p.;
sec.-treas.; with P. J. Scoles, directors.

Inc. Jan., 1907, in Idaho. **Cap.**, $1,000,000; $1 par; assess
issued.

Property: 6 unpatented claims, 90 acres, 3½ miles E. of M
up Gentle Annie gulch. Quartz vein cuts through shale, and
said to average $2 gold, 2% lead, 1 oz. silver, and 3% zinc.

Development: by 250' tunnel. Work was started through
Star company's tunnel, and by March, 1919, the face was in 1,55
a depth of 500'.

A prospect.

MANDARIN MINES CORPORATION

A reorganization, 1914, of the Yellow Jacket & Gold Minin
cers at that time were: C. W. Pope, pres., 25 Broad St., New Y
Catlin, v. p., 60 Broadway, New York; with C. E. Pope, H. E.
John B. Hastings, directors.

Inc. 1914, in Nevada. **Cap.**, $1,000,000; par $1.

Property: 4 claims, patented and 3 millsites, on Yellow J
in Lemhi county, 45 miles S. W. of Salmon City, was a produc
ore above a large fault was exhausted. Gold ore occurred in a
Said to have produced $600,000 in the past. Mine has been idle
years.

MASCOT MINING & MILLING CO.

Address: Pocatello, Idaho. **Mine office:** Hailey, Idaho.

Officers: Charles Peter, pres. and mgr.; J. M. Stevens, se
J. Weber, asst. treas.; with Ferd. Walther, J. W. Lorenzen,
Otto Schulze, A. H. Freber, and P. Gardner, directors. H. E. Jo

Inc. March 4, 1916, in Idaho. **Cap.**, $1,000,000; $1 par; 80
Annual meeting, first Monday after first Tuesday in October.
expenses in 1918 were $52,000.

Property: 18 claims, 4 patented, at Peter, near Hailey, in W
Creek mining district, Blaine county, said to show gold, silver a
phide ore in a vein in limestone-shale formation. Examined by
ski, and described by Higgins in 'Salt Lake Mining Review' is
tember 15, 1916; November 15, 1917; and October 30, 1918.

Development: by tunnels and 4,000' of workings, giving d
Main workings are on the Silver Fortune claim. A double-t
tunnel, being driven, 1919, and was 260' long in July.

Equipment: air-compressor, oil engine, and complete
hydro-electric plant is planned, also a 200-ton mill.

Company is well financed and is developing its property

McKINLEY GOLD MINES CO.

Letters returned March, 1918 from former

Inc. in Arizona. **Cap.**, $1,000,000; $1 par.
return.

Property: 700 acres on Jupiter mount
Idaho City, Boise county, shows a big vein

ent: a crosscut tunnel which has not yet reached the vein. f funds.

MINING & MILLING CO. IDAHO

9 Hooper Blk., Salt Lake City, Utah. **Mine office:** Albion, Idaho.

Samuel McIntyre, Sr., pres., gen. mgr. and treas.; R. M. and purch. agt.; P. McIntyre, supt.

ah. **Cap.,** $1,000,000; shares $1 par.

37 claims, including former holdings of the Cumora Mining 12, in the Stokes district, 38 miles from rail and 12 miles from try rock is schist, granite, and quartzite, orebodies occurring s in both schist and granite. The vein developed runs N. 10° ° west.

ent: by two shafts and 4 tunnels, one 3,290' long. Shows a 3' arrying chalcopyite and galena and lead carbonates, said to opper, 4% lead, 5 oz. silver and $5 gold per ton. A large e is said to be available.

t: includes 200 h. p. steam and water power plant, 5-drill air nd 100-ton mill and flotation plant.

1919, the mill was operating. Company is said to have ex- 00 to date.

INING CO., LTD. IDAHO

J. C. Northrup, mgr., Palouse, Wash. Mine under lease to Mining Co., until 1922.

J. C. Northrup, pres.-mgr.; G. A. Weldon, v. p.-treas.; C. E. , with E. R. Northrup and C. L. Cleveland, directors.

15, 1913, in Washington. **Cap.,** $3,750,000; $1 par; assessable bor only. Annual meeting April 16.

: the Mizpah mine, 20 claims, 318 acres, well watered and tim- pper mountain, near the Palouse river, in the Hoodoo district, , almost 40 miles from Palouse. A 20-mile wagon-road runs 0 miles from the Puget Sound railway.

the property is covered by quartzite and schist, with fissure quartzite-schist contact. The veins run N. E. and dip N. W. d orebody is 10 to 40' wide, and contains 3% chalcopyrite and glance.

nent: includes 5 tunnels, with about 3,000' of workings reach- 250'.

nt: includes 60-h. p. gasoline power, with a 3-drill air-com- ere are 16 buildings. A 50-ton mill is to be erected. Milling 4½% copper.

on: 2,000 tons of milling grade has been mined, and 170 tons ore shipped.

NING CO. IDAHO

A. E. Christensen, supt., Shelley, Bingham county, Idaho.

Soren Yorgeson, pres.; F. E. Roberts, v. p.; J. I. Hubble, ames Christensen, H. L. Malcom, and A. Whitton, directors. daho. **Cap.,** $300,000; $1 par; increased to $1,000,000; assess- issued. Operating expenses in 1918 were $2,500. Annual Monday in February.

4 unpatented claims [illegible] Little Lost River and Birch ains, Hamilton [illegible] by Robert N. Bell, of G. Burritt [illegible]

deposit is [illegible] to

ores car[illegible] and 17

sorc[illegible]

ent: [illegible]

[illegible]

Production: 5 carloads of ore averaging 35% lead and 13 o per ton.

MILITARY MINING & MILLING CO., LTD.

Office: Clyde-Taylor Bldg., Wallace, Wash. Walter H. Han

MINERAL ZONE MINING CO.

Address: G. L. L. Baskett, supt., Elk City, Idaho.

Property: known as the Parr group, includes the Mineral Z mine near Elk City,

Development: is by 2,000' of tunnels, etc. There is a 3-sta which was being worked early in 1918.

No recent returns secured.

MINES DEVELOPING & LEASING CO.

Address: W. A. Byers, 207 Atlas Bldg., Salt Lake City, Utah.

Property: a lease on the holdings of the Lemhi Gold Mining Virginia Consolidated Gold Mining Co. 7 miles from Baker and Salmon, Lemhi county, Idaho, 1 mile south of the Montana-Idah dary.

Development: by tunnels and shaft, opening copper-silver gold mill is to be erected to serve both properties.

MINNIE MOORE MINES CO.

Officers: I. E. Rockwell, pres., Bellevue, Idaho.

Cap., $500,000; shares $1 par.

Property: at Bellevue, in the Mineral Hill district, Blaine cou bonded to Chas. M. Schwab interests, but relinquished by them when ore was found to be cut off by complex faulting.

In June, 1912, all the property of the Idaho Cons. Mines bought at receiver's sale and in 1914 the Mill Site and Onyx lod were bought for $5,000. Some lead and zinc concentrates have been

Idle, "awaiting intensive prospecting," when funds permit.

MIZPAH COPPER MINING CO., LTD.

Property sold to Merger Mng. Co., which see.

MONITOR CONSOLIDATED COPPER MINING CO.

Stockholders sold property to Montana-Idaho Copper Co., $102,000, payable in shares of new company at par, stock exchanged 1917, and company disincorporated. See Mont.-Idaho C. Co.

MONTANA-IDAHO COPPER CO.

Address: Paulsen Bldg., Spokane, Wash. **Mine office,** Delag

Officers: H. F. DeBower, New York, pres.; J. L. Dirks, Spoka W. J. Kirby, sec.-treas.; Otis Hill, gen. mgr., and G. B. May, direc

Inc. 1914 to take over holdings of Monitor Cons. C. M. Co. C shares; $100 par.

Property: 44 claims, 10 patented, ¼ to 7½ miles from Adair, line of C. M. & St. P. Ry. First copper location in the easter d'Alene. A fissure vein of 10 to 30' width, with N. E. strike an vertical dip, has a paystreak carrying massive chalcopyrite ore, of vein carrying disseminated chalcopyrite, mainly of concentratin Occasional native copper is found.

Development: in 1919 the main tunnel was 4,265' long. At t point a drift driven 1,050' on a vein, had a back of 1,300'. Abou has been spent on exploration.

Equipment: hydro-electric power plant, compressor, drills, etc

MONTE CRISTO GOLD MINES CO.

Address: C. E. Eddy, Bonanza, Custer county, Idaho.

Property: [illegible] gold mine 4 miles from the Lost Packer copp which w[illegible] the mining world and make a great new [illegible] camps [illegible] 1918. Examined by Paul Valtinke, who said [illegible] ore [illegible] ing in 50 150' depth would commonly be [illegible] $150 [illegible] valuing from super-heated as

vhich deposited the rich gold and silver values and gave blue-greyish cast." This is extremely interesting if true.

IRL MINING CO. **IDAHO**

S. Rupp, sec., Salt Lake City, Utah.
19, in Idaho. **Cap.**, $250,000.
ims in Stanley basin, Custer county. Work was started d a car of rich ore loaded for the smelter.

COPPER M. & M. CO., LTD. **IDAHO**

E. Crocker, Bonners Ferry, Idaho.
1911, in Idaho. **Cap.**, $1,250,000; $1 par; assessable; 750,000 neeting first Monday in September.
. Kent, pres.; J. W. Reid, v. p.; G. E. Crocker, sec.; M. P. vith H. L. Medbury, directors.
unpatented claims in Moyie Yakt district, 17 miles from ns in Moyie Kootenai district, 3 miles from rail, all in

the first or Damon group, a gold-bearing quartz vein cuts te, the paystreak being 6" to 6½' wide. The second or a contact vein in quartzite, that carries gold, silver, lead, a little zinc; another vein contains 3" seams of ore assay- 5% lead, and $2 gold per ton.
: at the Damon group comprises a 35' shaft and 360' tun- een group only surface prospecting has been done as yet. ppear to be worth development.

PPER MINES CO. **IDAHO**

Chamber of Commerce, Portland, Oregon. Mine at Cup-

n. Trevor, pres. and mine supt.; Dr. R. J. Marsh, v. p.; es. sec.; W. F. Coffey, treas., with Jas. Wolfs and Fred . H. Skewes, directors.
on. **Cap.**, $3,000,000; $1 par; non-assessable.
claims, patented, in Cuprum Basin, Seven Devils district, daho; also the Gold Barr mine and Coad placer mine, 2 in southern Oregon. The Idaho claims are near Cuprum, Homestead on the Northwest (Snake River) R. R.
s gold, silver, and lead as well as 5 to 17% copper, and t deposits.
: by over 3,500' of tunnels, shafts, and open-cuts. In 1916, were mined. New orebodies were opened 1917, and ship- t so far as known none since. This company must not be National Copper Co. operating in the Coeur d'Alene.

INING & DEVELOPMENT CO. **IDAHO**

C. Gallupe, pres., Placerville, Idaho.
, 1911. **Cap.**, $1,000,000; $1 par; divided into 600,000 com- preferred shares.
e Mountain Chief mine at Placerville, Boise county, shows a fissure vein, 1-3' wide. Ore averages from $20-$25 per by 5 tunnels.
scribed 17th Annual Report of the Mineral Industry of

includes 30-ton all-sliming cyanide plant.
ince 1912. Property promising.

OM MINING CO. **IDAHO**

E. Hopkins, supt., Horse Shoe Bend, Boise county, Idaho.
e Nellie Bloom mine, about 2 miles from Horse Shoe Bend, oxidized gold ore, 3-5' wide, 500' long at depth of 300', said milling value of $10 per ton.
includes a 10-stamp mill and electric power. Management onths' supply of free milling ore blocked out at last report.

NICKEL PLATE MINING CO.

Office: 616 Hutton Bldg., Spokane, Wash.

Officers: L. Oriard, pres.; J. R. Fordyce, v. p.; S. A. Wells, Z. A. Moore, treas.; with D. Leitch and C. George, trustees.

Inc. in Washington. **Cap.,** $2,000,000; $1 par. Annual m Monday in June.

Property: 2 claims on Nickel Plate Mountain, between R Granite creeks in Bonner county. Country rocks include granit and gneiss. Cut by veins reported to have shown cobalt, pla palladium values together with some gold and copper. About $ spent on equipment up to 1918, and about 1,000' of work done, the multiplicity of metals prevents profitable treatment of the o

NORTHWESTERN DEVELOPMENT CO.

Address: C. Rock, supt., Salmon, Idaho.

Property: the Ranger copper mine, 12 miles E. of Salmon, county. The mine was worked for gold in the eighties, but the c tent prevented gold recovery, 60% being lost. About $260,000 on the mine at that time. In 1917 the mine was unwatered afte idleness, and new work disclosed an ore shoot 320' long, 4' wid values of about $40 per ton in copper and $50 to $75 per ton in go 100' out of 150' in depth was stoped. In 1918, an 800' tunnel was cut the vein at depth of 650'. Dumps said to contain 10,000 tons Hydro-electric power can be developed nearby.

NORTHWESTERN MINING CO.

Out of business.

OLIVIA GROUP

Address: Hazlitt & Trader, owners, Dixie, Idaho county, Id

Property: 11 unpatented claims, 200 acres, in Dixie minin shows $9.50 gold-silver ore in quartz fissure veins, averaging 2 running N. W., with dip 60° N. E. The country rock is granite

Development: by 150' tunnel, and total of 250' of workings tunnel has been started at water level.

Equipment: includes a 10-ton Huntington mill. A prospect

OROGRANDE GOLD MINING CO.

Address: Judge Geo. Turner, Spokane, Wash. William Ho and H. E. Hewitt, mill supt.

Cap., $1,500,000; $1 par; non-assessable.

Property: on the Crooked River, 64 miles S. E. of Stites, I point, Idaho county. Ore carries $2.30 to $3.60 per ton gold, veloped by 1,000' of tunnels and lateral workings. Mining is d glory-hole method.

Equipment: includes a 300-ton all-sliming cyanide mill. In trial runs showed that 1,700 tons ran $2; 2,697 tons gave a recover and 2,939 tons went $1.93. By selective mining a $3 to $4 averag secured, of which $1 would be profit.

OVERLOOK MINING & DEVELOPMENT CO.

Address: Walter Upington, sec., Walla Walla, Wash.

Cap., $1,000,000; shares $1 par; non-assessable.

Property: 16 claims in Black Warrior district, Lemhi coun contain $10 gold ore.

Development: by 1,600' of tunnels and over 1,500' of other

Equipment: 20 and 3-stamp mills, and complete outfit, in w ore has been treated, though returns are unknown.

PACKER CO., THE

Office: at last accounts, Mackintosh Block, Salt Lake City, U

Officers: Chas. Read, pres.; E. G. Rowe, v. p., with W. A E. Gubin and A. L. Miller, directors. J. H. Woodmansee, sec.-treas & Transfer Co., N. Y., registrar and transfer office.

Inc. June 12, 1917, in Maine. **Cap.,** $200,000; par $1. $100,000

as holding company to take over 80% or more of Lost Co. stock (which see).

R & GOLD MINING CO., LTD. **IDAHO**

Cedar St., Wallace, Idaho. **Mine office:** Mullan, Shoshone

W. Lewis, pres.-mgr.; Nellie J. Stockbridge, sec.-treas.
00; shares 10c par.
claims, on the southern side of Stevens Peak, 5 miles from property is said to have a fissure vein in quartzite, of about idth, capped by a 40′ gossan of mixed hematite and siderite, s of high-grade copper carbonates and chalcopyrite, with e copper.
t: by two 25′ shafts, and 3 tunnels, the two upper tunnels ile No. 3, the lower tunnel, of 1,680′ length, with a back of ws no ore. The mine has about one-half mile of workings. 917, but management expected to resume operations in 1920.

-IDAHO CO., LTD. **IDAHO**

ourth Ave., Pittsburgh, Pa. **Mine office:** Gilmore, Idaho.
. S. Ross, pres.; Irvan Neckermann and Robt. B. Little, McCutcheon, sec.-treas.; with G. W. Provost, J. W. Brown, der, directors. J. E. Walker, supt.
o. **Cap.,** $1,000,000; $1 par; 813,227 issued. Bonds, $150,000, tstanding. Commonwealth Trust Co., Pittsburgh, registrar; its own stock transfers. Annual meeting, first Monday in ted on Salt Lake City Exchange and New York Curb.
tatement years ending December 31:

venue	Operating charges	Profit or loss	Dividends	Surplus
99,060	$247,208	—$48,145	$65,523	$68,738
.....	165,468	+159,934	44,928	182,409

total $375,000.
5 claims, 5 patented, about 500 acres, in the Texas district, emhi county.
aims show limestone cut by fissure veins 3 to 30′ wide and 0 to 700′. Veins strike N.-S. and dip about 45°. Ores are a carbonates and cube galena, averaging 28% lead, 14 oz. sil- gold and 15% iron. Ore at the bottom level is still partly

also developing the Brown group on which high-grade ore ered.
t: by 18,000′ of workings including a 45° shaft to depth of 0′ transportation tunnel connecting with the 400′ level. A ter on the bottom level retards work. Ore reserves are es- 0 tons. The 7th level had cut 5 orebodies by December,

electric power is produced by a 250-h. p. Diesel engine to a 135-k. w. generator, hoist, compressor, pump, tramway, lete plant.
94,494 tons ore has been sent to the smelters since 1910, 32. Ore mined in 1918 averaged 30% lead, 15 oz. silver, and

ny has been in a transition stage, doing much development w machinery, but should soon resume dividends, especially ver $1 per ounce.

LEAD MINING CO. **IDAHO**

ace, mgr. **Directors:** Henry L. Collins, G. B. Oberall, of M. Rumley and Christopher Murphy, of Chicago. Merged Cons. Mng. Co. and Panhandle M. & M. Co., July, 1916. 000; shares $1 par; all issued.

Properties: are in Nine Mile creek section, or Placer Center di Shoshone county.

The **Pittsburgh property** was formerly a shipper but idle several y comprises a small group only. **The Consolidated** consists of the Cloud group, 4 patented claims, idle since 1901, but owns a mill 2 miles Wallace, leased and operated until recently by the Marsh Co.

The Panhandle group: consists of 2 patented claims on Nine Creek.

Nothing is known of operations since 1917.

POCATELLO GOLD & COPPER MINING CO. ID

Address: Pocatello, Idaho. H. W. Lockhart, pres.

Inc. Dec. 1, 1902, in Idaho. **Cap.,** $1,000,000; shares 50c par.

Property: 7 claims, 140 acres, in the Fort Hall district, 12 miles s Pocatello, Bannock county, shows a vein of about 3' average width, rep to give assays of 30% copper, 13.8 oz. silver and $1 gold per ton, from nite and chalcopyrite ore. Ore is of milling grade but contains a streak of rich ore, from which shipments to the White Knob smelter returns of 17 to 30% copper and 15 to 18 oz. silver per ton.

Development: by tunnels, with about 1,000' of workings. Presu idle.

PONDERAY MINING & SMELTING CO. ID

Offices: 922 Old National Bank Bldg., Spokane, Wash., and Sand Bonner county, Idaho.

Officers: Geo. S. Brooke, pres.; Leo Greenough, sec.-treas.

Cap., $500,000; $100 par; all issued.

Property: 4 patented gold-silver-lead claims near Lakeview, in B county, and 4 lime-copper claims near Bayview, Kootenai county.

POPE-SHENON COPPER CO. ID

Address: Salmon, Lemhi county, Idaho.

Officers: R. H. Winder, pres.; Thomas Austin, v. p.; C. R. Bra sec.-treas.; A. Boulais, supt.; R. H. Bradford, metallurgist.

Six assessments have been levied, the latest on February 21, 191

Property: near Salmon, developed by tunnels, the upper and lower 900' apart. In October, 1918, 12.86% copper ore was sent to Utah sm and in May, 1919, 10 to 15% ore was being extracted. In Septembe weekly output was 2 carloads. A leaching plant is being erected. Bradford volatilization process is to be used also.

PRINCEMONT MINING CO. ID

Address: Marble Creek, Idaho. J. D. Olley, supt., at Noxon, Mo

Officers: S. B. Holbert, pres., Pittsburgh, Pa., with N. B. T F. Briggs, W. J. Williams, A. G. Holmes, E. F. Holbert, and W. H. G directors.

Inc., 1916, in Idaho. **Cap.,** $2,000,000; shares $1 par; non-asses 1,650,000 issued. Annual meeting second Monday in September.

Property: 43 claims, 875 acres, as follows: Copper Prince of 13 on C. M. & St. P. R. R., Ida., also the Idaho-Virginia group of 24 near St. Joe, Ida.; and the Pilgrim group of 6 claims near Noxon, county, Mont. These properties contain copper and gold ores, and silver ore, and others only copper.

The copper Prince and Idaho-Virginia properties are fully the former developed by 600' tunnel and 125' drift and the latter shaft. The Pilgrim is opened by tunnel.

RABBIT FOOT MINING CO. ID

Address: R. E. L. Rains

Property: 15 quar

being opened by

been operated.

RAMSHORN

Address

Bay Horse, Custer county, Idaho. Was reported by State
es in 1912, to the best developed deposit of silicious silver

ms show well-defined fissure veins in black altered slate
al. Vein worked varies from a few inches to several feet
ries quartz and spathic iron, with oreshoots containing
of tetrahedrite carrying high value in copper and silver.
by tunnels, said to block out over 20,000 tons of high-

ydro-electric plant, motor-trucks, and tramway; a mill is

everal carloads of ore were sent to a Utah smelter during
shipments were being made in 1919.

K PLACER MINES CO. **IDAHO**

S. Thatcher, pres., 1455 Michigan Ave., Salt Lake City,
lrum, sec.-treas.
ah. **Cap.**, $25,000; shares 25c par; 60,000 in treasury.
acres in Yankee Fork district, Custer county, reported
1. About 1,000' of placer ground previously worked aver-
d. There is an old mill on the ground. Active develop-
t in 1917, but details were lacking.

NING & SMELTING CO. **IDAHO**

ired by Clayton Mining & Smelting Co., which see.

NING CO., LTD. **IDAHO**

rison, Kootenai county, Idaho.
W. Frost, pres.; E. R. Goodwin, v. p.; M. A. Kigar, sec.-
Frost, Otto Borchardt, S. Jones, R. A. Jones, John Demay,
er, directors.
daho. **Cap.**, $1,500,000; $1 par; assessable; 1,000,000 issued.
claims, 320 acres, 5 miles N. E. of Springston, Idaho. A
anite carries ore with gold, silver and copper values.
by 1,700' of workings. During 1918, $2,000 was received
and expended in development work. There have been
l there is no equipment.

OPPER MINE **IDAHO**

R. N. Bell, State Mine Inspector, Boise, Idaho. Minne-
aid to own the mine.
pper, gold and silver claims, 10 miles north of Landore,
n Deep Creek canyon, and 17 miles from Homestead,
ail; described in Vol. XII.

NING CO. **IDAHO**

. Mason, pres., Kellogg, Idaho. Owned in Kellogg and

0; shares $1 par; assessable.
laims in National Forest Reserve, at headwaters of the
ene d'Alene river, Kootenai county, shows a 7' vein with
silver-lead ore.
crosscut tunnel reaching depth of 100'.
steam power, compressor, hoist, etc.

-COPPER CO **IDAHO**

Mine office: Landore, Adams

W. Riddle, v. p.; Chas
with Chas. Marvin.

$1 par; issued

Bonds: $250,000 authorized at 6%. Annual meeting, secon in March.

Property: 15 claims, partly patented, 134 acres, including the Margaret mines, and bond and lease on the Decorah mine, 16 rail. Lands show contact deposits, between diorite and limesto a strike of N. 75° W., and said to be 15 to 50' in width. These dep oxidized ores, succeeded at a little depth, by sulphides, the chalco bornite ores said to average 5% copper, 2 oz. silver and $1 gold

Development: exclusively by tunnels, there being drift tunn and 150', and a 483' crosscut tunnel, with 2,800' of workings, estima management to show 182,700 tons of ore blocked out for sto Arkansaw mine has produced a little high-grade ore in the past.

Equipment: includes a 125 h. p. electric plant, taking power Oxbow station of the Oregon-Idaho Power Co., and there is near the mine.

Production: to 1916, 555 tons ore said to have averaged 11.2

Inability to pay off $20,000 debentures caused closing down o suspension of all operations except leasing, in 1915. Company's mine has since been taken over by the Arkansaw Leasing Corpora Seven Devils company is alive legally, being held to take over t interests when the results of development are completed, givin basis for distribution of interests in the corporation.

SILVER CITY MINING CO.

Address: Silver City, Owyhee county, Idaho.

Property: near Silver City, adjoins the Trade Dollar Consol the east and has a system of parallel fissures containing gold-silver 1914 the company remodeled the old Blaine mill, purchased from Dollar Consolidated, located in Long Gulch, ½ mile S. E. of Si Mill has 10 stamps, classifiers, concentration tables, and a 25-to plant. Presumably idle.

SILVER LEAF MINING CO.

Address: J. B. Sullivan, Lakeview, Bonner county, Idaho.

Property: silver-lead prospect near Lakeview, which in 1918 w by tunnels, with some ore ready for shipment. The upper level sh of $125 silver ore, alongside 36" of $35 lead carbonate ore.

SILVER MOUNTAIN MINING CO.

Office: 950 Pine St., Potlatch, Idaho. W. E. Horstkotte,

SILVER TIP MINING CO.

Merged with International Mining & Metals Co., which see.

SINKER TUNNEL MINING CO.

Address: W. G. Adams, sec., Nampa, Idaho.

Property: the War Eagle group of gold claims in Silver Cit Owyhee county. Idle since 1878, but re-opened in 1916, since 6,400' tunnel has been extended 310', cutting a rich free gold vei be 9' wide, including a "granite horse."

SMOKY BULLION GROUP

Address: E. A. Worswick, Soldier, Camas county, Idaho.

Property: 3 claims, patented, 57 acres, on headwaters of Sm near Hailey, Blaine county, contains a big deposit of low-grade co ing ore opened for 4,200' on a contact zone between granite and

Reported to show a shoot of silver-lead ore, with considerable some iron pyrite. A lower tunnel was driven under the main sho proved to be almost barren. Whether the orebody was faulted o out at comparatively shallow depth is not known. The latter because it has proven to be the case with many Wood River veins

Development: amounts to 2,000', mostly by tunnels, one 600' 575' back. Property examined by Prof. Knutson and by J. M. Wille

Property has milling plant erected by an Eastern syndicate, wh

operty and allowed it to be sold for taxes. Regarded as ect, but practically idle for 15 years up to 1920.

AHO DEVELOPMENT CO. **IDAHO**

y, supt., Pocatello, Idaho. U. B. Sollie and Dr. J. C.

up near Pocatello, showing a vein of copper ore, from shipped, 1916, returned 17.7% copper and 4 oz. silver

ed in June, 1919; company probably defunct.

MINING & MILLING CO. **IDAHO**

amber of Commerce Bldg., Spokane, Wash.

H. Stowell, pres.-mgr.; H. C. Kreyssler, v. p.; J. W. Higwith W. D. Scott, directors.

1914, in Washington. **Cap.**, $1,500,000; $1 par; assessable t a year); 945,946 issued.

claims, 220 acres, in Ten-Mile and Elk City district, Idaho is a quartz vein in granite, carrying $10 gold per ton. ng; $8 is recovered by amalgamation and $4 in sulphides. by 4 tunnels totaling 3,000', reaching depth of 400'. t to 4,000'.

water and steam power, and 5-stamps with concentrator. y $150 per ton. A new mill and water power are planned. otals about $200,000.

LD MINING CO. **IDAHO**

D. B. Cornell, sec.-treas., Great Barrington, Mass. Henry H. Cornell, v. p.

1914, in Arizona. **Cap.**, $2,000,000.

e Gold Dollar group, 10 lode and 5 placer claims, near o county, shows fissure veins in granite. The veins are carry gold ore, shown by systematic sampling to carry $3

; by 3,000' of work, all tunnels, 1,000' depth. formation.

NG CO. **IDAHO**

F. Van Wagenen, gen. mgr., Leadore, Idaho. E. D. Cox, Snow, mill supt.; G. W. Wood, mine eng.

Huffaker, sec., Room 312, Utah Savings & Trust Bldg., Utah. Company is controlled by Utah capital.

20 miles north of Gilmore, in Lemhi county. Examined f of Salt Lake City.

ore occurs in a contact deposit between blue Carboniferl an underlying sheet of white silicious quartz-prophyry. The under a red fault gouge, which overlies the ore-bearing brecand separates them from a capping of Tertiary lake bed gravels e hanging wall. Deposit has a flat dip. Ore in upper levels ead carbonate, but the orebody in the lower tunnel consists of galena scattered through brecciated limestone, with occasional lean shipping ore. On the 500' level the orebody is 10' to 20' ng, all of it of milling grade.

t: by tunnels and extensive lateral workings, opening a age of ore.

includes a new 60-ton concentrating plant, to be enlarged

in 1918 irregular shipments of 11% lead and 7-oz. silver Utah smelters, while in July, 1919, the mill was producing 7 ns) of concentrate per month.

C MINING CO., LTD. **IDAHO**

rlee, Idaho county, Idaho.

F. Bethmann, secs.; A. C. Jack, v. p.; F. M. Bethmann,

sec.; E. F. Bethmann, treas.; William Jack, mgr.; Miles Joh attorney.

Inc. in Idaho. **Cap.**, $250,000; $1 par

Property: 7 claims and a millsite, all patented, ½ mile N. W in the Lolo mining district, near the N. P. R. R. Claims show a in granite, the ore carrying copper carbonates and sulphides. by Samuel Aughey.

Development: by 700' of shafts and tunnels. A 2-drill co available. No recent progress has been reported.

TUNGSTEN HILL MINING CO.

Address: C. D. Muxen, sec., Spokane, Wash.

Cap., $50,000; shares 5c par; assessable.

Property: 7 claims in the Moyie-Yahkt district, Boundary c carries scheelite, gold, silver, and lead.

Equipment: includes gas engine and compressor; a concentr was planned at last accounts.

UNA MINING CO.

Address: Ralston McCraig, sec., Spokane, Wash.

Inc. 1914. **Cap.**, $1,250,000; shares $1 par; 650,000 issued; ass

Property: 3 claims, 4 miles west of Orogrande, shows a vei carrying pay streaks of a few inches to 5' thick. In the 40' sh is said to average $7 per ton in gold with some silver.

Development: by 1,100' tunnel which cut the vein, Sept., 191

UNITED LEAD CO.

Name changed to Silverado Mining Co., which see.

UNITED METALS & POWER CORPORATION

Address: Arrott Bldg., Pittsburgh, Pa.

Inc. April, 1918, in Delaware. **Cap.**, $5,000,000; $5 par; 67,

Officers: Walter Gray, pres.; W. P. Fowler, v. p.; A. L. S sec.; C. C. Wesley, treas.; with M. E. Frazee, and A. S. Moore, d

Property: 14 claims, 289 acres, in Sea Foam district, Cust Nearest rail is at Ketchum, 105 miles distant. Company is sa re-built 22 miles of old road, constructed 3 miles of new road and The State is expending $50,000 on a road from Galena Summit between the mine and the shipping point. Four veins cross the the Montana being the principal one. Ore carries silver, lead, Ore being mined, sorted, and shipped averages $75 per ton.

Development: by a number of short tunnels.

Equipment: water-power, compressor, drills, 10 Holt tra trailers to be ready by May, 1920; employs 25 men.

UNITED MINES CO.

Office: 501 C. of C. Bldg., Spokane, Wash. **Mine office:** J. L Fairfield, Idaho.

Officers: T. S. Griffith, pres.; E. J. Peterson, v. p.; L. J. Chas. Uhden, treas., with V. A. Johnson, E. A. Worswick, Jack and J. C. Lawrence, directors.

Inc. May 17, 1916, in Washington. **Cap.**, $250,000; 25c pa issued.

Property: 13 claims, 10 miles N. E. of Fairfield, Blaine co to show a fissure vein in granite, dipping 45° with N.-S. course are 3 to 7' wide, 260' long and 150' deep. Ore is mostly sulphide pyrite, galena and chalcopyrite. Value in gold, silver, and l per ton.

Development: by 511' tunnel, [illegible] with [illegible] of workings. Ore reserves estimated at [illegible] out.

Equipment: 10-stamp mill [illegible] sawmill, etc. No details [illegible]

.D MINES CO. **IDAHO**

Varren, Idaho county, Idaho, and 120 Broadway, New York. James H. Hawley, pres.; Lorren M. Hart, v. p.; George C. .; Eduard C. Christensen, sec.; Jay A. Czizek, managing director,

1, 1916, in Delaware. Cap., $2,500,000; $5 par; 350,000 out- d on New York Curb. Security Transfer & Registrar Co., New agt. and registrar. Company has no debts, and has funds to to production stage.
200 acres, patented, including the Little Giant and Charity unnel sides, each 3,000' long and 1,500' wide, crossing vein system ; all at town of Warren, Idaho, 40 miles from Lakeport on O.

the prevailing rock is granite, cut by typical quartz veins, by later dikes of porphyry. Veins are step faulted by these dikes issures. Veins carry shoots of free milling quartz; that of old ittle Giant mine being 800' long, 3' thick, and averaging $85 per tons milled. The ore shoot of Old Charity mine workings is d averaged $30 per ton. These shoots are faulted and were lost orkings, but the deep crosscut drainage tunnel proves the shoot ze and value down to that level 450' below old stopes. One vein el carries high-grade tungsten ore.
ent: a 2,750' new drainage and transportation tunnel of 8'x8' as been driven beneath the old mine workings at a depth of 300' he vein outcrop. This has opened up five veins each with stoping 500 ft. and crosscuts, raises and drifts expose the veins, and open es. This tunnel will be extended 2,500' farther to crosscut five roduction veins.
n: in former years said to total $1,200,000 from 150' backs wo mines; including 5,500 tons of $85 ore mined and milled from orkings.
e vein was cut at 1,850' in main tunnel at a depth of 450'. A 120' shows vein to be 3' wide. Ore was stripped for 40'. Product oux & Co., New York, shows 60% concentrate from crude ore. ed 75.8% tungstic acid; phosphorus, 0.005%; arsenic, 0.18%; Recovery was 94.7%.
t: hydro-electric power developed from water carried in ditch 238' head for driving compressors, stamp-mills, and tramming ore gh tunnel.
re free milling, and first mill unit was erected at mouth of tunnel. ke and gyratory crushers with capacity of 500 tons; 10 stamps, 2 50 tons in 24 hours. A second unit is to be erected at the orkings.

EVUE MINES CO. **IDAHO**

oe Saxman, pres., Bellevue, Idaho.
00 shares; in treasury, 165,000. No bonded indebtedness.
3 claims in Wood River district, Blaine county, said to show c ore. Reported developing and shipping. Two feet of high- pened late in 1919.

ONSOLIDATED GOLD MINING CO. **IDAHO**

ing operated by Mines Developing & Leasing Co., which see.

NG & MILLING CO. **IDAHO**

J. D. Hedrick, Hailey, Idaho.
1919, in Idaho. Cap., $50,000; in 35,000 common and 15,000 s of $1 par.
C. E. Gordon, pres.; Jack Edwards, v. p.; J. D. Hedrick, sec.; , treas.
ation is given out as to property or operations.

WEILER MINE

Address: H. W. Weiler, Mackay, Idaho.

Property: 6 claims in Antelope district, Butte county, Idaho occurs in fissure and contact veins in porphyry and limestone, the vein up to 4' wide. Ore reported to assay 20% lead, 25 oz. silver, and up t per ton.

Development: 200' shaft and 5,000' workings. Reserves are at 2,500 tons.

Equipment: 6-h. p. gasoline hoist.

WEIMER COPPER CO.

Address: Dubois, Fremont county, Idaho.

Property: 18 claims, 360 acres, on Birch Creek, in Skull can trict, shows a crushed zone 100 to 200' thick between quartzite and which carries high-grade ore in pockets and in cross fissures, of 3" to running at right angles to the main contact deposit.

Development: by an open-cut and 2 tunnels of 300' each. Idle eral years. Said to be controlled by Jesse Knight interests.

WEST COAST MINES CO.

Address: H. J. Hibschman, Spokane, Wash.

Cap., $500,000; shares $1 par; non-assessable.

Property: 13 claims, the Pearl mine near Boise, Ada county, a vein of gold-silver ore, developed by 200' shaft and several hundre lateral workings. Idle since 1917 for want of capital.

WILBERT MINING CO., LTD.

Office: 222 Kearns Bldg., Salt Lake City, Utah.

Officers: A. S. Ross, pres. and gen. mgr.; J. A. Foley, se D. J. Lennon, supt.

Inc. 1907, in Utah. **Cap.,** $1,000,000; shares $1 par; assessable; i to $2,000,000 in February, 1918. Annual meeting in May. Stock trans company's office. Listed on Salt Lake Stock Exchange and New Yo U. S. Corporation Co., New York, transfer office. Assessment No. 5 per share was levied June, 1919.

Dividends: $10,000, Nov. 15, 1915; $40,000 in 1916; and $40,000 and $30,000 in 1918.

Financial Statement, years ending May 1:

Year	Revenue	Expenses	Dividends
1918	$165,961	$135,961	$30,000
1917	181,389	128,475	40,000
1916	.....	.....	40,000

Property: 16 patented claims, plus those of the Wilbert Annex Dome mining district, 40 miles from Arco, Butte county.

Geology: the claims show Cambrian quartzite cut by a fiss that contains lead and silver ore, mostly of concentrating grade. The v vein has been folded into a nearly horizontal bed, worked by quarryi main ore-shoot has been followed to a depth of 800' and is stoped out fr level to the surface.

Development: by 800' incline shaft and extensive lateral workin cent work has been concentrated on the 500' level.

Equipment: most of the surface plant, including a 100-ton m burned in August, 1918. It will probably be rebuilt.

Production: for year ending May 1, 1916, was 15,204 tons c assaying 25% lead and 3.86 oz. silver, which yielded by sorting and concen 5,787 tons, assaying 52% lead and 8 oz. silver. Costs were $3.56 per ton.

In 1916-'17, the mill treated 6,981 tons of 18.7% lead and 4.9 oz. s yielding 1,758 tons of concentrate, assaying 54.2% lead and 15.3 o Extraction was 72.9% and 78.6% respectively. Milling costs were $1.9

WILBERT ANNEX MINING CO.

Bought out, 1919, by [illegible]

ROUP **IDAHO**

W. Oliver, Grangeville, Idaho.

claims, 3 patented, in northern part of Buffalo Hump dis-
ty, 50 miles by road from Grangeville. Surface exposures are
ing.

t: a 500′ crosscut tunnel and a 200′ shaft. A drift on the
rth and 200′ south from bottom of shaft exposes an average
f ore estimated to run $20 gold per ton. Owing to litigation,
for 15 years, so that timbering, 10-stamp mill, boiler, engine
quire considerable overhauling. Dumps are said to contain
illing ore.

KET GOLD MINING CO. **IDAHO**

1914, as Mandarin Mines Corp., q. v.

E QUICKSILVER MINING CO. **IDAHO**

Main St., Boise, Idaho.

E. Fox, pres.; J. A. Marks, v. p.; G. G. Adams, sec.; Wm.
with O. R. Call, directors.

, 1918, in Idaho. **Cap.**, $1,000,000; $1 par; assessable. An-
y 24.

claims being patented in Yellow Pine district of Valley
ed by W. H. Hill. Surface indications are very promising.
scription of the region in the annual report of the Idaho State
18. The deposit is in quartzite and limestone, and carries from
y.

t: by 100′ tunnel, to be extended 300′. About $8,000 was
8. A 25 or 50-ton furnace was contemplated in 1919. An ad-
duced 2,175 lb. (70 flasks) of quicksilver in 1918, using small

COEUR D'ALENE REGION

gion along the Coeur d'Alene river for 10 miles west of the
ncluding Mullan, Burke, Wallace, Pine Creek, Murray, and
called mining districts.

NING CO. **IDAHO**

Vine St., Missoula, Mont. **Mine office:** Mullan, Shoshone

rbert Crego, pres.; F. D. Fox, v. p.; Henry Hubert, sec.-
officers, and F. H. Murphy, directors; Joe Peila, mgr.

Cap., $1,000,000; shares $1 par; assessable. Last assessment,
levied May 8, 1916.

unpatented claims, 4 miles from Mullan, on Snowstorm hill,
Snowstorm on the east and the Butte & Coeur d'Alene on the
es of timber land.

t: by 1,550′ tunnel with 2 crosscuts showing streaks of
No recent information.

M. CO. **IDAHO**

allace, Idaho.

. Murphy, pres.; O. W. Lewis, sec.-treas., with Dr. C. S.
Quigley and C. W. Gilstrap, directors.

0; shares 10c par; assessable.

claims, unpatented, 1 mile S. E. of Burke, Shoshone county,
tunnel. Idle since 1915.

CO. **IDAHO**

e, Idaho.

E. Starkey, pres.; H. W. Woodward, v. p.; J. A. Havig-
with F. Moriarity, G. E. Sprague, Gus Benson, and Alva C.
rectors.

0; $1 par; all issued; assessable; 8 assessments of 5 mills
gust 1, 1917. Annual meeting, first Tuesday after first Monday

Property: 13 patented claims, 184 acres in Gorge gulch, Coeur d'Alene district, adjoining the Hercules on the E., and s the extension of the Hercules vein system for 1¼ miles in length.

Ore contains silver and lead values.

Development: by several tunnels. No. 2 is tunnel over 3,00 cutting the shoot opened in upper workings and exposing 1 to 8' o with a 400' drift on a 6 to 8" high grade streak. A 250' shaft w the point where the vein was reached by the tunnel 650' from the He dary. Shaft fully equipped with air-hoist, compressor, and electric large outcrop at east end of property was opened by 1,000' of work and arrangements made to use the 3,500' Oom Paul Cons. Minin nel, to explore Ajax ground. Early in 1918 the heading was 7,000' in was cut at a vertical depth of 1,200'. Owing to high mining cost closed down during much of 1918, but was worked again in 1919.

Extensive development of promising ground has not yet disc mercial orebodies.

ALAMEDA MINING CO.

Address: Wallace, Idaho.

Officers: F. J. Finucane, pres., 323 8th St., Spokane, Wash. Burbridge, v. p.; Chas. McKinnis, mgr.; J. A. Wayne, sec.-treas.; Chas. Hussey, directors. R. R. Catching, supt.

Originally inc. 1900 as the Alameda M. & M. Co., Ltd. 1910 as Alameda Mng. Co. **Cap.,** $1,500,000; $1 par; assessable; ments levied since 1900. Control of 800,000 shares purchased April, a share, by syndicate consisting of above named officers. Stock listed and Butte Exchanges.

Property: 6 claims adjoining Success mine on the E., in section, Coeur d'Alene district, Shoshone county. Little work has on the property during the 5 years up to 1918, owing to litigati Success company. Operations of the latter company having show bodies opened on the 400, 450, and 700' levels of the Success mine Alameda ground. The faces on the 400' and 450' levels are said to oz. silver per ton, 31.5% lead, 21.1% zinc; and on the 700' level, 7.5% silver, and 25.7% zinc.

The first suit was won by the Alameda Co., which was awar damages. The Success Co. won on appeal, the court permitting follow the granite vein downward between vertical planes along the the Granite claim beneath surface of the Cardiff, or any other claims this vein extended within the vertical lines named. The Alameda the case, but lost.

Development: by several tunnels, one being 2,500' long. zinc ore was found, on same level as the Success main tunnel, 500' belo workings on this ore-shoot.

ALBANY LEAD MINING CO.

Address: Wallace, Idaho.

Officers: John Dunphy, pres.; C. W. Betts, sec.

Property: 11 unpatented claims S. E. of Burke, Coeur d'Al No recent information.

ALCIDES MINING CO.

Office: Hyde Bldg., Spokane, Wash.

Officers: Grant Miles, pres.; Ed. Ehrenberg, v. p. and ma Neary, sec.; Oscar Cain, treas., with Fred Russell, directors.

Cap., $1,000,000; $1 par. Operating expenses in 1917 nearly

Property: the Mark Cooney group, 100 acres, near Pa d'Alene region.

Development: carried on through the 4,000' [illegible] of the Co. Ore carries lead and silver. Mine was closed [illegible] recent news.

ALHAMBRA MINING CO., LTD.

Address: W. A. Carey, [illegible]

,000; $1 par; assessable.
22 patented claims, in Yreka district, Coeur d'Alene, said
ad ores.
: included compressor and 50-ton flotation plant erected late
l by men identified with the Bunker Hill & Sullivan property.
December, 1919, showed that total receipts had been $168,326, of
was from assessments. Expenses were $146,096 for development
general charges.

NG CO. **IDAHO**

Wallace, Shoshone county, Idaho.
Walter Mackay, pres.; J. H. Foss, v. p.; J. F. McCarthy, sec.-
h C. E. Bender and G. W. Ruggles, directors.
0,000; $1 par; assessable.
23 patented claims, known as the Alice mine, situated be-
and Mullan.
ent: by 685' shaft and 9,570' of workings, from which 3,420
ead ore were shipped.
t: includes a compressor and 125-ton concentrator. Electric
Idle in 1919.

MINING CO. **IDAHO**

Kellogg, Idaho.
W. W. Papesh, pres.; Peter Engle, v. p.; C. Weigand, sec.-
A. Brockman and C. B. Forbes, directors.
,000; shares 25c par; assessable.
14 claims near Kellogg, between the Lombardy and Teddy

ent: by several tunnels, in one of which copper-silver ore was
returns.

INING CO. **IDAHO**

C. A. Maynard or John Sherrard, Mullan, Idaho.
6 unpatented claims at head of south fork of Coeur d'Alene
tunnel has opened silver ore.

IXIE MINING CO. **IDAHO**

Wallace, Idaho. **Mine office:** Sildix (not a P. O.), Mont.
Wesley Everett, pres.-mgr.; A. W. Ellenberger, v. p.; Her-
sec.-treas.; W. W. Woods, and Hugh Toole, directors; F. W. Cal-

in Montana. **Cap.**, $750,000; shares 50c par; assessable; 1,228,-
. An assessment of 2c was payable on May 30, 1919, and another
December 12.
ance of April 29, 1919, showed that $228,187 had been spent, in-
3 for development, and over $41,000 for equipment. This money
rom sales of shares and assessments.
8 claims and 4 millsites, 64 acres, well timbered, at Sildix,
nkout, just across the Montana line, adjoining the Leslie Copper
operty shows a fissure vein in quartzite exposed by surface trench-
arrying galena, chalcopyrite and lead carbonates, associated with
ues mainly in galena.
nt: by 2 tunnels, 9,550' long, the lower or main working
uth near the Northern Pacific Railway, to be extended 1,000'.
uected by a 400' raise. In April, 1919, a double compartment
deep, with 3 station, skip-pockets and levels at that depth. Cross-
f south opened two veins, the southern one showing a body of
copper concentrating ore along a 60' drift. This shaft is to
ore.
a water-power plant developing 110 h. p., a 10-drill
[illegible] sawmill, (150,000' of sawn lumber on
[illegible] and other necessary mine build-
Northern Pacific Railway, 160' from the mine.
September, 1919, that A. W. Ellenberger

and others of Cleveland, Ohio, had agreed to provide $150,000 for in
electric power, and sinking shaft 500' deeper and for development at

AMAZON-MANHATTAN MINE

Address: Eugene R. Day, Burke, Idaho.

Property: 6 claims N. W. of Consolidated Interstate-Callah
Creek district, Coeur d'Alene region. Its history, which is one of
litigation over ownership, dates from 1912. The former owners ever
an option to purchase for $160,000, to J. H. Wourms of Wallace, wh
property to Con. Interstate-Callahan. Patrick Burke of Wallace, wh
given an option in 1912 and failed to make his first payment of $16,0
to deliver the property, whereupon the District Court ordered vaca
premises. An appeal to Supreme Court sent the case back to the low
being alleged that Wourms had represented both Burke and the Cons
This contention was upheld, and eventually Cons. Interstate-Callah
dered to restore the Amazon-Manhattan to Burke, upon return to th
of $159,825, the full amount paid for it. This was, it is said, supplied
R. Day and the others, now in control.

Development: in the report for 1917, Cons. Interstate-Calla
that it had expended considerable money in exploration. When p
was considered a good prospect, but little ore was found, and none wa

Development is by tunnels. The lowest, or No. 3, 2,000' long,
depth of 900'. It is now stated that reserves are worth $2,000,000
1918, a ½-mile tramway was constructed to the Ray-Jefferson compar
mill, from which 60 carloads of concentrates from Amazon-Manhatta
shipped in 1918.

AMBERGRIS MINES CO.

Address: Wallace, Idaho.

Officers: Eugene R. Day, pres.; Harry L. Day, v. p.; W. I
sec., with August Paulsen, W. Clayton Miller and Al. Page, directors.

Inc. June, 1916, in Idaho. **Cap.**, $1,000,000; $1 par; assessabl
sessment, 2c per share, called August, 1917. Company is a reorganiz
Ambergris Mining Co., organized under laws of Washington with
capitalization. Stock was exchangeable at the rate of 3 shares of old
in the new company. Controlled by the Day family.

Property: 3 claims, patented, adjoining the Hercules at Bu
d'Alene region, developed by 200' shaft, said to show 2-3' of silv
As a result of former litigation, company has the right to use the He
nels and the aerial tram for shipments to rail. Developing through
Hercules tunnel to cut the Ambergris vein. In May, 1918, and again
1919, it was reported that ore was being opened up, but company is n
producer.

AMERICAN COMMANDER M. & M. CO., LTD.

Address: Mullan, Shoshone county, Idaho.

Officers: D. F. Clark, pres.; J. H. Burns, sec.-treas.

Cap., $1,500,000; $1 par; assessable; 2 assessments of 3 mills
levied, 1918.

Property: 2 patented claims, 32½ acres, situated 3,000' nort
lan, Idaho, and between the Gold Hunter mine and the Federal M.
Morning mine. Considered well located for exploration through adjo
erties.

Development: by open-cuts, shafts, and tunnels. Surface e
lead-silver bearing ore.

Mine is in exploration stage.

AMY-MATCHLESS M. & M. CO.

Reorganized in September, 1919, as Amy Mining & Development
see.

AMY MINING & DEVELOPMENT CO.

A reorganization of the Amy-Matchless M. & M. Co.

Address: James A. Wayne, Wallace, Idaho, and Mankato,

W. A. Beach, pres.; Geo. Wideman, v. p.; E. L. Hawes, sec.; on, treas, all of Mankato, Minn.
ember, 1919, in Idaho. **Cap.**, $1,500,000; $1 par; assessable.
: 19 claims on Pine creek, 3 miles from rail, developed by nd 200' shaft, showing lead-zinc ore.
ganization ended dissension of old company and provided money ion of work.

MINING CO. **IDAHO**

: Evan Evans, pres., Burke, Idaho.
500,000; $1 par.
: lead-silver bearing claims near Murray, Lalande district, e. Developed by tunnels. An ore-shoot 200' long was opened early

Y-SILVER MINING CO. **IDAHO**

: Wallace, Idaho. H. J. Rossi, Theo. Brown and John Finnel,

il, 1915. **Cap.**, $100,000; shares 10c par.
y: on Pine creek, said to show silver-antimony ore in a vein e, exposed by tunnels and a shallow shaft.
t information.

INING & MILLING CO., LTD **IDAHO**

: W. H. Keating, treas., Wallace, Idaho.
,500,000; $1 par; assessable.
y: 5 claims on Placer creek, 6 miles S. of Wallace. Tunnels have silver ore.

MINING CO., LTD. **IDAHO**

: Mullan, Idaho.
: E. Lindsley, pres. and mgr., Missoula, Mont. D. C. Smith, Brock, sec.-treas., with A. L. Duncan and W. C. Richardson, directors.
c., 1906, in Idaho. **Cap.**, $1,092,000; $1 par; assessable; all out- annual meeting, second Monday in January.
y: 5 claims, 3 patented, 75 acres, in Hunter district, Shoshone ed to show quartz fissure vein, 12' wide, carrying carbonate and surface and sulphide ore at depth; the surface ores consisting of uartz and barite, average 2% lead and 1 oz. silver. Development by depth of 400'.
ent was crosscutting for the vein, August, 1917, and a year later extracting ore.

ON MINING CO. **IDAHO**

: Burke, Idaho.
: C. T. Fisher, pres.; M. J. Mahoney, sec.-treas, with W. Fisher, and Otto Freeman, directors.
500,000; $1 par; assessable.
: 20 claims near Mountain House, Coeur d'Alene. Ore carries d copper.
ent: by 2,000' of tunnels. Equipped with compressor, etc., er power.

MINING CO. **IDAHO**

Herman J. Rossi, pres., Wallace, Idaho.
0,000; $1 par.
7 claims in Beaver section of Coeur d'Alene. No informa-

AHO MINING CO. **IDAHO**

J. Smith, sec., Spokane, Wash.
,000; $1 par; assessable after all issued.
patented claims in Hunter section of Coeur d'Alene region, and silver and is opened by 1,500' of tunnels, etc.
ion obtainable.

G CO. **IDAHO**

allace, Idaho.

Officers: E. R. Day, pres.; J. J. Murphy, v. p.; P. Maggy with H. J. Rossi and J. J. Day, directors.

Inc. July, 1915. **Cap.**, $75,000; shares 5c par. Company is a tion of the old Basin Mining Co., involved in litigation since 1907. chased May, 1916, by the Hercules Mining Co., which bought 700,0 issued and 500,000 shares treasury stock, and held 840,854 shares, at

Property: 5 patented claims in the Burke section, south of ing the Hercules mine, between the Laclede on the west and the S It is valuable to the Hercules Co. for tunnelling from the Humr Stanley into the Hercules mine. No information obtainable.

BEAR CREEK MINING CO.

Address: Wallace, Idaho.

Officers: P. Burke, pres.; R. E. Dunlap, v. p.; J. F. Morton

Inc. Aug., 1916. **Cap.**, $250,000; shares 25c par. Annual m Tuesday in August. Company bought the holdings of the Oro receivers sale, June, 1916, and is a reorganization of that company.

Property: 11 lead-silver claims, about 7 miles from Mur Summit district, 3 miles from the railroad.

Development: about $60,000 was spent by the Oro Fino Co two tunnels, some raises, etc. A new tunnel 400' lower, was driven

Equipment: includes a mill and flotation plant, in opera 1918 and 1919. Lead concentrate assays up to 70% and zinc con metal.

BELLE OF THE WEST MINING CO.

Address: G. R. Trask, pres., Wallace, Idaho.

Cap., $75,000; shares 5c par; assessable.

Property: 2 claims, adjoining the Success mine, showin ore in tunnels and crosscuts.

BELL MINING CO.

Address: C. H. Hussey, sec., Spokane, Wash.

Cap., $50,000; 10c par; assessable.

Property: 8 patented claims in Lalande section of Coeur rying lead-silver ore, developed by over 7,000' of tunnels and other w

BELMONT-BANNER MINING CO.

Office: 417 Hutton Bldg., Spokane, Wash.

Officers: Conrad Wolfle, pres. and gen. mgr.; E. A. Wolfle, Poole, sec.-treas., with A. J. Davis and Gale Smith, directors.

Cap., $1,000,000; $1 par.

Property: 10 claims, one fractional, near Delta and 12 mile lace, Shoshone county, shows a fissure vein of 3 to 4' surface width carrying silver, lead and copper. Mine has a tunnel over 500' lo winze sunk on the orebody.

No recent information available.

BELMONT MINING CO., LTD.

Office: Wallace, Shoshone county, Idaho. Mine in Two Evolution district, 3 miles north of Osborn.

Inc. 1900. **Cap.**, $100,000; 10c par, with 200,000 shares in tr organized 1909, 1,000,000 shares at $1 par; assessable; placing 500, treasury. Assessment levied August, 1916.

Officers: William Scheave, pres.; D. C. Nicholson, v. p.; Fr sec.-treas., with Ida Scheave, Christ Anderson, Dr. T. C. Withersp Nickels, directors.

Property: 9 claims, showing several contact veins in Burk quartzite. Ore is said to assay 2.5% lead, 2 oz. silver, 15% mangan a trace of copper.

Development: by 2,600' of tunnels. No recent returns.

BENTON MINING CO.

Address: Burke, Shoshone county, Idaho.

Officers: John Callahan, pres.-mgr.; F. P. Candee Gnaedinger, cons. engr., with Fred Richardson and N. I

00; $1 par issued 1,165,000 shares; assessable; 3 assess-
½ mills have been levied; last one in 1915 was 3 mills.
e Exchange. Annual meeting in April at Wallace.
laims on east side of Gorge gulch, adjoining the Stanley
ear Burke, supposed to have a continuation of the Stanley
: a silver-lead-copper-antimony, occurring in fissure veins
lead, up to 12% copper and 65% antimony. Lead vein
ize at 60′ depth and at 200′ the McNeil fault was passed
tting at this level exposed lead vein to the S. E., but main
sed to be deeper.
adits, 200′ winze from main adit level, with over 1,000′
ecent returns.

MINING CO., LTD. **IDAHO**

03 Paulsen Bldg., Spokane, Wash. **Mine office:** Wallace,
daho.
s. H. Bell, pres.; W. A. Cox, v. p.; Chas. A. Gram, sec.-
cott and Chas. Horr, directors.
1909, in Idaho. **Cap.,** $1,500,000; $1 par; fully paid and

claims, unpatented, in the Yreka section, Coeur d'Alene.
ing lead and silver ore said to be 100′ wide in Burke quartzite.
by 2,800′ of workings. Work was in progress in 1917,
e at last accounts.

EASING CO. **IDAHO**

ogg, Idaho.
V. Price, pres.; Thomas Fluke, v. p.; O. A. Larson, sec.-
rice, W. A. Beaudry and Elmer Brown, directors.
shares $10 par; all issued. Annual meeting July 8. An in-
50c per share paid September, 1917; total dividends, $1.50
in 1917.
-year lease, to 1920, on the ground below the 500′ level
Mining Co. property (which see).
by tunnels, one 2,150′ long, opening silver-copper ore
5 cars of ore in 1916, valued at $28,000; 2,468 tons
Shipments were made in 1919, but no recent returns

NING CO.

Bank St., Wallace, Idaho.
cott Anderson, pres.-mgr.; W. W. Smith, sec.
. Irving Anderson, and C. E. McCoy, directors
0; $1 par. Annual meeting first Tuesday in
aims, 1½ miles up Big Creek, near Kellogg,

by 3,380′ crosscut tunnel, which in 1918 up
z. silver ore for 200′ at depth of 1,200′. Two ore
me shoot, which can be developed 500′ deeper. Si

ncludes electric power, air-compressor and drill
d upon in May, 1919, and was to be finished by Janu
ned the plant.
om 1915 to 1917, 17 cars of 1 to 5% copper and
44,010 net; and 18 cars in 1918, yielding $43,510. Si

VER MINING CO. ID
Crane, Kellog
10c par.
Big Creek, nea
ation available.
NING CO., L IDA
ace, Idaho.

Officers: Alexander Murphy, pres.; F. P. Markwell, v. p.; tison, sec-treas., with C. A. Markwell and J. F. Markwell, directors.
Cap., $1,500,000; $1 par; 1,241,740 issued.
Property: 137 acres, a silver-lead prospect in Lalande dist hone county, between the Success mine and property of Federal M. &

BIG FIVE MINING CO.
Address: W. F. Sargent, sec.-treas., St. Maries, Idaho.
Cap., $2,000,000; $1 par; assessable.
Property: 40 acres in St. Maries section of Coeur d'Alen gold, copper, and lead, and opened by tunnels.

BIG IT M. & M. CO.
Address: Beeler, Idaho.
Officers: H. S. Davenport, pres.; Charles Walker, v. p.; C. sec.-treas., with W. L. Grant and Charles Korcle, directors.
Cap., $150,000; 10c par. Annual meeting June 21, 1919.
Property: in Pine Creek section of Coeur d'Alene, said to c and lead ore.

BITTER ROOT MOUNTAIN MINING CO.
Address: 939 South Hilliard St., Spokane, Wash.
Officers: F. A. Edgerton, pres.; F. A. Noteware, sec.-treas.
Inc. 1900, in Washington. **Cap.,** $75,000; 5c par; 1,200,000 is
Property: 3 patented claims in Hunter district, developed tunnels, and shaft, opening a little silver-lead ore.

BLACK BEAR CONSOLIDATED MINING CO., LTD.
Reorganized as Black Bear Mines Co., which see.

BLACK BEAR MINES CO.
Formerly Black Bear Cons. M. Co., Ltd. **Office:** Wallace,
Officers: Peter Bernier, pres.; L. L. Brainerd, sec.-treas. Rossi and A. D. Wallace, directors.
Inc. March, 1917, in Idaho. **Cap.,** $400,000; 20c par; assessab issued. Assessment 1c. a share, delinquent August 2, 1919. An optio of shares was given to the Flynn Group M. Co. in Jan., 1920, at This secures a right-of-way for the Flynn.
Property: 4 patented claims and a millsite, 4½ miles N. W. Shoshone county. Examined by Frank J. Davey.
Geology: claims carry a fissure vein in Burke quartzite, th S., and runs N. 75° W.; in upper horizons vein carries 10% lead a with 2 oz. silver per ton. Though narrow and poor at surface, t widened to 8' at 125' in depth, with the content just given. In pla widens to 23' across narrowing to 4' in face of drift. At 1,180' be face the vein is lean and shows evidence of extreme pressure, as drifts from a 2,400' crosscut tunnel. Raises from that level encou trating ore carrying silver, lead, and zinc, a short distance upward.
Development: by tunnels. No. 1 tunnel cuts vein at 500' de ing carbonate ore continuing down to bottom of 125' winze. Main tunnel, 1,000' lower, also cuts ore, the shoot being 2'-25' thick and 30 shown in raises, the ore averages 6' wide, and runs 2.2 oz. silver, 7.7 16.57% zinc. The face of the workings is but 350' from the end Flynn property.
Equipment: includes electric motors, compressors, shops, pany had a lease on the Western Union Co's. mill, which was to b Mine closed, 1919, owing to incompetence of president, but new direc ises to resume work.

BLACKHAWK LEASING CO.
Address: Thomas Fluke, sec., Wallace, Idaho
Cap., $25,000; 50c par.
Property: [illegible] held under 5-year lease [illegible]
[illegible] CLOPMENT CO. 1,711

. Treat, sec., Wallace, Idaho.
10 par; assessable.
Blackhawk lead-zinc in Government gulch, Coeur d'Alene,
4,000' of workings. Is under 3-year lease to Blackhawk

MINING CO. **IDAHO**
. Sommer, Old National Bank Bldg., Spokane, Wash.
10c par.
npatented lead-silver claims 2 miles N. of Kellogg.

NING CO., LTD. **IDAHO**
Weber, pres., 2732 N. San Francisco Ave., Chicago, Ill.
; $1 par.
npatented claims near Wardner, Shoshone county, Idaho.
a 2,500' tunnel, said to have opened silver-lead ore.

MINING CO. **IDAHO**
s Keeth, 414 Kuhn Bldg., Spokane, Wash.
McCormick, pres.; Geo. Goebler, v. p.; James Keeth, sec.
Washington. **Cap.**, $150,000; 10c par.
acres, 5½ miles N. E. of Burke, Shoshone county, car-

by 1,900' tunnel gaining depth of 350'.

NING & MILLING CO., LTD. **IDAHO**
ston, Idaho.
. Powell, pres.; Aug. Gren, v. p.; A. C. Morbeck, sec.-

daho. **Cap.**, $1,000,000; $1 par.
acres on Pine creek, Shoshone county, carrying silver

by 500' two-compartment shaft, and 3,000' of workings.
bruary, 1918, that H. Isolata and I. Peterson of Butte had
ontrol of shares for $30,000.

NING CO. **IDAHO**
ian J. Rossi, Wallace, Idaho.
10c par.
patented claims on Nine Mile, Shoshone county, carry-

k done.

SON GROUP MINING CO. **IDAHO**
ian J. Rossi, sec., Wallace, Idaho.
; $1 par; assessable.
cres near Wardner, Shoshone county. Ore carries sil-
, opened by shallow shaft and short tunnel.

ING CO. **IDAHO**
. Featherstone, sec., Wallace, Idaho.
c par; assessable.
ims, 2½ miles N. of Osborne, Shoshone county, carry-
nd zinc. In a report of July, 1918, the superintendent, H.
of driving in a tunnel had revealed a 12' vein, and surface
ranging.

K MNG. & MLG. CO., LTD. **IDAHO**
Natl. Bank Bldg., Spokane, Wash.
Greenough, pres. and mgr.; W. D. Greenough, v. p.;
eas.
0; shares $1 par; assessable; 976,230 issued. Annual
y in December.
im, 20 acres, about 2 miles S. of Mullan, developed by
est 1,200', said to show ore assaying 10-15% lead with gold,
Property considered promising, but has been idle for several

BRISTOL MINING CO., LTD.

Address: W. A. Tuson, pres., Kellogg, Idaho.

Cap., $125,000; 10c par.

Property: 9 claims, near Wardner, Shoshone county, contain lead-zinc ore.

BROWN LEASING CO.

Absorbed, 1918, by Kellogg United Mines Co., which see.

BUFFALO MINING CO.

Address: Mr. Conroy, sec., Missoula, Mont.

Cap., $1,500,000; $1 par; assessable.

Property: 28 unpatented gold-silver-lead claims, partly in county, Idaho, and partly in Mineral county, Mont. Developed by tunnels.

BUNKER HILL & SULLIVAN M. & C. CO.

Officers: 1022 Crocker Bldg., San Francisco, Cal., and Kello

Officers: F. W. Bradley, pres., San Francisco; J. W. P. McF Wm. H. Crocker, treas; J. S. Wallace, asst.-treas; Geo. F. Holman, Abbott, asst. sec.; Jules Labarthe, executive head of Bunker Hill Smel ly A. Easton, mgr.; R. S. Handy, supt. of mills. F. M. Smith, sme at Spokane.

Inc. 1885, in Oregon. **Cap.,** $3,270,000; all issued; shares $10 listed. Company is practically a close corporation. Transfer agent and asst. sec. of the company at San Francisco. Annual meeting, third T June.

General Balance Sheet, year ending December 31:

Assets—

Year	Property & Plant	Supplies	Cash, Ore & Concts.	Investment Reserve	Miscel.
1918....	$44,933,202	$710,581	$1,670,573	$1,615,580	$526,939
1917....	45,494,361	360,201	1,894,912	1,429,384	393,713
1916....	46,180,979	125,976	977,395	1,029,409	226,889
1915....	4,977,268	253,583	603,416	1,047,550	190,274

Re-valuation of mine increased the property account from $4, 1915 to $46,180,979 in 1916. This was done to comply with Federal Re of September 8, 1916, and subsequent amendments, by which owners deposits are entitled to a deduction from gross income on account of of natural deposits "not to exceed the market value in the mine of th thereof, which has been mined and sold during the year, etc.," nor ex the aggregate the capital originally invested, or in case of purchase March 1, 1913, the fair market value as of that date.

Liabilities—

Year	Capital Stock	Surplus Account	Property Re-valuation Surplus	Miscel.
1918.....	$3,270,000	$6,760,[illegible]	$38,168,589	$1,208,841
1917.....	[illegible]	[illegible]	42,290,265	1,402,530
1916.....	[illegible]	[illegible]	42,290,265	218,437
1915.....	[illegible]	[illegible]	[illegible]	110,930

Income [illegible]

Year	Operating Revenue	Income [illegible]	Dividends Paid
1918...	$6,128,[illegible]	[illegible]	$1,853,250
1917...	9,[illegible]	[illegible]	981,750
1916...	6,22[illegible]	[illegible]	[illegible],750
1915...	4,41[illegible]	[illegible]	[illegible],750

* Stands [illegible]

** Stands [illegible]

† Surplus [illegible]

Dividends [illegible]

5, $3.25; in 1916, $5.25; in 1917, $6.25; in 1918, $4.75, and 75
pril 4, making a total of $22,495,500.
apex litigation with the Caledonia Mining Co., B. H. & S. con-
owning 1,308,100 shares out of 2,605,000 issued. See Caledonia
ierra Nevada is also a subsidiary of B. H. & S.
ut 5,000 acres, patented, at Kellogg, Coeur d'Alene, Idaho.
larger part of the ore is principally a replacement of the
which the replacement is closely connected with fissuring. The
ls are galena with some pyrite and zinc blende, and in places a
in silver. The orebodies are definitely related to a persistent
° W., dip 38° S. W., locally known as the "foot wall fissure."
d quartzite in which the orebodies occur has a maximum width
nd in the hanging-wall of the fissure. The orebodies are very
nd may be several hundred feet in length and depth with width
as 40'. For geology of this district, see U. S. G. S. Prof
and Ore Deposits of the Coeur d'Alene district, by F. L.
. Calkins, in 1908.
tunnels and shafts. The Kellogg tunnel, 8x9', in section.
long, is the main working level. It is equipped with electric

nnel the orebodies have been explored to surface. Below
intervals are 5 working levels, Nos. 10, 11, 12, 13 and 14.
e of value and size of orebodies down to No. 15 sub-level,
oven by work in 1919.
rk has been as follows:

	Feet	Cost per foot
.....	1,740	$13.73
.....	1,524	20.06
.....	3,944	9.87
.....	4,783	9.32
.....	2,754	10.77

l report 1918 of Robert Bell, State Mine Inspector, will
ng notes on the Bunker Hill & Sullivan ventilating sys-
ound work.
January 1, 1919, were 4,362,024 tons. Milling ore averages
d 3.7 to 4.5 oz. silver per ton. Shipping ore runs from
and 17 oz. silver per ton.
ncludes 3 concentrators, power-plant, water power, ma-
mills, etc. Replacement value of surface equipment is
49. Mill extraction is about 85% for lead and 80% for

mill, consisting of jigs, trommels, and tables, is treating
ilings daily.
has a 12-year contract, dated March 1, 1918, to sell por-
ssaying between 40 and 66% lead to the A. S. & R. Co.
rn the two companies had been constant, B. H. & S. Co.
lter at Kellogg, in 1917. Initial daily capacity, 1,000 tons.
from the Washington Water Power Co. of Spokane.

Mined Tons	Concts. Tons	Lead Lb.	Silver Oz.	Cost per ton Mining	Cost per ton Milling
9,027	84,169	67,125,717	1,191,907	$2.92	$0.71
[illegible]	103,982	93,992,898	1,692,765	2.38	0.60
[illegible]	76,284	77,298,879	1,406,260	2.36	0.43
[illegible]	59,901	74,584,741	1,298,284	1.99	.....
[illegible]	56,163	70,663,236	1,161,324	1.98	.....
[illegible]	59,471	71,860,773	1,227,076	2.25	.....

Production since 1886 is 8,275,913 tons of ore worth $86,34
Net smelter returns were $50,925,287, of which $28,771,132 was
$4,105,624 investments, etc., and $22,086,750 paid in dividends
1918.

Cost of producing lead has been as under:

Year	Price rec'd c. per lb.
1918	7.375
1917	8.731
1916	6.881

Company issues a report containing considerable detailed
little on underground conditions. The mine is a big one and w
to pay dividends for many years. The general policy of comp
gressive, with much initiative.

Bunker Hill Smelter.

Subsidiary of Bunker Hill & Sullivan Mining & Concent
which see.

Offices: Crocker Bldg., San Francisco; 1015 Paulsen Bldg
Wash.; and Kellogg, Idaho.

Officers: Jules Labarthe, director; F. M. Smith, asst. direc
Sullivan, smelter supt.

The smelter, erected in 1917, improved and enlarged sin
Kellogg, at Bradley railroad station. The principal supply of or
centrate is from the B. H. & S. mines, but custom business is do
1920 the company had arranged to receive ores from British Colu
competing with the Consolidated M. & S. Co. at Trail, Northpo
and the A. S. & R. Co.

The works consist of 4 Traylor blast-furnaces, 48 by 180
tuyeres, 2 I.-R. turbo-blowers of 12,000 cu. ft. capacity per mi
pressure, slag settlers, 20-ton electric crane, 130 cu. ft. motor-du
pots, 10-ton Baldwin-Westinghouse loco, Dwight-Lloyd sintering
two 50-ton drossing kettles, centrifugal pumps, two softening fu
ton crane, Faber du Faur retort furnaces using powdered coal,
naces, and Cottrell precipitators. The furnace charge carries
lead, and the slag assays only 1% lead.

These works are in able hands, and are of great importa
Northwest.

BURKE MINING CO.

Address: J. C. Glahe, sec., Burke, Idaho.

Cap., $1,500,000; $1 par; assessable.

Property: 10 patented claims in Canyon creek, 2 miles E.
Shoshone county. Opened by 1,500' tunnel.

BURLINGTON MINING CO.

Address: John Hall, Grinnell, Iowa.

Cap., $2,500,000; $1 par.

Property: 17 unpatented claims in Evolution section of Coe
Shoshone county, developed by 1,600' of tunnels.

BUTTE & COEUR D'ALENE MINING CO.

Address: care Jos. Rosslow, Hyde Bldg., Spokane, Wash.

Inc. 1907. **Cap.,** $1,500,000; $1 par; assessable up to 10 ve

Officers: L. C. Lens, pres.; Peter McGregor, v. p.; Joseph Ro
treas.; with R. C. Dillingham and J. M. Pickrell, directors.

Property: 8 claims [illegible] miles from Mullan in Shoshone
joining the Gold Hunter [illegible] lead.

Development: [illegible]
with 200' and 400' [illegible]

Equipment: [illegible]
Little work done [illegible]

LOGG MINES CO. **IDAHO**

rman J. Rossi, Wallace, Idaho.
); 10c par.
claims, one mile from Kellogg, Shoshone county. Ore
silver.

DEVELOPMENT CO. **IDAHO**

ace, Idaho. Chas. McKinnis, mgr., associated with others
Mining Co., which see.
rmed to examine and acquire a new mine for the Cale-

00); $1 par.
option was acquired on the stock of the Jemison Mines
nty, Ariz., after examining its mine and its operations for
Stockholders in the Caledonia Mining Co. had the privi-
1917, of subscribing to 200,000 shares of J. M. Co. treasury
are.

MINING CO. **IDAHO**

ace, Idaho. **Mine office:** Wardner, Shoshone county, Idaho.
A. Easton, pres.; J. E. Gyde, v. p.; Chas. McKinnis, sec.-
C. F. Kratzer, directors.
1907, in Idaho. **Cap.**, $2,605,000; $1 par; assessable; all is-
office at Wallace, Idaho. Listed on San Francisco and
Cash surplus December 31, 1919, was $570,520, equal to 22

t rate of 3c a month in 1917 and 1918; reduced to 1c in
Total dividends to December 5, 1919, amounted to $3,985,650.
s acquired stock control in the Jemison Mines Co., which
onia Development Co.
unpatented claims, about 50 acres; adjoining property of
& Sullivan M. & C. Co., at Kellogg, Idaho, showed a strong
an ore-shoot 1,000' long, that is in places 50' wide and car-
silver-lead ores, averaging 15 to 40 oz. silver, with a little

t by a 500' shaft and 2 tunnels, lower tunnel, 4,000' in
acks of about 1,300'. The 1,000' level showed 7' of ship-
broken faulted ground was encountered. Most of the ore
een the 500 and 700' levels. Management reported May 1,
pment had failed to disclose new ore, and that the down-
of the orebody has been faulted and could not be found.
ring 1917, 1918, and 1919 failed to find new ore.
as idle from 1912 to July, 1914, on account of litigation
r Hill & Sullivan over apex rights. A compromise was
the capital of the Caledonia company was increased from
05,000, B. H. & S. taking 550,000 shares. The company is
diary of B. H. & S.
includes an electric hoist, air-compressor and electric
treated at the mill of the B. H. & S. Company employs

Copper lb.	Lead lb.	Silver oz.	Net profits	Dividends
245,610	6,599,720	537,854	$761,797	.....
659,660	11,142,580	1,212,730	760,324	$755,450
741,235	10,412,640	1,297,193	1,154,762	911,750
744,802	9,434,900	1,068,700	1,227,155	937,800
54,338	4,038,784	668,784	647,819	937,800
53,906	4,224,053	507,962	420,197	312,600

ing and shipping was $2.05 per ton in 1919.

CALIFORNIA CONSOLIDATED MINING CO.

Address: S. Severance, sec., Pittsburgh, Pa.

Cap., $1,000,000; $1 par.

Property: 4 patented claims in Placer Center section of Co carrying lead and silver.

CARBONATE HILL MINING CO.

Absorbed by Idaho Carbonate Hill Mining Co., which see.

CEDAR CREEK M. & D. CO., LTD.

Address: Wm. Becker, sec., Wallace, Idaho.

Cap., $1,000,000; $1 par. A 3-mill assessment was levied in

Property: 15 claims in Summit section of Coeur d'Alen county, developed by over 5,000' of workings. Operations were early in 1918 and resumed in September, 1919.

CHAMPION COPPER MINING CO.

Probably defunct. See Vol. XII. Property at Mullan, Ida

CHESTER MINING CO., LTD.

Address: S. P. Fairweather, sec., Wallace, Idaho.

Cap., $1,000,000; $1 par.

Property: 6 patented lead-silver claims in Evolution distric county, on which $25,000 had been spent to mid-1918.

CHICAGO-BOSTON MINING CO.

Address: W. S. Bangs, sec., 514 California Bldg., Tacoma,

Officers: C. W. Gossert, pres., with W. S. Havin, H. M. M J. R. Neely, directors.

Cap., $1,500,000; shares $1 par.

Property: 10 claims on Lake creek, 2 miles W. of Wallac county, one mile from rail and electric power available. Exami 1919, by C. W. Newton.

There are two ore-bearing veins, one the Tincup, having high copper ore, from which shipments have been made. The seco Killbuck, is said to have 8 to 12' of lead-silver milling ore, open tunnel. The copper vein is up to 5' wide, and some ore carried per ton. So far as explored, the property is within the Revett q

Development: by 6 tunnels and shaft. Some milling o blocked out. Sinking 200' is suggested, which can easily be Cons. Interstate-Callahan.

Recent information is to the effect that the option held b in 1917 was dropped; that J. A. Percival of the Cons. Interst had acquired control of the mine in November, 1918; and i work was resumed after a shut-down.

CLIMAX SILVER-LEAD MINING CO.

Address: H. V. Edwards, Jr., Wallace, Idaho

Cap., $375,000; 25c par.

Property: 4 claims in Revenue gulch, Shoshone county. Opened by short tunnel and drills.

COEUR d'ALENE ANTIMONY MINING

Office: Kellogg, Idaho.

Officers: M. E. Jolley, pres., Coulee v. p.; C. M. Powell, sec.-treas., Kellogg, Ida

Cap., 1,500,000 shares; 10c par; assess ment of 3 mills per share was levied June ber 30th.

Property: 2 claims, including an antimon Kellogg, that had been idle for 10 years.

Development: by 300' shaft being sunk said to show two shoots of ore, the large The high-grade ore is said to assay 35% an

nt: 100-ton mill employing flotation. Work resumed Feb., 3 years' suspension.

LENE CHAMPION MINING CO. **IDAHO**

James Keeth, sec., 510 Kuhn Block, Spokane, Wash.
500,000; $1 par; assessable.
: 17 claims near Burke, Shoshone county, carrying lead and loped by 4,000' of tunnels and fairly well equipped.

ALENE CRESCENT MINING CO. **IDAHO**

: 404 Jamieson Bldg., Spokane, Wash.
L. W. Bonney, pres.; J. B. Millspaugh, v. p.; F. W. Mauser, vith F. R. and G. E. Crocker, directors.
250,000; $1 par; assessable. 675,000 issued.
y: 5 unpatented claims and millsites, one mile N. W. of Os- hone county. Vein is in quartzite carrying silver and lead, 50 to $25 per ton.
ment: by 300' shaft and 500' tunnel. No work has been done o years.
led by Stewart Mining Co. and described thereunder.

ALENE EMPIRE M. & M. CO. **IDAHO**

: A. Herman, Rookery Bldg., Spokane, Wash.
: F. D. Garrett, pres.; Frank Johnson, v. p.; A. Herman, sec.- T. H. Holland, directors.
17, in Washington, to take over property of Coeur d'Alene M.
Cap., $1,500,000; $1 par; assessable.
y: 9 silver-lead claims near Wardner, Shoshone county.
pment: by tunnels and workings aggregating over 3,000 feet.

'ALENE EXPLORATION CO. **IDAHO**

s: O. A. Olsson, sec., Wallace, Idaho.
y: 10 claims near Wardner, Shoshone county.

OLD & COPPER MINING CO., LTD. **IDAHO**

care Jos. F. Whelan, sec., 408 Sixth St., Wallace, Idaho. Mine n, Shoshone county, Idaho. Archibald McCullom, pres. and A. L. Honeker, treas.
00,000; shares 10c par, assessable. ½ mill per share levied 1913

y: 4 claims, adjoining the Springfield, east of Mullan, on Stevens near 2 railroads, shows 2 veins of 10' and 15' estimated width, apart, carrying chalcopyrite and bornite, with iron and quartz

oment: by tunnel, cutting a hematite vein, with about 1,000' of Property worked on a small way, with proceeds of assessments o orebodies of commercial size have thus far been developed.

K COPPER [illegible] LTD. **IDAHO**

: Wallace [illegible]
[illegible] Olsson, treas.,
[illegible] directors.
Idaho
[illegible] tunnel
[illegible]
[illegible]
[illegible]HO
[illegible]

Inc. June 12, 1912, in Arizona as a consolidation of the Interstate Lead Mining Co. and the Callahan Mining Co. **Cap.** $5,000,000; $1 373,303 outstanding, as explained below. Listed on New York Sto change. Title Guarantee & Trust Co., New York, transfer agent; trar & Transfer Co., New York, registrar.

Outstanding shares totaled 464,990 up to October, 1918, whe were reduced to 319,893. In April, 1914, the company made a contra the American Metal Co., Ltd., for the sale of the entire output mine and mill for a 10-year term commencing September 22, 19 prices to be spelter at St. Louis, less certain deductions. Owing t tinual controversies between the two companies in regard to modifi of the contract, asked by the American Metal Co., it was finally deci cancel the contract in October, 1918, the consideration being the d and surrender to the Consolidated Interstate-Callahan Mining Co., of shares held by the Metal company. In addition, company acquired of $9 per share from parties affiliated with the Metal company thei ings of its stock of 21,590 shares thus reducing the amount of stoc standing to the amount shown above.

Since the above was arranged, the mining company made a c with the Grasselli Chemical Co. of Cleveland, Ohio, for sale of i until July 1, 1919. The lead-silver ore is sold under contract to the Am. S & Refining Company and treated at Colorado smelters.

Financial Statement—Years ending June 30, to 1916, and Decem thereafter:

	Current assets.					
Year	Cash	Ore account	Other	Total	Current liabilities	S
1919.....	$74,909	$264,156	$398,888	$737,954	$119,324	$
1918.....	57,855	75,762	297,393	431,011	176,458	
1917 (18 mos.)	252,542	253,149	160,409	666,100	114,159	
1916.....	143,573	596,289	101,709	841,571	34,860	
1915.....	316,588	784,190	50,864	1,151,642	56,780	1

Comparative Operating Statement—Years ending June 30 to and December 31, thereafter:

Year	Income	Op. & Gen. charges	Profit	Surp. from last year	Dividends	S
1919.....	$972,665	$602,902	$369,763	$248,867	.....	$
1918.....	1,228,616	968,328	260,289	450,486	456,222	
1917 (18 mos.)	4,179,932	1,854,055	2,325,876	783,509	2,557,445	
1916.....	4,013,172	912,681	3,100,491	1,142,967	3,254,930	
1915.....	2,161,177	569,404	1,591,773	200,686	697,597	1

Dividends: initial paid April 1, 1915, amount that year being $1 share; $7 in 1916; $5.50 in 1917; $1.25 in 1918; 50c. on March 30, 1920, total being $15.75 per share, or $7,126,029, equal to $3.15 per annum.

Company is a consolidation of two prospects, called the Interst Callahan groups, the first named developed and the Interstate vein while Walter Harvey Weed was consulting engineer, on whose adv present consolidation was effected at a time when this part of the d'Alene district was regarded by many mining men as worse tha promising. The mine has developed into one of the principal zinc-le ducers in America; in fact, the third largest, and one of the greatest.

Property: 79 claims, 1,250 acres, (40 patented), also the Jumbo 7 claims, the Blue Grouse (two combined have 20[illegible] trolling interest in the Silver State Mining Co. adjoi all in the Coeur d'Alene district, Wallace [illegible] Amazon-Manhattan mine was relinquished [illegible] on account of defec[illegible]

ocated in 1883, Cons. Interstate-Callahan was adjudged the owner
).

he two fissure veins thus far worked in the property are the
he Callahan. The veins cut through Prichard slates, which
a monzonite porphyry dike and by small diabase dikes. The
varies from 3-20′ in width, the Callahan from an inch to
y of the district see U. S. G. S. Professional Paper by
and F. C. Calkins in 1908; also reports of the mining in-
by Robert N. Bell, especially that for 1918, covering gen-

nt: totals over 47,000′, of which 1,088′ was done in 1919.
orking level is tunnel No. 4, about 1,200′ below the moun-
an ore-shoot 1,200′ long has been encountered, running
width. This ore extends from the uppermost tunnel down,
od metal contents on the lowest level. The 3-compartment
during 1917 and 1918 to 1,100′ below No. 4 level, the main
Exploration during these periods on the new levels has
actory. At the collar of this shaft is a station 25x25′, be-
oist room 40x40′. Hoist is driven by 250 h. p. motor. The
or a lift of 12,000 lb. at a speed of 800′ per minute from an
of 2,000′. By November, 1919, a large orebody had been
00′ level assaying 31% zinc, 34% lead and 7 oz. silver per ton.
ing deep development (to 3,000′, or 1,500′ below No. 7 level)
ion of the O.-W. R. & N. Ry. branch from Mullan, up to

s: 310,000 tons Jan. 1, 1920, plus an equal amount from new
fully developed, averaging 25% zinc. Development has not
limits of orebody.
claims are situated about a mile N. of the portal of Inter-
el. The group lies between the Idora and Interstate-Calla-
he Beaver creek side of the Nine Mile divide. The claims
two fissure veins in quartzite and slate, that average 3′ in
bands and shoots of lead and zinc ore, the lead ore carry-
er ton to each 10% lead. The mine has been intermittently
1892, but no important orebody discovered. There are
longest 1,200′, with a total of 2,140′ of workings. The group
aluable, but has an additional value to the Interstate-Calla-
its much deeper tunnel work than any now existing and
on the Beaver creek side of the mountain, with easy access
rk.
on with this work, in 1917 a crosscut was started from
level, across the Silver State ground, and into the Nipsic,
r's vein at 1,000′ below the orebody indicated in the upper
ipsic. This crosscut will also develop the Silver State.
, 1918, the drift was driven 2,282′ to the side-line of the
into that ground. At 233′ from side-line, 12″ of clean ore,
ad and 10 oz. silver, was cut. Ore carries very little zinc.
way. At a point 1,100′ above, there is 120 of high-grade
4″ wide, so a substantial orebody may be developed.
is modern, with a view to future big development. Build-
mill, bunk and rooming-houses for 300 men. The concen-
is rated at the rate of 11,100 tons of ore per month dur-
mpletely remodeled during 1918 and a contract was made
ts Corporation Co. for the use of its patents. A 400-ton
bins, consisting of a 75-h. p. motor, No. 8 Sturtevant
, two 16″ elevators, 2 Janney emulsifiers, and 16
mechanical air flotation machines, each driven by an
motor, are the installation. There are 2 sets of
of cleaners. The former are in

parallel, each unit consisting of one emulsifier cell and 6 flot while the cleaners consist of 4 flotation machines in series.

The grinding department contains a 200-h. p. motor, a 6x1 2 Akins' classifiers, two 18" elevators, and four 4" Krogh sand pu

A Sauerman slack-line cable excavator is used to reclaim ta the dump. They are dumped into a hopper, and then conveyed flotation plant. In 1917, there were 225,000 tons of these, 50% slime assaying 12% zinc, and 2% lead; the remainder, from jigs, and assay 8% and 2% respectively. By 1919 the tonnage ha duced to 125,000 tons. In June, July, August and September, plants treated 46,802 tons of slime tailing and 37,245 tons of coa The flotation concentrates from these tailings were passed over Overstrom slime tables and 4 Wilfley tables, separating some from the zinc.

During 1918 the old mill was altered to make room for 10-De strom and Wilfley tables; building elevator to feed tables; install system and classifiers; and repairing line shafting and gearing A new set of rolls was built on concrete foundation; the tr jigs were repaired and duplicates built; a new 6x6' ball-mill w another Oliver filter was erected; the pumping system was alte 30' Dorr settler added. One of the great difficulties has been se lead from zinc, and experiments are being made with selective flotation.

By December, 1919, zinc concentrate had improved from metal content, lead from 50 to 59%, and silver from 15 to 20 oz. p

There are 330 men employed, the full complement.

Production: during 1919, the mine was shut down from M October 21st, on account of low metal prices and labor conditio to permit improvements to be made in mine and mill. Production two months of 1919 was 8,866 tons of 50% zinc concentrate, 3,010 lead concentrate and 55,445 oz. silver. Output for November and 1919, was 6,700 tons of zinc concentrate, 2,150 tons lead concentrate ounces silver.

Production gradually increased and is now normal, or about 4, 50% zinc concentrate, 1,700 tons of 59% lead concentrate and 34,00 monthly. Total production to March 1, 1919, 215,680,459 lb. zinc; 5 lead; 949,980 ounces silver, realizing $11,461,364.

In January, 1920, an extension of the fifth level, 200' below t tunnel cut an orebody 22' wide that assayed 23.7% zinc, 12.8% lea silver per ton. In view of this work and the finding of the oreb the fault, the ore reserves may be considered as doubled, and turns on the shares should be not less than $20 per share.

	1919	1918	1917	19
Ore mined, tons	67,952	85,363	240,858	
Crude lead ore shipped, tons	634	1,634	3,469	
Crude zinc ore shipped, tons	975	2,755	17,926	
Ore milled, tons	52,526	69,002	197,388	
Tailing treated, tons	.....	84,055	.....	
Lead concentrate shipped, tons	4,722	3,518	8,944	3,7
Zinc concentrate shipped, tons	14,825	40,258	74,219	51,7
Zinc content, pounds	16,498,285	40,891,881	89,396,127	
Lead content, pounds	7,993,664	12,098,429	24,357,826	
Silver content, ounces	139,276	202,750	416,126	
Gross value of all products	$724,535	$1,816,444	$5,153,398	
Operating costs per ton of ore mined	.....	.....	$5.901	

1919, the output was approximately 3,800,000 lb. zinc. d, and 22,000 oz. of silver.
is able and progressive. With spelter at 8c. and silver allahan should continue to make big profits on an average 9,000,000 lb. spelter, 3,400,000 lb. lead, and 34,000 oz. silver, base-metal markets are favorable and costs are normal.

N MINING & MILLING CO. **IDAHO**

bia Bldg., Spokane, Wash.
ge Geo. Turner, pres., 525 Seventh St., Spokane, Wash.; v. p.; B. H. Kizer, sec.-treas.; Frank T. Post, Richard hos. Thwaite, directors; Joseph Trainor, supt.
00; increased Jan., 1916, from $1,000,000; shares $1 par; ued.
acres patented, on east fork of Pine creek, 9 miles from on O.-W R. & N. R. R., Coeur d'Alene district, shows ns 4' to 8' wide, in a shear-zone in Prichard slate.
by adits, one at vertical depth of 150' and the other at outh of the latter a 550' crosscut tunnel cuts the vein No. 2. This orebody is said to be several hundred feet ink at the portal of tunnel No. 2, is 200' deep and from drift is said to have been run on ore.
ncludes hoist, compressor, 100-ton mill, sawmill, and elec-

rom Aug., 1917, to early in 1918, shipped 1,400 tons of ng 12% lead, 9 oz. silver, and 27% zinc; also 700 tons of ilver, and 33% zinc concentrates.
onsidered valuable, but operations have been hindered by sportation.

MINING & SMELTING CO. **IDAHO**

lan, Idaho.
Edelstein, pres.; Dave Holzman, v. p.; Harry W. Ingalls, gr., with H. R. Schroeder, R. C. Vanderford, and John

1901, in Idaho. **Cap.**, $1,500,000; $1 par; assessable; all nt, No. 17, levied May 23, 1918. Annual meeting first ptember. Company expended $30,000 in development in ch 17, 1919 had a bank balance of $2,020.
sment, of 5 mills, was payable December 10, 1919.
claims surveyed for patent on the west fork of Deadman ne National mine on the west, in Shoshone county.
two tunnels have developed a lead-silver orebody 250' to 6' wide, assaying 20% lead, 15 oz. silver, 4% zinc and er tunnel (No. 3), was driven a distance of 5,000' at 100' total cost of $14 per ft. Four separate orebodies have his level so far, but no extensive development has been hem. About 3,000 tons of ore on dump average 4.5 oz. nd 1% copper. Hand-sorted ore on dump assays, 30% silver. Three of the ore-shoots average 3' wide and 50' t shoot is 65' wide and 100' long. A raise is up 100' on ptember, 1919, a 50' vein containing irregular bunches eported cut on the tunnel level.
ncludes 1-drill Franklin air-compressor and 35 h. p. elec-

15, 1919, property was under bond and lease to J. M. ciates of Seattle and Tacoma, Wash., for $250,000, pay- at the rate of $50,000 per year. Lessees furnish surety ill erect 100-ton mill and plan to expend $75,000 on new ing 200' on orebody.

COPPER PRINCE CONSOLIDATED M. & M. CO.

Mine office: Herrick, Shoshone county, Idaho.

Officers: S. B. Halbert, pres.; Samuel R. Hite, v. p.; Be
sec.-treas.; W. M. Ramsey, with S. C. Dooley, W. Hankins,
ton, and J. W. Wood, directors. Frank Drummond, supt.

Inc. July 30, 1910, in Idaho. **Cap.,** $4,000,000; reduced
$400,000; $1 par. Annual meeting, first Monday in Septembe

Property: 37 claims, unpatented, 740 acres in 2 groups
bank of the St. Joe river, 6 miles and 20 miles, respectively, a
of navigation. Property includes water-rights. The Copper
formerly known as the Black Prince, has 13 claims, and the I
or Gold Ridge group, of about 24 claims, is about 6 miles ea
per Prince, and 3 miles from the C. M. & St. P. railway.

The Copper Prince group shows contact orebodies, betwe
Revett quartzite, of 20 to 30' estimated average width, carry
rite, bornite and gray copper, giving assays of 3 to 41% co
13 oz. silver per ton. **Developed:** by 500' of drift tunnels
the sides of 2 canyons. The orebody has been traced by trenc
cut tunnels, on each claim, for the entire length of property,
7,800'.

The Idaho-Virginia group is reported to have a 15 to 2
posit, between granite and slate, carrying galena giving assay
lead, and 14 to 46 oz. silver. **Developed:** by 2 shafts of 50' a
and 3 crosscuts, intercepting a vein said to show galena
quality. Buildings include a smithy, boarding house and a st

Company planned utilizing water power from Prince cre
of 3' ditch and 1 mile of 3' flume.

Equipment: includes 4 boilers, 2 hoists, 2 six-drill air-com
a saw-mill. In 1916, S. B. Holbert, brought suit against co
cover $27,970 for services rendered and money advanced.

No recent information is obtainable.

COPPER QUEEN MINING & MILLING CO.

See Reindeer Queen Mining Co.

CORBY LODE MINE

Address: J. B. Steffes, 709 Division St., Kellogg, Idaho.
mons, v. p.

Property: 4 claims surveyed for patent, on Pine cre
county, adjoining Federal M. & S. on west, owned by 5 pe
trolled by J. B. Steffes and wife. A quartz fissure in slate
gold per ton and some antimony.

Development: by 488' tunnel, attaining depth of 400'.
Oscar Hershey.

A prospect.

CROWN POINT LEASING CO.

Out of business after Coeur d'Alene Development Co
Stewart Mining Co. See Vol. XIII.

CUSTER CONSOLIDATED MINING CO.

Address: Wallace, Shoshone county, Idaho.

Inc. July, 1910, in Nevada. **Cap.,** $1,000,000, shares $1 pa

Property: near the Tamarack & Chesapeake mine, wa
stock control by the Day Bros. Property a good one.

DADDY MINING CO.

A co-partnership, not incorporated.

Address: A. O. Coplon, 2424 Altamont, Ogden, [illegible]

Property: 25 acres, Murray district, containing a [illegible]
Prichard slate; gold value is reported to be $30 per ton.

Development: by [illegible] cost $400 to [illegible]

Equipment: [illegible]

ING CO. **IDAHO**

S. Clough, sec., Wallace, Idaho.
00; $1 par assessable; 1,200,000 issued. Two dividends of 1917, and ¾c in January, 1918. An assessment of 2 mills mber 12, 1919.
full claims on Pine creek, which were under option Copper Mng. Co. until December, 1918, when it was re- bly due to transportation difficulties.
: by 1,550' of tunnels and several hundred feet of other are said to be 100,000 tons.
Anaconda shipped 198 carloads of ore assaying 25% zinc, z. silver per ton.

NG CO. **IDAHO**

W. Coleman, Kellogg, Idaho.
E. Ginter, pres.; J. B. Eberhart, sec.-treas., with J. W. akeslee and S. J. Schreckengast, directors.
. **Cap.**, $1,000,000; $1 par.
acres, 2 miles E. of Kellogg, Shoshone county, carrying copper, and developed by 1,500' tunnel and 600' shaft. mp mill available.
n idle for years.

NEAPOLIS MINING CO. **IDAHO**

B. Wallace, mgr., Wallace, Idaho.
W. McClelland, pres.; R. M. White, v. p.; P. M. Olsen, d, treas., with J. S. Graves, directors.
Grouse gulch, Coeur d'Alene district, Idaho.
: by 1,850' of tunnels. Crosscuts said to have opened from zinc ore. No recent returns.

DA MINING CO., LTD. **IDAHO**

exander Murphy, treas.-mgr., Wallace, Shoshone county,

00; $1 par; 650,000 issued; assessable.
claims, 1 patented. Is a lead-silver prospect adjoining the g Divide mines in the Coeur d'Alene region.

ONIA MINES CO. **IDAHO**

A. Bartee, sec., First National Bank Bldg., Kellogg, Idaho.
rman J. Rossi, pres., Wallace; W. H. Nichols, v. p., Butte, ec.-treas., with W. I. Hall, Kellogg, and Frank Pfeiman, s.
1915, in Idaho. **Cap.**, $1,000,000; 25c par; assessment of August, 1917.
0 acres, including the Keating mine at Wardner, Shoshone **Ore:** is silver-lead in 4 known veins, from 9 to 25' wide. un from 1½ to 36% lead, with good silver values. Com- wn or control 2,300' of the Silver-King-Caledonia vein sys- f 4,500.'
; several tunnels and the Keating 600' vertical shaft. The orked intermittently for several years before present com- ontrol. In February, 1918, the vein was cut on 600' level, t, showing some galena.
hoist, 60-h. p. engine, air-compressor, pump, shaft-house hop.

LES EXTENSION MINING CO. **IDAHO**

Rookery Bldg., Spokane, Wash.
D. Millspaugh, pres.; C. S. Crawford, v. p.; W. H. Macfar- W. H. Reeves, mgr., Cheney, Wash.
. **Cap.**, $1,500,000; $1 par.
claims, unpatented, 176 acres, 4 miles east of Burke, Idaho,

and about 2½ miles from the Hercules mine, reported to sh
vein carrying gold, copper, silver values.

Development: by tunnels 137' and 500' long, and 150' of
Annual assessment work only being done. Is a prospect.

EAST SNOWSTORM MINING CO.

Mine near Larson, Shoshone county, Idaho. A fraud order
1911, by the postal authorities against C. E. Mitchell, promoter
pany, and also against the company. The title was changed, I
Snowstorm Deep Mines, Ltd.," which has also been branded
Property described Vol. X, Copper Handbook.

EAST STANDARD MINING CO.

Address: Wallace, Idaho.

Officers: Joseph Matt, pres.; Hans Helgeson, v. p.; Gu
treas.; C. E. Inskip, sec., with F. J. Ryan and Swan Swans

Property: 4 patented claims adjoining the Hecla on the w
d'Alene region.

Development: is under way from a 2,100' tunnel, which has
eralized ground.

ECLIPSE MINING CO

Was formerly the Lead King Mining Co.

Address: E. W. Conrad, pres.-mgr., Eagle Block, Spokane,

Property: 13 claims, in McFarren gulch, about 1 mile south
Shoshone county, said to carry 2 veins, one with outcrops o
galena, the other showing silver-copper ore.

Development: mainly by 4 tunnels, longest 550', with op
shallow shafts, showing silver-lead and gray copper ore, giving

Equipment: includes several small cabins for mine purpose

Mine was dormant from 1913 to April, 1918, when prese
opened some ore in a tunnel.

ENTERPRISE MINING CO.

Address: Kellogg, Idaho.

Officers: Fred F. Donaldson, pres.-mgr.; Gust Samuelson
S. Tuson, sec.-treas.

Inc. June 17, 1910, in Idaho. **Cap.**, $1,000,000; $1 par.; assess
issued. A 2 mill assessment was levied on October 29, 1919.

Property: 55 acres unpatented, 2½ miles E. of Kellogg
Coeur d'Alene river. Ore consists of lead and silver in a fissure
formation. Vein is said to be 30' wide, dipping 40°.

Development: 1,200' tunnel giving a depth of 600', also 1,4
ings. Small shipments have been made in the past to Anac
productive in 1919, but crosscut tunnel had cut silver-lead ore early

EUREKA MINING & MILLING CO., LTD.

Address: Wallace, Idaho.

Officers: W. R. Powell, pres.; C. B. Fly, v. p.; A. D. M
C. A. Sterling, treas.; and J. S. Mooney, directors.

Inc. 1905, in Idaho. **Cap.**, $1,000,000; $1 par.

Property: 1½ miles N. of Wallace, on Nine Mile creek
county, carrying lead-silver ore. Developed by tunnels, one
long. Work was under way in 1919 and a motor-driven co
stalled.

EXCELSIOR MINING CO.

Located [illegible] Burke, Shosh
Idaho [illegible]

York, F. R. Raiff, W. E. Bennett, E. L. Newhouse, Fredk. Burbidge, Wm. Loeb, Chas. Earl, and Roger W. rs; M. A. Shepherd, sec.; Fred. Burbidge, gen. mgr.; Wal-, supt., Mullan, Idaho.

in Delaware (charter perpetual), amended Aug. 22, 1903. \$20,000,000 pfd., 7% cum., and \$10,000,000 com.; shares \$100 ng. \$12,000,000 pfd. and \$6,000,000 com. Preferred stock power except in connection with the increase of preferred eferred as to assets. One-sixth entire capital stock said to erican Smelters Securities Co. Federal Guaranty Trust Co., nsfer office; U. S. Mortgage & Trust Co., New York, regis-neeting, second Monday in April. Listed on New York and nges.

per cent:

Com.	Year	Pfd.	Com.	Year	Pfd.	Com.
....	1908.....	7	....	1915.....	4	....
4½	1909.....	7	1½	1916.....	4¼	....
6(a)	1910-11....	7	....	1917.....	5¼	....
6(b)	1912-13....	6	....	1918.....	7	....
6(c)	1914.....	5	....	1919.....	2	....

xtra. (b) 11% extra. (c) 8½% extra.

dividend rate reduced August 18, 1914, to a 4% basis. Ac-ends on this stock amounted to 12% up to 1920.

of annual reports, income account:

	1918	1917	1916	1915	1914
.....	\$2,408,867	.....	\$5,204,513	\$2,782,658	\$2,200,777
.....	1,793,453	.....	4,159,745	2,326,719	2,011,684
rofit.....	\$615,414	\$1,446,937	\$1,044,767	\$455,939	\$189,093
ings.....	308,611	176,000	613,311	352,662	702,462
ngs.....	\$924,025	\$1,622,937	\$1,658,079	\$808,601	\$891,556
.....	1,397,889*	.....	789,880	498,234	339,160
profit and loss.....	\$473,864**	.....	\$868,198	\$310,367	\$552,396
preferred.....	838,854	\$839,027	509,409	479,444	599,305
ss account for the year	.....	.....	\$358,789	\$169,076	\$46,908
year.....	\$1,601,157	\$1,578,325	\$1,219,536	\$1,388,613	\$1,485,522
year.....	285,440	1,601,157	1,578,325	1,219,536	1,388,319

7,234 for Liberty Bonds, \$598,229 for purchase of property, and \$142,536 for n settlement. ** Loss.

capital, years ending December 31:

ures other panies	Supplies	Accounts Receivable	Cash	Total current assets	Total current Liabilities	Excess of assets
,627	\$328,959	\$277,475	\$1,052,674	\$1,967,735	\$141,060	\$1,826,675
,263	276,746	415,698	2,021,157	3,029,864	467,594	2,562,270
,620	174,003	655,496	1,136,983	2,255,702	373,719	1,881,983
,120	120,840	521,531	548,704	1,477,195	257,658	1,219,537
,120	114,376	261,040	770,496	1,532,032	211,887	1,320,145

Liberty Bonds.

ontract: the Federal has a contract with A. S. & R. Co., dated 05, terminating August 31, 1930, by which the Federal com-all of the silver-lead ore, slime and concentrate, of its own g properties, and all owned or leased property of any com-he Federal owns 75% of the capital stock to the A. S. & R. ter agrees to take all such output.

R. allows the Federal 90% of the contents of the latter's New York quotations, when lead sells at less than \$4.10 the price is over \$4.10 they divide the difference between arket price. Contract for silver calls for 95%, based on an quotation. Contract for gold calls for 95% at \$20 per 0.05 oz. per ton. Contract provides deductions of

$8 per ton for treatment charge plus freight to smelter (whic
$7.17 per ton), and 50c per ton for each 1% or fraction of 1% o
cess of 10%. Federal cannot lease or dispose of its stock in
owning or leasing mining property without previous written co
A. S. & R. Co.

Apex litigation with the Bunker Hill & Sullivan, started
settled in 1910 by agreement between the two companies.
company holds 28,000 B. H. & S. shares.

Property: company entered upon the operation of its prop
1, 1903. Of the preferred stock, $10,500,000, and of the con
$5,250,000, were issued upon the acquisition of all the minin
formerly owned by the Empire State-Idaho Mng. & Dev.
Standard Mining Co., the Mammoth Mines in Idaho, and certa
property at Everett, Wash. The smelting property has since
without loss to the company. The above mentioned mining pr
sists of silver-lead mines in the Coeur d'Alene mining district.

In 1910, company acquired an option on a portion of the s
Govt. Gulch Dev. Co., lying east of the Black Hawk mines in th
district. On account of default of the stockholders, 414,000 sha
million reverted to the Federal Mining & Smelting Co. The
this company consists of 1 patented and 6 unpatented claims,
also controls through stock ownership the Black Hawk Mng. &
Ltd.

The company exercised an option on 7/10 of the Clevelan
the Idaho Investment Co., and started negotiating for rema
also for the Green Hill ground. This resulted in the orga
the consolidated Green Hill-Cleveland Mng. Co., to which Fed
eral deeded its 7/10 interest, and the owners, thereof deeded
interest in the Cleveland group, and also all of the Green H
Subsequently Federal leased to the Green Hill-Cleveland Mng
the mining and milling plant of the Mace mines for an indefinite
the ores in the ground belonging to the new company are exhaus
ing therefor a rental of $180,000, payable out of the first profits
company, before any dividends were declared. Ownership of
Hill Co. lies 50% with the Federal company and 50% with
Hill interest. Owners of each half interest share equally in
and management of the new corporation, operations of which w
November 1, 1912. Dividends received by the Federal from the
Cleveland Co. amounted to $352,000 in 1913, $576,000 in 1914,
1915, $160,000 in 1916. The Green Hill-Cleveland group was fina
out early in 1918, and closed.

The Helena-Frisco property was purchased in January, 1913
000. Operations proved unprofitable and the mine was closed do
1916. The mill, plant and buildings were sold to the Tamarack C
Mng. Co. for $150,000, the Federal company retaining all miner

In July, 1915, Federal purchased, at receiver's sale, the mi
trator, power line and supplies of the Iron Mt. Tunnel Co., a
Mineral county, Mont., for $100,000. The mine is an old one, h
stoped for 1,700' above water level 20 years previous. Operati
disappointing and the mine was closed down, August, 1918. Sa
of plant was $78,331.

In the 1916 annual report the following active properties
the Wardner, which includes the Last Chance mine at Wardner
or Standard-Mammoth, one mile west of Burke; the Morning,

The Wardner group consists of 30 patented and unpatented
claims, also several hundred acres of agricultural land. The
cover over 7,000' in length of the Wardner vein [illegible]
Chance mine, north and west of the Bunker Hill & Sullivan
belong to the same vein at three [illegible]

ey fissure zone. The Sweeny adit level is the principal level. ' above the Kellogg tunnel of the Bunker Hill & Sullivan. to the Arizona portal, from there over a spur of the O.-W. e to the mill at the mouth of Government gulch. Below nnel is an inclined shaft several hundred feet deep with The mine has been a steady producer for 25 years, but the end, together with the Mace. Only the prevailing high ring 1916 made profitable operations possible.

ns for the purchase and development of the Independence , in Wood River district, Idaho, for $500,000, were completed Although considered a good prospect, at last accounts no of ore had been developed. The ore is easy to treat, being m zinc. It consists of shattered quartz coarsely crystalline ittle pyrite. Six levels have been opened at 100' intervals. ot 80' long and up to 30' wide was developed. A small mill centrates. It is proposed to drive 3,000' and connect this North Star.

ng mine, ½ mile N. W. of Mullan, is one of the large lead- es in the district, and one of the best equipped. It is the t mine of the Federal group, though its ores are the lowest roperty in the district and very difficult to treat. This is a in that below the main or No. 6 tunnel is a shaft, the 18th 00' below it. Some interesting notes and diagrams on the ound in the report of the State Inspector of Mines, R. N.

000' sub-level opened in 1919, shows normal ore 3,000' vertically of the vein.

the Morning mine is the property of the Star Mining Co., 917 brought suit against the Federal company, alleging wrong- of ore, and claiming $500,000 damages. Many well-known retained by both sides. In March, 1918, the Star lost the aled. By this decision the Federal added considerably to its .

ent of company's mines in the Coeur d'Alene region is by pest being 1,250', while at the Morning mine tunnels aggre- Reserves now total 1,519,280 tons compared with 890,000 in in 1916; and 1,050,000 in 1915.

of the mines has been attended to, and in February, 1918, of 30,000 cu ft. capacity per minute was installed at the Morn- of 60,000 cu. ft. was ordered.

Star-Triumph mines, near Hailey, Idaho, acquired under ve a 300-ton concentrator with flotation system and electric er construction. The properties are said to carry a large nplex ore, containing 14% zinc, 8% lead and 8 oz. silver. The 20' thick and several hundred feet in length and depth. indered by an excess of arsenical pyrite and some antimony. company is amply provided with modern concentrating tons capacity employing flotation at Wardner), pumping, ressing and electric plants.

	Ore, tons	Lead in products, tons	Silver in products, oz.
shipment)....	36,772	.....	.....
.....	360,588	.....	.....
.....	728,359	.....	.....
.....	.....	.....	.....
...	461,252	26,777	983,830
...	421,631	25,487	913,498

Production—Continued.

Year	Ore, tons	Lead in products, tons
1913	691,487	36,687
1912	836,947	50,937
1911	784,600	52,272
1910	741,650	48,155
1909	832,568	56,904

The data on the Federal M. & S. Co. is unsatisfactory, as has been withheld in recent years. The above table shows that company has been a big producer in the past, its Coeur d'Alen parently are nearly worked out. Recognizing this, company new properties in Kansas and Oklahoma described elsewhere. $12,000,000 7% preferred stock is in arrears over $1,000,000, a has received no dividend since 1909, and is now worthless, t property, the Morning mine—has a heavy load to carry.

FLORENCE MINING & MILLING CO.

Address: John B. Steffes, sec.-treas., Kellogg, Idaho.

Officers: Chas. Dallaire, pres.; J. D. Chisholm, Jas. Ezkie Haalund, directors, at last accounts.

Inc. 1908, in Idaho. **Cap.**, $1,000,000; shares $1 par; assess issued. Assessment of 2 mills levied on October 11, 1919. Ann second Tuesday in July.

Property: 10 claims, 170 acres, due E. of the Alhambra a the Sherman and Roanoke mines in the Yreka section of the Co district. Ore occurs in vein in Revett quartzite, carrying lead, copper. Orebody is 100' wide, has dip of 70° and S. E.-N.

Development: by crosscut tunnels, 150' and 300' long, with 800' workings. The lower tunnel started in 1917 to intercept depth of 1,000' is still in progress. The power line was instal and a compressor was added in 1917-18.

FLYNN GROUP MINING CO.

Address: Wallace, Idaho.

Officers: J. T. Hayes, pres.; J. F. Whelan, sec.; with J. J. Cr Kern, and T. McCarthy, directors.

Inc. 1905, in Idaho. **Cap.**, $1,000,000; $1 par; 704,888 issu

Property: 4½ miles N. E. of Wallace, Shoshone county, o ridge between Canyon creek and the South Fork of Coeur d' It includes 16 unpatented claims owned outright, and an in others. The Black Bear and Frisco mines are on the west, an Flynn and Ivanhoe on the east. Examined by Rush J. White i securing an option on control of the Black Bear shares, a through the Black Bear is now possible, and $3,000 monthly is in exploration.

There are 3 veins in Burke and Revett quartzite. No. 1 ve little lead; Nos. 2 and 3 have no mineralization, though the latt combed and well oxidized. Little development has been done, adjoining property, the Black Bear Fraction vein, has been de depth of 1,160', at a point within 300' of the Flynn. The shoots a and from 5 to 7' wide, the ore assaying 2.2 oz. silver, 7.76% lead, zinc. Future development can best be effected by tunnels. Tra is good, and power is obtainable nearby. More work is require whether this property has merit or not.

FOUR TIMBERS MINING CO.

Address: Wallace, Idaho.

Property: [illegible]

Development: [illegible]

fined vein. [illegible]

1919.

[illegible]

ects to obtain as good ore as that in the adjoining prop-
re.

G CO. **IDAHO**

Lindelle Bldg., Spokane, Wash.
Schierding, pres.-treas.-mgr.; David Barth, sec.; T. F.
Geo. Baxter, Herbert Nuffer, directors.
daho. **Cap.,** $150,000; 10c par.; assessable. Annual meet-
y in August. Assessment of 3 mills was payable January

unpatented claims in Beaver Creek district, Shoshone
eins with lead, silver, and zinc. It is reported that con-
blocked out in 1919.

G CO. **IDAHO**

itton Bldg., Spokane, Wash. **Mine office:** Burke, Idaho.
. Hutton, pres.; A. A. Booth, v. p.; G. N. Crawford, sec.;
., with Mrs. E. C. Travers, directors.
increased in 1914 to $250,000; shares 10c par; non-assess-
pokane Stock Exchange.
patented claims, 35 acres, near Burke, adjoining Hecla
and Maher Ahern group on the W. Also owns about 10
crosscut tunnel. Company has driven a 4,100' tunnel with
ne expectation of cutting ore in a vein mined on the Hecla
ein is said to have shown 3 or 4" of clean galena. 300'
ne and 250' farther back Hecla is said to have mined 3 to
large vein was cut 1915, but results, being disappointing,
ed a crosscut tunnel to Gertie claim to find the vein.
over $75,000. In March, 1919, mine was closed down. In
Gertie had filed suit against the Hecla, alleging wrongful
y the latter.

MINING CO. **IDAHO**

ne, Wash.
Taylor, pres.; J. Erikson, v. p.; W. W. Johnson, sec.-
ith D. S. Prescott and A. B. Shelton, directors. Chas. G.

reorganization of the Granite Allie Co. **Cap.,** $1,500,000;
50,000 issued.
Granite gulch, 4 miles E. of Murray, Shoshone county.
by 400' shaft and over 900' of other workings. On the
is 20' wide, averaging $7 per ton in silver.
-drill compressor, hoist, pumps, 1½ mile flume and elec-
50-ton mill started 1917, was not finished March, 1919,
esumed after a 6 months shut-down. Favorably regarded.

& DEVELOPMENT CO. **IDAHO**

Bank St., Wallace, Idaho.
Rechsteiner, pres.; E. R. Turk, sec., with G. Malcrida and
directors.
; 10c par; assessable; 4 mills per share levied, August,

claims in Beaver district, Shoshone county, opened by
, which show some lead-silver ore.

MINING & SMELTING CO. **IDAHO**

n, Idaho.
Hennessy, pres.; E. C. Hennessy, sec.; T. F. Keeley,
rick, managing supt.; C. K. Cartwright, mine supt.; G.
t.
0; $10 par; is a close corporation.
and a fraction, 240 acres, patented, in Hunter dis-
also 20-acre millsite.

Geology: fissure zone in quartzite and shale. Lead-silver
occurs as shoots with dip of 80° S. and course of N. 75° W. The
area is 200' by 1,800'.

Development: by tunnels and shafts. Main tunnel 4,800' l
down 1,200' below tunnel level. Two shoots developed, the N.
S. 20' wide. Best ore came from east part of Yolande and
West Hunter claims. In November, 1919, a cave-in of slopes
men for 2 weeks.

Equipment: includes 150 h. p. electric hoist, two 3,000 cu.
sors, 100 g. p. m. pump, 400-ton mill using 9 flotation cells on
system.

Results of operations:

	Tons Ore	Gross	Cost Mining	Trans. and Treatment	Impro ment
1915.....	118,764	$614,590	$333,904	$214,315	$34,7
1916.....	119,490	815,779	482,275	180,186	8,0
1917.....	116,562	994,407	525,493	293,202	44,8

No later figures obtainable. The monthly output of co
1,200 tons.

GREAT DUNKER M. & M. CO.

Address: E. C. Connor, Kellogg, Idaho.

Company was organized in July, 1919, to develop ground n
$40,000 was to be spent on equipment and new work.

GREAT EASTERN MINING CO., LTD.

Address: Wallace, Idaho.

Officers: John Carlson, pres.; Charles A. Solberg, v. p.; Jo
sec.-treas.; with Edwin Erickson and Charles Bollinger, directors

Inc. Sept. 19, 1900, in Idaho. **Cap.,** $1,000,000; shares $1
able. Annual meeting in April.

Property: the Great Eastern group, 14 claims, patented,
miles N. E. of Wallace, Shoshone county, said to show silver-l
in fissure veins.

Development: by shafts and tunnels, longest tunnel 3,000'.
still in the development stage, and have been for a numb
Management states that $6,000 was spent in 1915 on develop
Property is easily accessible to Northern Pacific and Union Pac
railroads.

GREAT WESTERN MINING CO.

Address: Burke, Shoshone county, Idaho.

Officers: Jesse Norton, pres.; Victor Hunt, v. p.; W. S.
with W. K. Karnes, F. T. Robinson, and J. J. Jenkins, director

Property: 7 claims, patented, 3 miles from Burke, show ve
about 1,200' by trenching, carrying copper and lead ore.

Development: tunnels of 1,270' and 900' and a 207' shaft,
begun Aug. 12, 1904. A raise driven in 1914 was reported to h
12' orebody, assaying 7% lead, 1.54% copper and 0.4 oz. gold.

Equipment: includes hoist and small air compressor, driven
motor. Idle since 1917.

GREEN HILL CLEVELAND MINING CO.

See Federal Mining & Smelting Co.

GUELPH MINING & MILLING CO., LTD.

Head office: Kellogg, Idaho. **Mine office:** Sunset, Idaho.

Officers: [illegible] pres.; W. C. Boyle, v. p.; A. P.
Eliza H. [illegible] T. J. Yarbrough, H. H. Rhodes,
and S. D. [illegible]

artz vein in Burke quartzite, with dip of 55° and strike. Ore occurs as streaks and contains lead carbonate and silver

: by 225' shaft to be sunk another 100' and by 2,200' of tun-

includes 75 h. p. hoist, compressor, pump, and electric ent was in progress late in 1919.

ERICAN COPPER M. & M. CO. **IDAHO**

llogg, Idaho.

. Schaefer, pres.; Elmer Brown, v. p.; F. P. Jones, sec.; as.; Paul Jacobs, H. Froehlich, and Frederick Bell, directors. 08, in Idaho. **Cap.**, $1,500,000; $1 par; assessable. laims, between the Handspike and Riverside, on the Little es from O.-W. R. & N. line.

: 1,100' tunnel opening copper ore. No data since 1917.

IDAHO

Hayes, pres., Kellogg, Idaho; Martin Nicholson, sec.; S. A.

Idaho. **Cap.**, $50,000; shares $1 par.

mpany had a lease on about 1,200 acres, including 3 miles the Coeur d'Alene river, and operates a 200-ton flotation plant r recovery of lead and silver from slime from the bed of the ur d'Alene river.

to Aug., 1917, 9 cars of slime running about 22 oz. silver

MINING CO., LTD. **IDAHO**

allace, Idaho, and Markwell Bldg., Long Beach, Cal.

P. Markwell, pres.; Alex. Murphy, v. p.; Everett H. Patti-Nordquist, treas., with C. A. Markwell and Angus Sutherland,

Idaho. **Cap.**, $1,800,000; $1 par; 1,438,995 issued. Bonds:

claims, 10 patented, 130 acres, in the Leland mining dis-unty, reported to show lead-silver ore in fissure veins in quart-by tunnels. Idle, 1917-1919. Ground is said to contain the ex-tandard-Mammoth vein, but is reported that there has been Federal company over apex rights, though the Headlight has rove its contention.

NG CO. **IDAHO**

ace and Burke, Idaho.

. F. McCarthy, pres.-treas. and general manager at Wal-E. Smith, Carl Landsee, F. J. Kipp, W. J. C. Wakefield h, directors. L. E. Hanley, sec., Wallace, C. H. Foreman, engi-mechanic.

da Mining Co., inc. in Idaho in 1891, with cap., $500,000 and wned the Hecla and Katie May claims. **Re-incorporated** shington. **Cap.**, $250,000; shares 25 cts. par; all issued and ity Transfer and Registrar Co., New York, transfer agent; t Co., New York, registrar. Annual meeting in April. Listed h, Los Angeles and Spokane Stock Exchanges.

tement for years ending December 31:

	1919	1918	1917	1916
ty revenue	.....	$4,035,339	$3,671,818	$2,549,195
depreciation, etc.	$1,692,771	1,980,621	1,507,868	791,567
	1,066,232	2,054,718	2,163,950	1,757,628
	626,539	350,000	1,600,000	1,550,000
	1,822,226	2,467,607	.....	544,868
	63,318	76,933	.....	111,949

Dividends: $420,000 up to Aug., 1905, then as under, years 1, to 1911, after which, Jan. 1:

Year	Amount	Year	
1906	$340,000	1913	
1907	540,000	1914	
1908	29,000	1915	
1909	250,000	1916	
1910	170,000	1917	
1911	210,000	1918	
1912	130,000	1919	

The total to end of 1919 was $7,855,000.

Property: 29 patented claims, 347 acres, near Burke, also Gem.

Geology: ore is chiefly silver-lead sulphides accompanied b and pyrite, occurring in the Hecla lode; strike N. W.-S. E., with 80° to N. E. General country rock is sericitic Burke quartzite, intimately associated with a lamphrophyric dike, which has an a of 2°. Ore averages 5' to 6' in width, occurs mainly in the quartzi both sides of the dike, and, to a large extent, fills fissures. The p an extreme length of 1,200'. The Hecla ore carries lead and silv of Ore-Or-No-Go carries zinc as well. For geology of Coeur d'A see U. S. G. S. Prof. Paper No. 62, published in 1908; also paper Hershey, published by M. and S. Press. In November, 1919, it was the Federal M. & S. Co., for the Marsh Mines Consolidated was an apex suit against the Hecla, alleging ore was wrongly extracted f orebody of the Hecla. The Gertie M. Co. also started suit in Janua

Development: is by tunnel and shaft. Extensions amount in 1916; 12,386' in 1917, and 13,566' in 1918.

The main shaft was 2,000' deep in 1918, at which depth a statio skip-pocket were cut and the vein cut, the drift showing ore 12" continued on the East orebody between No. 3 adit and the 900' leve No. 2 shaft level to 1,200' on the Ore-Or-No-Go orebody.

Reserves were estimated at 1,296,000 tons in 1916; 1,526, 1917; 1,584,115 tons in 1918, and 1,549,833 tons in 1919, plus probable.

Equipment: the property is one of the best equipped in with hoists, compressors, machine-shops, and a 500-ton concentrato at Gem has a flotation unit. Electric haulage was started in 1917.

Production:

	1918	1917	1916	1915	191
Ore milled, tons	269,956	282,726	194,209		
Ore and concentrate shipped, tons	52,894	45,317	40,432	30,214	2
Lead produced, lb.	21,525,070	44,268,220	40,217,573	21,917,502	18,05
Silver produced, oz.	1,580,902	1,266,981	1,195,841	962,444	
Zinc produced, lb.	440,241	507,500			
Average lead price, cents per lb.	7.41	6.41	4.91	4.82	
Average silver price, cents per oz.	98.00	79.38	67.09	70.40	
Average zinc price, cents per lb.	7.04	7.46			
Cost of mining, milling and general expenses, per ton	$5.37	$5.00	$5.00		
Cost of milling and flotation					

In 1919, sha
in 1917
Hall &
Kellogg
Ore

NING CO. **IDAHO**

ted with the Aurora-Sampson Mining Co., to form the Western Co., which see.

A EXPLORATION CO. **IDAHO**

Wm. A. Beaudry, mgr., Wallace, Idaho.

d, 1917, by Wm. A. Beaudry, P. Weber, Ben. Harmon, Sidney Frank H. Skeels. Has a 5-year lease from 1917 with option to 30,000, on the Bear Top mine, formerly owned by the late M. S. Murray.

: about 5 miles from Murray, shows a vein in slate, carrying in pockets and irregular shoots. Lessees operate on a royalty 15% on lead settled for under 7½c per lb., and 20% for shipments that figure.

ment: 2,200′ of tunnels and over 2,000′ of other workings.

nt: power plant and concentrator, but no returns are published

A LEASING CO. **IDAHO**

anged to Henrietta Exploration Co., which see.

MINING CO. **IDAHO**

Eugene R. Day, mgr., Burke, Idaho.

is a partnership, not a corporation, the Day family owning a half dominating the policy. It owns 500,000 shares Northport Smelting ., at whose smelter at Northport, Wash., ore and concentrate from and other mines is reduced.

holds the following stock:

Pennsylvania Smelting & Refining Co.
Hidden Treasure Co.
Idaho & Eastern Mining Co., a controlling interest.
Hummingbird Mining Co., a controlling interest.
Ambergris Mining Co., a controlling interest.
Basin Mining Co., a controlling interest.

: the Hercules mine near Burke, is the greatest bonanza of Mene region. It has one big vein in quartzite and slate, cut by two nd one dike.

ment: by tunnels. In the lowest or Hummingbird tunnel with the town of Burke, there is an 800′ shaft, making a total depth w the apex. Early in 1918, No. 5 level of this shaft, 2,000′ below entered rich lead-silver ore, opened for a length of 480′ at last

on: 1901 to October 28, 1916:

Price Silver	Tons Milled	Milling Ore Lead %	Milling Ore Silver oz.	Shipments Crude Tons	Shipments Concts. Tons	Crude Ore Lead %	Crude Ore Silver Oz.
58.95	362	.....	...	362	.....	59.84	132.13
52.16	5,003	.....	.....	5,003	.....	62.34	83.92
51.57	10,043	.....	.....	10,043	.....	62.28	89.69
52.22	12,266	.....	.....	12,226	.....	56.40	77.55
60.35	11,691	.....	.....	11,384	38	55.47	68.81
66.79	34,998	7.34	6.90	9,379	8,178	57.53	58.55
65.32	30,961	7.82	7.54	9,537	10,929	54.20	54.29
52.86	30,083	9.53	9.32	6,395	13,050	56.61	52.55
51.50	31,820	10.07	9.43	6,076	11,874	54.16	47.01
[illegible]	[illegible]	10.70	9.86	6,627	19,138	46.00	38.87
[illegible]	[illegible]	9.46	8.32	8,459	22,940	49.79	44.89
[illegible]	[illegible]	9.29	7.90	11,402	22,595	44.06	40.44
		10.76	7.97	15,684	25,008	52.02	42.65
		[illegible]	10.58	20,364	39,282	57.32	52.61

Production—Continued.

Year	Average Price Lead	Average Price Silver	Tons Mined	Milling Ore Lead %	Milling Ore Silver oz.	Shipments Crude Tons	Shipments Concts. Tons	L
1915....	4.67	49.69	215,089	10.10	8.02	12,603	36,428	5
1916....	6.85	65.66	231,568	10.88	8.73	20,400	49,144	4
Total.	....	.....	1,650,087	.....	.....	165,984	258,604	..
Average 11 yrs	....	.....	.....	9.85	8.60	.....	.....	5
Average 16 yrs.	4.70	57.27	.....	.....	.....	.....	.....	5

Year	Concentrate Lead %	Concentrate Silver oz.	Value per Ton	Receipts	Profits
1901.....	.....	.....	$84.53	$27,810	$20,567
1902.....	.....	.....	55.12	266,785	169,527
1903.....	.....	.....	69.75	667,616	438,746
1904.....	.....	.....	63.55	731,107	430,418
1905.....	.....	.....	66.87	725,218	375,348
1906.....	57.53	58.55	74.51	1,272,000	787,534
1907.....	54.20	54.29	65.62	1,296,328	765,160
1908.....	56.61	52.55	48.46	907,071	383,751
1909.....	54.16	47.01	44.70	798,245	325,305
1910.....	46.00	38.87	36.52	874,955	418,542
1911.....	47.23	37.52	38.30	1,148,574	544,429
1912.....	48.18	39.34	43.36	1,415,462	715,763
1913.....	54.91	41.77	51.83	2,055,633	1,207,326
1914.....	55.76	46.56	50.76	2,991,148	1,868,761
1915.....	53.14	38.67	44.03	2,103,955	1,096,019
1916.....	47.95	34.33	54.22	3,690,703	2,368,682
Total.....	.....	.....	.....	$20,972,610	$11,915,678
Average 11 years.	52.33	44.49			

Production: for years ended May 1, as made to County Ass follows:

Year	Ore mined tons	Gross value	Cost of mining	Cost of freight and treatment	Cost of betterments
1917....	87,179	$7,272,258	$1,501,129	$2,634,028	.....
1918....	108,052	9,880,978	2,140,052	3,765,024	$282,500

The property normally employs 500 men. On account of th ket, mine was closed for 5 months in 1919.

Litigation in which the Hercules is involved is known as th case. On October 28, 1916, a 1/16 interest in the mine was purc Mathilde Cardoner of Albuquerque, New Mexico, by Eugene $350,000. Later it was alleged that he did not give correct sta to the value of the mine, therefore Mrs Cardoner was not paid her interest. On January 25, 1918, the U. S. District Court legality of the sale but in August the case was appealed.

Equipment

eceding with Chas. R. Mowry, George Lamielle, and L. F.
ctors.
in Idaho. **Cap.**, $1,200,000; shares $1 par; assessable; assess-
hare are levied occasionally, to provide fund for development
ssessment due September 18, 1919.
18 claims, 3 patented, 400 acres in Pine Creek, 15 miles by
logg. Also 9 claims, lying east and on the strike of the High-
g up property to the Bunker Hill & Sullivan ground.
ies silver-lead-zinc sulphides in fissure veins in slate; veins
E., dip 70°.
o average 5 oz., silver, 8% lead and 20% zinc. A shoot of zinc
540 long, 3 to 12' wide.
ent: by 2 main tunnels with 5,000' of workings.
t: includes 175-ton mill erected in 1915, using rolls, jigs, tables,
Callow flotation plant.
1919 a few men were employed on development work, which
eported as being very satisfactory. See Vol. XIII, for details

MINING CO. **IDAHO**
ed January, 1917, with the Pine Creek M. & M. Co.
W. H. Moffitt, sec., Wallace, Idaho. Jacob Lackman, pres.,
.
00,000; $1 par. Listed on Butte Exchange.
18 claims in the Pine Creek district, Shoshone county, covers
along strike of vein said to be the extension of the Constitu-
glas.
ies lead and zinc.
ent: by 2 tunnels with 700' of workings. Property is a pros-
nt returns.

NG & MILLING CO. **IDAHO**
Josiah Hill, Kellogg, Idaho.
a group of claims near Kellogg, Shoshone county.
ent: by tunnels, one 900' long, exposes some lead ore in vein
and quartzite.

E MINING CO. **IDAHO**
Mullan, Idaho.
Lawrence Hollywood, pres.; P. J. Scoles, sec.-treas., with P.
ectors.
in Idaho. **Cap.**, $1,500,000; $1 par; 900,000 issued.
12 claims, 1½ miles S. E. of Mullan, Shoshone county, and
Kennedy group in Rio Grande gulch.
ies silver and lead occurring as carbonate and galena in fis-
quartzite.
ent: by tunnels.

VELL COPPER MINING CO. **IDAHO**
August, 1919, with the Linfor Copper Co., which see.

K MINING & MILLING CO. **IDAHO**
Wallace, Idaho. **Mine office:** Kingston, Shoshone county,

J. H. Kerns, pres. and gen. mgr.; J. H. Guenther, v. p.; O.
.-treas. and mgr.; with W. W. Davidson, J. H. Kirk and S. A.
ors.
,000; 10c par; assessable. Bonds; $105,000, 7%. 12-year, au-
14. An assessment of 5 mills per share was levied in April,
on Spokane Exchange.
er returns from November 1, 1916, to February 11, 1918, were
expenses for same period totalled $211,829. In August, 1918,
1,100,000 shares held by J. E. George of New York at 15
relinquished. Share prices have been very erratic, jump-

ing from 4 to 22 cents within 2 months. In September, 1919, was 2½ cents bid.

Property: 9 claims, 6 miles from Enaville, Shoshone coun 1886, by Octave Guay, shows 3 veins, 2 of 10 to 20' estimated third vein, known as the Great Western, of 8 to 25' width, havi 18" paystreak carrying native copper and cuprite, assaying u balance of vein carrying low-grade ore, estimated to carry 2 with small gold and silver values in quartz gangue.

Development: by 1,000' tunnel and 3-compartment shaft to level. The 523' level (750' below surface) opened up a fine sho mercial lead ore. The 900' level showed this ore to be 6' thic long. This is the deepest mining work in the Prichard slates of d'Alene sedimentary series, a formation hitherto considered un The finding of chalcocite at this mine below 1,000' of Burke qua pletely contradicts all former views. In February, 1916, a c the 1,100' level opened up a vein of solid galena ore from 18 to In December, 1919, a new tunnel was being driven.

Property examined by J. V. Richards in June, 1917, who rep the ore shoot opened by the 700', 900' and 1,100' levels was 400 averaged 3' in width. The ore is largely lead carbonate, ass lead and 1 oz. silver per ton. Half-way between 900' and 1,100' is cut off and but little ore is found at 1,100', or 100' below it the vein is strong. Reserves would not exceed 20,000 tons. the company let a contract for drilling the ground north and the vein, also below 1,200', and it was reported that 4' of 20.5% had been cut by the drill.

Equipment: the mine is electrically equipped and has a 20 centrator with Chilean mill, Wilfley tables, Frue vanners, etc. aerial tram was installed to convey ore from the mine to the r

Production: 25 tons of crude ore and concentrate weekly in recent news.

IBEX MINING CO.

Address: Amalgamated Stock Holding Co., Wallace, Idaho.

Inc. April 15, 1911, in Idaho. Company still in existence, tose.

Property: 4 claims, adjoining Idaho, Boulder Creek and B mines. Three-fourths of a mile S. of Mullan and 300' from S Property shows 4' iron vein adjacent to a diabase dike. Devel tunnels, the lower one starting from the Coeur d'Alene river (at 700' below outcrop.

IDAHO CARBONATE HILL CONSOLIDATED MINING CO

Address: A. W. Witherspoon, Peyton Bldg., Spokane, Wash

Inc. 1917. **Cap.,** $750,000; 25c par.

Officers: W. D. Greenough, pres., Alfred Thompson, v. Witherspoon, sec.-treas.; with Herbert Wheeler and Dr. R. A directors. W. E. Greenough, mgr.

Property: 24 claims formerly owned by the Carbonate Hill Grant Mining Companies purchased 1917 for $275,000. Total area 2½ miles Mullan, Shoshone county.

De ...ub groups are ...ed by tunnels, workings ...carrier lea... inc. A shaft has been ... tunnel ... 1,200' from portal. ... Sacramento, 191... ...pressure ai... ...ave and slo...

...CO.

in Delaware. **Cap.**, $1,500,000; 600,000 shares in treasury. fered at par.
: 6 giants, 2 small, 4 large, handle 7,000 cu. yd. daily.

PER MINING CO., LTD. **IDAHO**

llace, Idaho, and Mullan, Shoshone county, Idaho.
ohn H. Nordquist, pres.; A. N. Strqud, v. p.; Geo. F. Stoney, atherstone, treas.; W. H. Herrick, gen. mgr.
6 claims, 3 patented, on the Continental divide, between tana, near the head of Willow creek, in the Hunter district, eindeer Copper & Gold M. & M. Co., Ltd. Claims carry the strike of the extension of the Reindeer vein, and are gh the 3,000′ Reindeer crosscut tunnel. Idle at last report.

INING CO. **IDAHO**

lace, Idaho.
hn H. Nordquist, pres.-gen. mgr.; J. N. Thennes, v. p.; H. with G. A. Lahaefer, directors.
2, 1908, in Idaho. **Cap.**, $1,000,000, increased later to $1,500,-ssable; 1,486,469 issued.
patented claims, 159 acres, adjoins the Copper King on the of Burke.
t: by 5,000′ of tunnels and crosscuts; a 750′ raise is to be rk is resumed. Deposit is a fissure vein in Revett and Burke ing silver bearing lead ore. Over $15,000 worth of de- done, including diamond drilling and raising, to prospect nd in the upper or 4,000′ tunnel, which was not encountered

3-drill electrically-driven compressor.
closed down for 2 years, mine was reopened in 1915, but n in 1918. Work is to be resumed as soon as conditions

NCE LEAD MINES CO. **IDAHO**

aurice W. Bacon, pres.; John H. Wourms, v. p.; W. E. Hyde Bldg., Spokane, Wash.; with R. A. Carnochan and nd, directors.
1914, in Idaho, as a reorganization of the Independence ing Co. **Cap.**, $1,500,000; $1 par; assessable. 1,400,000 shares isted on the Spokane Exchange.
0 patented claims and a ½ interest in the Key Lode claim, Alene district, 1 mile from Mullan, on the N. P. R. R. e Gold Hunter M. Co. holdings to the E. and the You-Like ines of the Federal M. & S. on the W. Mine shows 3 be the extension of the Morning-Evening, You-Like and lies, which have been profitably worked to depth of 2,800′ perties.
: mainly by 4 crosscut tunnels, 200′, 400′ and 1,800′ long. o. 4 tunnel, 370′ vertically below No. 3, early in 1916 inter- ike vein, showing 8′ of ore assaying 4 oz. silver, 3% n sulphide. In 1918 this tunnel was continued north g vein. Mine was formerly owned by F. A. Heinze, spent in exploration. In 1918, it was reported that o. had obtained control.

PPER MINING & MILLING CO. **IDAHO**

Idaho.
Nordquist, pres.; J. N. Thennes, v. p.-gen. mgr. and sec.-treas.; with James A. Bean, Aug. Matt, Chas. k and Henry Bilberg, directors.
Cap., $1,250,000; $1 par; issued $950,000; assessment re. First meeting in 7 years held June, 1914.
the Bullpen, San Quentin and Independent Frac-

tion, in the Snowstorm copper belt, 3½ miles N. E. of Mullan in ter mining district, Shoshone county. Claims show quartzite fissure vein running N. 72° W., 80° S., the vein underground said wide and to carry scattered bunches of 2% copper ore.

Development: includes 800' crosscut tunnel, with 300' or more at a depth of 300' below the outcrop. Property idle 1908 to 1 work has not developed ore in commercial amount.

INDEPENDENT DEVELOPMENT CO.

Address: W. A. Smith, Wallace, Idaho.

Cap., $100,000; shares 10c par.

Organized 1917 to treat tailings from the Coeur d'Alene rive Kingston and Dudley and to extract the galena by flotation. C to contain 500,000 tons worth $3.54 per ton, that could be tr marketed at $1.64 per ton, according to information supplied in recent returns.

INLAND EMPIRE MINING & MILLING CO.

Address: Box 73, Burke, Idaho.

Officers: Mary Madar, pres.; Frank Bath, v. p.; Geo. Clair, Madar, treas.

Inc. Feb., 1910, in Washington. **Cap.,** $1,000,000; $1 par; 1,000,000 issued.

Property: 11 acres, patented in Leland district, Shoshone cou phides of lead, silver, zinc, with low gold values occur in a qu 80' wide in Burke quartzite. Selected sample assayed $59 per to

Development: by 225 inclined shaft, tunnel 450' and 500' 1,200' of workings.

Equipment: a 5 h. p. electric hoist, small compressor, 10 h. pump and partly completed mill. Expended $15,000 in 1918. N tion as yet.

IRON SPAR COPPER MINING CO.

Address: A. L. Honeker, Wallace, Idaho.

Officers: Wesley Everett, pres.; A. L. Honeker, v. p.-treas Doherty, sec.; with A. L. Nicholson, directors.

Inc. May 4, 1904, in Idaho. **Cap.,** $1,000,000; $1 par; assessa

Property: 4 claims, 80 acres, in St. Regis district, east Coeu partly in Idaho and partly in Montana, 1½ miles from N. P. R. carries gold-silver values in copper ore, encased in quartzite wal

Development: by 600' tunnel. No equipment on property.

IVANHOE MINING CO.

Address: C. D. Miller, Wallace, Idaho.

Officers: J. A. Bean, pres.; C. D. Brock, v. p.; C. D. Miller, with S. C. Bean, J. H. Foss, and J. H. Nordquist, directors.

Cap., $1,500,000; $1 par; an assessment of 1½ miles was le in 1918.

Property: 2 claims, the Ivanhoe and Palisades, patented, adj Star group on the S., 3 miles N. W. of Mullan, Shoshone coun lead-silver-zinc ore. Mine supposed to have continuation of Mor A crosscut from the Star main tunnel (4,200' long) intersected vein at 1,400' vertical depth. Drifting on the ledge for 200' pr average 6' in width with 2' of low-grade milling ore. Property under development since 1904. Diamond-drilling was suspended 1918 on account of litigation between the Federal and Star compa

JIM BLAINE [illegible] & PUBLICATE, LTD.

[illegible] Idaho

by 50' crosscut tunnel and a drift on the vein, which ore. Work is to be continued.

CO. **IDAHO**

ice, Idaho. John Carlson, of Gem; J. N. Morgan, of ood, C. E. Conn and Chas Minch, of Gem, Idaho, in-

913. **Cap.**, $1,000,000; $1 par. No returns secured.

NA MINING CO. **IDAHO**

Old National Bank Bldg., Spokane, Wash.
McEachran, pres.; S. A. McCoy, v. p.; H. F. Aldrich, K. Smith and Geo. W. Sommers, directors, all of

Washington. **Cap.**, $1,500,000; 10c par; 1,260,000 issued. ond Tuesday in February.
ops, each of 7 claims, one 3 miles N. W., the other logg, adjoining the Bunker Hill & Sullivan. Deposit is carbonate and small values in silver and lead. It is nnel; a 500' shaft is to be sunk when company starts

YSIDE MINING CO. **IDAHO**

llogg United Mines Co., which see.

D MINES CO. **IDAHO**

t'l Bank Bldg., Spokane, Wash.
cCoy, pres.; J. A. McEachran, sec.; G. W. Sommer, wn, directors.
ares 25c par. Is a consolidation of the Kellogg-Sunny-Leasing, and Coeur d'Alene Atlas Mining Companies. os of claims, about 1,000 acres, in the Pine Creek dis-ty, said to have 40,000 tons of lead-zinc-silver ore. tunnels and shafts, workings aggregating over 5,000'.

CO. **IDAHO**

daho.
cott Ord, pres.-treas., 2628 Manito Blvd., Spokane, nman, v. p.-sec.-mgr. and E. J. Roberts, directors.
n. **Cap.**, $250,000; shares $1 par. Annual meeting,

250 acres on Pony creek, between Wallace and Mur-Management reports having 6 gold veins, a tung-lead veins; latter having aggregate length of 8 miles. 61 Broadway, New York, holds an option on con-

CORPORATION **IDAHO**

ockholders receiving 13½c per share for their hold-Armstead Mines Corporation.

G CO., LTD. **IDAHO**

Jos. Clark and by Hon. W. A. Clarke, 20 Exchange

e 10c par; all issued; unlisted.
on Lake creek, adjoins Chicago-Boston holdings,
ce
xtension of Coeur d'Alene Vulcan M. Co. tunnel, ein, already opened 900' above. Shipped silver-lead ore for years.

CO **IDAHO**

Wall Ave., Spokane, Wash.
Crapser, pres.; C. W. Lewis, v. p.; Jas. A. Wayne, Knight, J. M. Sheets, C. E. Sogn and E. G. Gnae-

Cap., $1,000,000; $1 par; increased, 1916, to $1,500,000; all is
able at the rate of 3 mills every 3 months.

Property: lies between the Cons. Interstate-Callahan and
Custer mines in the Coeur d'Alene district, Shoshone county.

Development: consists of 300' crosscut tunnel and a winz
below the tunnel level, 600' vertically below the apex of th
levels run each way very 100'. Ore occurs irregularly.

The Day interests were reported to have secured control
by purchase of 400,000 shares at 9c each. No recent informa

LESLIE COPPER CO.

Office: 508 Bank St., Wallace, Idaho. **Mine office:** Walla
county, Idaho.

Officers: Wesley Everett, pres. and mgr.; A. W. McLa
Hon. Herman J. Rossi, sec.-treas., with A. M. Stevens and O.
directors.

Inc. Feb., 1899, in Idaho. **Cap.**, $100,000; shares 10c par.

Property: 11 claims, 220 acres, adjoining the Amazon-Dixi
site and 2 water rights, lying east of Mullan. Has several fis
porphyry, the main vein, of 12' average surface width, having a

Development: mainly by tunnels, with about a mile of op
upper workings show galena and copper ore, and a lower tun
a back of 650'. The property carries mainly silver-lead ore
trating grade, with a narrow paystreak of copper.

Management reports no changes during 1919.

LEWIS & CLARK MINING CO.

Address: J. Wm. Grismer, pres., Mullan, Shoshone county

Inc. 1907, in Idaho. **Cap.**, $1,250,000; $1 par.

Property: 9 claims, N. E. of the Snowstorm, has surface
red hematite, with silver and copper.

Development: consists of 120' tunnel and 500' of workin
ment was trying to raise funds for further development in
information since.

LINFOR COPPER CO.

Successor of the Horst-Powell Copper Mining Co.

Address: Box 2221, Spokane, Wash., and William Bean
Shoshone county, Idaho.

Property: 5 claims and a 5-acre mill-site, well timbered,
North Fork river near Enaville, Coeur d'Alene.

Development: by 3 tunnels, 300', 600' and 200' long, and
and 100'. Vein is of 15' estimated surface width, opened up
proved to depth of 400' with slate footwall and quartzite
carrying copper ore averaging 2 to 6%.

Equipment: includes steam and gasoline power, with a ho
sary mine buildings. Mill installed 1916. Property is co
Idaho No. R. R. at Murray by 5-mile wagon-road. Estimate
of copper ore on dumps in 1917, was under option until Jan
the Empire Copper Co., the owners however operating the
later reported that option was dropped. The new control
tensive program of development in hand.

LISTON MINING CO., LTD.

Address: Max Baumgartner, pres., 323 Lindelle Bldg., Sp
Cap. $1,500,000; $1 par.

INING & MILLING CO. **IDAHO**
logg, Shoshone county, Idaho.
er Albinola, pres. and gen. mgr.; Ed. Albinola, v. p.; Her-
c.-treas.; Robert Albinola, asst sec.; H. O. Beemis, mgr.
Idaho. **Cap.**, $1,000,000; shares $1 par. Annual meeting
n April. Last assessment payable Jan. 26, 1920.
claims, one mile N. of Kellogg. A bedded vein esti-
27′ wide with shale foot and quartzite hanging wall has
800′. Ore is said to carry some copper, and up to 47%
lver per ton.
by tunnels of 360′ and 900′, and 200′ shaft, with about
. Management planned to crosscut at 200′ and drift into
on tunnel level.
ncludes 85-h. p. electric motor operating hoist and drills.
ork being done at last accounts.

UNTAIN M. & M. CO. **IDAHO**
g, Idaho.
. Brainard, pres.; Wm. Boro, v. p.; W. L. Penney, sec.-
Gardner, and W. T. Roach, directors.
ap., $375.000; shares 25c par, assessable. One mill per
. 27, 1920.
claims and 2 fractions, about 225 acres, in the Pine Creek
eur d'Alene, said to show three veins in quartzite carry-
ues.
by 2 tunnels, lower one 300′ beneath upper, about 350′
ded to 500′. Management hopes to cut the downward
veins encountered in upper tunnel, which are reported
width and to carry 37.5% lead and 10 oz. silver.

INING CO. **IDAHO**
ed in 1919, from former address: Wallace, Idaho. Wm.
kane, Wash., pres.; C. C. Landis, supt.
daho. **Cap.**, $250,000; shares 25c.
iles from Murray, Shoshone county, said to carry lead-

by 200′ crosscut tunnel.

ET COPPER MINING CO., LTD. **IDAHO**
Block, Wallace, Idaho. **Mine office:** Mullan, Shoshone

H. Nordquist, pres. and gen. mgr.; Chas. H. Solberg,
on, sec.-treas.; with A. J. Olsson, directors; Al. J. Grills,

in Idaho. **Cap.**, $1,500,000; shares $1 par; assessable.
ported was 5 mills per share, levied in 1914.
laims, patented, 181 acres, on Snowstorm hill, between
d Snowstorm mines, and about 5 miles N. E. of Mullan,
issure veins of 10 to 50′ width, in quartzite.
by 3 tunnels. The upper one, of 1,700′ length, has a
ts and crosscuts, which develop what is supposed to be
he Snowstorm vein, showing low-grade ore carrying
nates and bornite of 2 to 3% estimated copper tenor.
a crosscut, from the head of Gentle Annie gulch, is
opened up a good body of ore, presumably the National

lude electric power, with 2 motors, and a 5-drill air-
ety is worked intermittently with proceeds of annual
formation is hard to obtain from this as well as all
ngs ames.

NING CO. **IDAHO**
73rd and E. Gilson Sts., Portland, Oregon.

Officers: Chas. Hyle, pres.; Henry Wingert, sec.-treas.
Cap., $50,000; 5c par; $29,285 issued.
Property: lode and one placer claim in Summit mini
shone county, containing lead, silver, and zinc ore. Prob
Company pronounced delinquent, Jan., 1920, by Secre
Idaho, for failure to file 1919 corporate statement.

LUCKY FRIDAY MINING CO.
Address: Wallace, Idaho. Is a reorganization (1914
Friday Mines Co.
Officers: Franklin Pfirman, pres.; Jas. A. Wayne, sec.;
Cap., $1,500,000; shares $1 par; assessable; 170,000 sh
Property: 4 claims at Mullan, Shoshone county, adjoi
mine on the south.
Development: by 90' shaft, 625' upper crosscut tunne
crosscut tunnel, developing a 10' vein, with 4' paystreak
to 3.5% copper, 29% lead and 89 oz. silver per ton.
Equipment: includes electric drilling plant.
Work was reported resumed in 1919.

LUCKY STONE MINING CO.
Address: G. H. Walters, sec., Wallace, Idaho.
Cap., $1,000,000; $1 par; assessable.
Property: 14 claims near Osborne, Shoshone county
claims in Granite county, Montana. The former carries
silver-lead ore.
Development: by 1,000' of tunnel work in the Idaho
12 to 14" of $100 ore was disclosed in the summer of 1919.
property two veins have been exposed by over 600' of dri

LUCKY SWEDE GOLD & COPPER MINING CO.
Office: 625 Cedar St., Wallace, Idaho.
Officers: Morris Pearson, pres.-gen. mgr.; Otto A. O
with C. E. Berglund, C. M. Clark, P. E. Johnson, and R
directors.
Inc. May, 1909. **Cap.,** $1,000,000; shares $1 par; assess
1c per share, delinquent sale June, 1919.; 300,000 shares
Property: 14 claims in the St. Joe district, Shoshone
Mullan, near the C. M. & St. P. R. R. shows 3 veins with
ing good assays in copper and gold.
Development: assessment provided funds for a 1,500'
cut a copper vein expected to be reached at depth of 1,
was prosecuted in 1919.
Equipment: includes oil engines, compressor, and a
recent returns.

MAINE-STANDARD MINING CO.
Address: 6 P. O. Bldg., Wallace, Idaho.
Officers: Alexander Murphy, pres.-mgr.; I. W. Paro
tison, sec.-treas.
Cap., $1,500,000; shares $1 par; assessable.
Property: 5 unpatented claims in Yreka district
on which $13,000 has been spent. Apparently idle.

MAJESTIC MINING CO., LTD.
Address: Therrett Tow
Cap., $1,000,000; $1 par
Property: 13 patented
county. Veins with
of tunnel work
shut-down.

MARSH MINE
Office: 601
Idaho.

Edward Pohlman, pres.; M. M. Lee, v. p.; Joseph McCarthy, Ilman, treas., with F. L. Bergen, (supt.), directors.
cessor of Marsh Mining Co., which was incorporated 1909 in Reorganized July, 1916, as the Marsh Mines Consolidated, stock d share for share. In addition, for each three shares of Marsh, bscribed for one share of new stock at 15c. a share.
1916. **Cap.**, $1,500,000, increased to $2,000,000 at time of in July, 1916; shares 25c. par; reduced, 1918, to $500,000, same nnual meeting in March. Stock listed on Spokane Exchange. 911 to Oct., 1918, aggregate $2[illegible]0,000.
Mining Co. and Green Mountain Mining Co. are being liquidated, transferred to Marsh Mines Consolidated.
reason given for shutting down the mines in 1916 was that litiga- Federal Mining & Smelting Co. threatened. The latter company roperties to the south and west of Marsh, and Marsh had been es extending under the surface of the Federal ground, at a depth of main tunnel level and 1,300' below the surface. This contro- settled, by agreement, with the Federal Mining & Smelting Co., a 10-years' lease on the Mono, Russell and O'Neil claims of the group, which include the vein in controversy. This agreement complete settlement of all claims for alleged trespass.
were suspended until March, 1917, when a new Gould pump the 900' level, the mine was unwatered and milling resumed.
work on the Got-em-now vein, exposed in the Gertie tunnel, the Marsh property, is under way. This vein was cut 512' from e Gertie tunnel and at a depth of 350' to 400' from the surface; ein can be quickly mined by utilizing the present working shaft 00' deep and splendidly equipped to handle a large output.
claims, about 100 acres in O'Neil gulch, N. E. of Burke e Tiger-Poorman mines. Claims show simple fissure veins in ein is 2' wide in the upper 175' tunnel, averaging 5' on the 5th silver-lead ore with zinc in shoots, the orebody thus far de- 0' long and 4½' wide. The shoot is short, limited by a fault, eloped in depth to get tonnage.
t; includes a main working tunnel and 940' shaft with levels nd 904'. Tunnel cuts the vein at 625' and a drift follows it n runs north 70° west and dips 78° south. A rich lead-silver on the 900' level and produces a small quantity of ore. The ut promising.
were estimated at 26,000 tons in 1918, equal to 8 or 10 . Arrangements were under way to deepen shaft to 1,100', llow the shoot found at 900'.
ludes 1,170' Ingersoll-Rand and 600' Franklin compres- ibing electric hoist, 40-h. p. Edgerwood and two Ottumwa anderson pumps, Ingersoll, Waugh, and Wood drills, etc., al equipment.
and operate the Caldwell or Pittsburg mill in Nine Mile rom Wallace. Freight on Northern Pacific costs 15c. a ated at cost of $14,000 in 1915, handles 150 to 225 tons [illegible] contains 2 sets of 14"x30" [illegible] 2 new concentrating tables, [illegible] Dorr thickeners, etc.
[illegible] Co.; the March Co. [illegible] control of the Hecla [illegible] from on 30 [illegible] men were

centrate assaying 52 to 58% lead and 22 to 28 oz. silver; also 100
trate containing 21% lead, 33% zinc, and 12 oz. silver per ton.
$14,000 net.

Net returns from ore shipments have been as follows: 191
$114,648; 1913, $139,429; 1914, $81,944; 1915, $143,640; none
Marsh mine and mill were closed down May 15, after operatin
than 4 months in 1916, and producing 17,828 tons of ore, worth
just balanced expenses.

In Nov., 1919, it was reported that a new and promising
opened on the Russell claim, under lease from the Federal M. &
20, 1926. A tunnel driven on this vein showed up to 6' of le
380'. This vein can also be reached by 1,100' of crosscutting
Marsh tunnel. Recently a suit was started against the He
leged wrongful extraction of ore from the east orebody (s
& S. Co.)

MAYFLOWER MINING & DEVELOPMENT CO.

Address: John H. Foss, pres., Mullan, Idaho.

Cap., $1,250,000; $1 par; assessable.

Property: 13 patented claims in Hunter district, Shosho
which over 4,000' of tunnels, etc., have been driven, opening v
silver ore. After a 5-years' shutdown, work was resumed in 19

MIDNIGHT MINING CO.

Address: M. F. Quinn, 50 Broad St., New York.

Officers: H. L. Carr, pres.; E. F. Carlson, v. p., with E.
sec.-treas.; also directors.

Inc. Jan. 5, 1917, in Delaware. **Cap.,** $1,500,000; par
1,481,021 issued.

Operating expenses in 1918 were $114,755.

Property: 3 patented claims, 21⅝ acres, 1½ miles from
shone county; side lines the Morning and You Like claims of F
Co. Deposit is a fissure vein in quartzite, carrying silver-lead

Development: by 1,600' tunnel, the 3,700' of workings re
of 1,282'. Mine is being developed.

MIDWAY SUMMIT MINING & MILLING CO., LTD.

Address: W. W. Waltman, sec., 419 Chamber of Co
Spokane, Wash.

Inc. 1911, in Idaho. **Cap.,** $1,500,000; $1 par; assessable.

Property: 11 claims, surveyed for patent, 1 mile S. of B
county. Ore contains silver-lead.

Development: over 6,000' of work has been done on pr
disclosing ore in commercial quantities, though some rich ore

MINERAL FARM MINING CO.

Offices: Paulsen Bldg., Spokane, and Mullan, Idaho.

Officers: C. J. Carlson, pres. and mgr.; Wm. Sellars, v. p
sec.-treas., with J. H. Pelletier, director.

Inc. 1904, in Idaho. **Cap.,** 1,500,000 shares; $1 par; assess
ing 800,000. Annual meeting, first Monday in September. L
Exchange.

Property: 8 claims, 7 patented, 170 acres, 1 mile west
shone county, has a fissure vein in Revett and Burke quartzite,
was started in 1906.

Development: 3 tunnels, 60', 900' and 1,445' in length,
cross. Probably idle.

MULA COPPER MINING CO.

Mullan

levied in April, 1917, to pay for having examination made of

10 claims, about 175 acres, at the head of Deadman gulch, cky Calumet, and about 1½ miles N. W. of the Snowstorm, in the

property has a wide fissure vein in Revett quartzite, carry- r, cuprite, azurite, malachite, bornite and chalcopyrite, with value hides, ranging from about 1% on the hanging, to 8% on the averaging about ½ oz. silver per unit of copper. The property ne argentiferous galena. Geology described U. S. G. S. Bull. 913.

nt: consists of a 1,400′ upper tunnel and a 2,800′ lower tun- necting shaft and nearly 1 mile of workings. The main tunnel for 1,900′, then N. 70° E. for 700′, passing from purple St. Regis rtal into Revett quartzite.

t: includes a 100-h. p. electric plant, with an 8-drill air com- ie buildings.

914, ten of the largest stockholders formed an ironclad pool with deposited with Union Trust & Savings Bank of Spokane to In April, 1914, a lease and bond was given to Snowstorm M. Co. l agreement calling for expenditure of $2,000 for each month the owstorm expended $36,000, and option was cancelled on Sept. 12,

ockholders assert that property contains apex of National vein. ein is flat, dipping about 37° S. towards National vein which was rosscut at vertical depth of 1,400′, and is said to show dip similar It is said that National Co. feared to raise lest it prove apex in d.

rilling was done October, 1917.

T MINING CO. **IDAHO**

E. Hedin, Wallace, Idaho.

Eugene R. Day, pres.; Jas. J. Murphy, v. p. and mgr.; E. ta

0,000; shares $1 par; assessable.

9 patented claims, adjoining the Hercules mine on the east, unty.

ent: the main tunnel through which the property has been xtension of the old Trade Dollar tunnel, 600′ below the upper 00′ below the outcrop. The vein was cut in 1914 and drifting t vein was found to be cut off by a fault. A crosscut was then ack. About 600′ of drifting has been done, but little ore has nd. Total workings over 5,000′.

ll water power, compressor, etc., reaching depth of 1,000′. No

NING CO. **IDAHO**

. Leighty, Wallace, Idaho.

00; shares $1 par; assessable.

2 claims in Hunter district of Shoshone county, on which l silver ore.

ears a 1,000′ tunnel with 1,200′ of drift-work on vein. The 150- ported is being remodeled early in 1919.

L.L. MINING CO. **IDAHO**

Exchange Block, Spokane, Wash.

[illegible] pres.; J. C. Feehan, v. p.; A. Brounlow, sec.- [illegible] and Louis Wanie, directors.

[illegible] Cap., $1,500,000; $1 par; all issued.

[illegible] above Murray, Shoshone county, carrying [illegible] and slate. Examined by Rush J. White, [illegible] etc.

Equipment: 10-drill compressor, tramway, and 150-ton
Mine closed down in March, 1919.

NABOB CONSOLIDATED MINING CO.

Subsidiary of Stewart Mining Co., financing Nabob Cons. and N
described in Vol. XII of this work.

Offices: 1482 Broadway, New York, and Kellogg, Idaho.

Officers: J. E. Harrington, pres.; G. T. Witz, v. p.; John
sec.-treas., with A. H. Featherstone, and Nash Rockwood (counse
C. C. Griggs, mgr., at Kellog.

Inc. 1917, in Idaho. **Cap.,** $3,500,000; shares $1 par; 2,60
1,750,000 shares held by Stewart Mining Co. Registrar, Metropolit
and transfer agent, M. A. Hennessey, both in New York.

Property: 28 claims on Pine Creek near Kellogg, Shosh
Principal claims are the Denver, Mascot, and Nabob. Ore occu
quartzite and Prichard slate.

Development: by 3,000' tunnel, shaft, etc., totaling over 5,00
in 1918 were estimated as 22,000 tons possible and 46,000 tons prob
augmented by later work. In the Denver claim, ore averaging 10
zinc, and some silver has been followed for over 400' on two le
other tunnels and workings have opened a good deal of ore. A
ore in the lower Nabob tunnel yielded several cars of ore in 191
ore carries 10% lead, 15% zinc, and 7 oz. silver per ton.

Equipment: complete for mine, 4,000' aerial tram connectin
nel with Pine creek, and 150-ton mill started work early in Septe
One of the drawbacks has been lack of rail communication
down Pine creek, affecting other mines as well.

Mill construction work was financed by a loan of $60,000 from t
Co., through the Federal M. & S. Co., to be repaid by a smelting
per ton on shipments of concentrate, while a smelting contract wa
5 years, with renewal privilege for a similar period. The sum p
cient owing to increased cost of labor and supplies, and a fur
$15,000 was granted.

Application made February 6, 1920, for appointment of a rece

NABOB MINING CO.

Absorbed by Nabob Consolidated Mining Co., which see.

NATIONAL COPPER MINING CO., LTD.

Address: August Paulsen, Spokane, Wash., and Mullan
county, Idaho.

Officers: August Paulsen, pres.; A. P. McCrae, v. p.; Cha
sec.-treas.; Jas. F. McCarthy, Mgr., with Harry White, H. H. St
R. C. Steese, directors.

Inc. Sept. 22, 1906, in Washington. **Cap.,** $2,500,000; $1 p
from 1,250,000 shares in July, 1913; 1,800,000 issued, 800,000 sh
stock were sold at 50c [illegible] ts of 19½c per share have b
date, a total of $342,000 [illegible] in Spokane.

Property: 9 patent[illegible] ores, in Deadman gulch to
lan and Larsen, on the [illegible] Coeur d'Alene valley. It
miles west of and in the [illegible] Snowstorm copper prop
closely resembles in char[illegible]

Geology: ore occur[illegible] in thickly-bedded w
quartzite, with talcose sli[illegible] The vein runs
and dips steeply to south. T[illegible] ndications of
beneath it, in fact the ore-bear[illegible] show

During the boom days of [illegible]
an adit tunnel developing a fissu[illegible]
commercial quantity. Dec., 191[illegible]
cut at a distance of 4,800' from [illegible]
and shaft. The crosscut tunne[illegible]
Wallace slates and St. Regis qu[illegible]

om the more favorable Revett quartzite. The National vein is
is big fault. It is a vertical quartz vein, filling a fault in Revett
vein carries copper ore and a drift east disclosed the orebody
mine its short-lived prominence. A sample cut across the ore-
as 85' wide showed an average value of 2½% copper, 5 oz. silver,
d.

nt: by a 1,200' upper tunnel, a 4,800' lower crosscut tunnel
' of drifting on the vein, a 400' shaft with 400' of drifting and
the 1,500' level. In Feb., 1916, company reported sufficient ore
level to run the mill 2 years. Leached areas on the 800' and
e the extent of orebody uncertain. An estimate of 545,000 tons
above the 1,000' level, made 1913, was changed to 170,000 tons
nexpected barren streak.

a 500-ton concentrator with Callow flotation plant, and 2-
. The crushing plant can handle 500 tons in 16 hours and
o ½". The storage bins have a capacity of 1,100 tons, receiving
-mile electrically operated railroad. The various motors at the
p.

erated two months early in 1914, and again in Oct., 1915, crush-
f 0.83% copper ore carrying 1.99 oz. silver per ton. Operations
in June, 1916.

1917, a crosscut from shaft at depth of 535' below main working
rough 35' of ore of better grade than in upper workings, which
that better ore would be found at depth.

presents an investment of $400,000 without a dollar's profit, the
built before a producing mine had been developed. Deep work
up a large tonnage, but management announced this would not
new work above the 1,200' level justified it.

8, a small profit was being made from 1½% copper and 4 oz.
nluckily, the 1,500' level showed the vein to be more oxidized
n on the upper levels. A new hoist and electric pump were in-
and the mill ran at 33% capacity, the ore coming from the 800,
,200' levels. The mill treated 300 tons daily, early in 1919, the
being 14 cars of concentrate running 15% copper and 40 oz.
above the 800' level opened good early in 1918, but the mill had
wo months for repairs. The monthly output averaged about 15
ates, netting approximately $20,000. Fifty men were employed
tember, the mine was closed indefinitely and a statement pub-
l assets, including $51,205 in cash, totaled $59,079. There were
rom Nov., 1917, to July, 1919, the mill treated 105,129 tons of
05% copper and 3.27 oz. silver per ton. The value was $4.68
ts were $4.085. The 5,931 tons of concentrate averaged $83.11
15% copper and 43 oz. silver; the recovery was 80% and 74%.
ore of commercial grade has been found below the 1,500' level,
m fault ends the [illegible] short distance below this
opened by 1920' [illegible] to 0.7% copper and 1 to 2
his mine has provo[illegible] ...vestment after extensive
merit and large ex[illegible] ...and unless a new ore-
e property cannot be [illegible] ...January, 1920, it was
the mine and continue [illegible] ...ot 300' further.

NG & MILLING CO. **IDAHO**

H. Barnes, mgr., Taco[illegible]
E. Benedict, pres.; O[illegible] ...ning.

$1 par.
[illegible] miles
[illegible]
[illegible]

Shipped 20 tons of high-grade ore in Sept., 1914, from leasing op water power plant for pumping and hoisting work, and a small n planned active development in 1919.

NEVADA STEWART MINING CO.

Address: Wallace, Idaho.

Officers: Dr. C. R. Mowery, pres.; Dr. Herbert Mowery, s Huemann, treas., with M. J. Sinclair and A. J. Devlin, directors.

Inc. Nov. 19, 1915, in Idaho. **Cap.,** $150,000; 10c par; ass

Property: 7 claims in Pine Creek district, near Kello county, adjoining the Highland Surprise on the west, shows lea ore in veins. An 800' crosscut tunnel has been driven, and total about 1,000'.

Equipment: includes electric power and air-compressor. down in 1917, but was rebuilt. Inactive since Nov., 1917.

NIPSIC MINING CO.

Mine sold to Cons. Interstate-Callahan, which see.

NONPAREIL COPPER MINING CO.

Idle, but not dead.

Office: H. C. McAllister, pres., and H. G. Loop, sec., Wall

Inc., in Idaho. **Cap.,** $1,500,000; shares $1 par; assessable.

Property: 4 full and 3 fractional claims, on the west for creek, across from the Carney mine, 3 miles S. S. of Mullan, Sho

Development: by 4 tunnels. Surface ores have given assay copper, and 8 to 19 oz. silver per ton.

NORTH AMERICAN M. & M. CO., LTD.

Address: J. J. Presley, Kellogg, Idaho.

Officers: J. J. Presley, pres.; C. F. Reedy, v. p.; J. F. Mo J. Presley, treas., with Alex Murphy, directors.

Inc. May, 1903, in Idaho. **Cap.,** $1,500,000; $1 par; none o

Property: 25 patented claims, 390 acres, 3 miles S. E. of shone county, adjoining the Bunker Hill & Sullivan, and believed t carry the continuation of the B. H. & S. main fissure. Examined, Davey. Also 280 acres of millsite, water-rights, etc. The vein quartzite, and ore averages 1% lead and ½ oz. silver per ton.

Development: by tunnels totaling 1,700' reaching depth of

In 1916, company tried to raise funds with which to continue nel another 1,200', by lurid advertisements, written by an "adver The engineer's report is worth quoting: "It is a good business go into, for while there may be some chance that ore will not be mercial quantities, it is remote under the conditions existing els same vein."

NORTH BUNKER HILL MINING CO., LTD.

Address: N. T. Hardy, mgr., Kellogg, Idaho.

Officers: Elmer Brown, pres.; J. L. Trowbridge, v. p.; sec.; F. C. Cartwright, treas., with A. W. Vangilder, Moses Ev Drais, directors.

Inc. Feb. 16, 1907, in Idaho. **Cap.,** $1,250,000; shares $1 pa 4 mills per share called Sept. 24, 1919; 1,079,721 issued.

Property: 3 patented claims, 60 acres, at Wardner, Coeur trict, joined on the E. by the East Caledonia, on the W. by the on the S. by the Bunker Hill & Sullivan Mines.

Development: by tunnels, and 300' incline shaft sunk in th 200' crosscut shows 5' of ore in No. 1 vein that is reported to as lead and 25 to 40 oz. silver per ton. No. 2 vein was cut by this little work was done on it. The shaft was to be sunk 200' deeper at

Equipment: 75-h. p. motor, 500 cu. ft. compressor, sleeve pump.

Work is paid for by calling assessments, and the installation of noted shows that shareholders are getting good value for their mo

LIGHT MINING & MILLING CO. **IDAHO**

ellogg, and S. L. Shonts, mgr., Wallace, Idaho.
W. G. Nye, pres.; Fred W. Sachse, v. p.; Tom J. McGrath, Harmon, sec., with S. L. Shonts, directors.
1915, in Idaho. **Cap.,** $75,000; shares 5c par; assessable; one ied Aug., 1915; 1,100,000 outstanding. Annual meeting, second ay, at Wallace, Idaho.
owns 2 claims and has 7 adjoining claims under bond and 34 acres, 2½ miles south of O. W. R. N. Ry. on Pine creek, about f Kellogg, and 3½ miles west of the new Bunker Hill smelter oshone county.
rted on by Merriam Bros. of Wallace, and Albert Burch.
ontains two veins: No. 1 vein is said to be 6′ wide and to carry de lead with 0.33 oz. silver, 10% lead, free from iron and zinc. ocked out in this vein is estimated at 19,500 tons running 7% lead ver. Extension of this vein into claims held under option shows loped through 185′ shaft.
, 247′ S. of No. 1, varies in width from 5 to 12′ with continuous oped for 200′ by drift on 400′ level, a 60′ raise and 175′ winze, l, also 100′ of openings at bottom of winze, called 500′ level. 20,000 tons of ore are estimated as blocked out, averaging 5.5% and 2.1 oz. silver. A 200-ton mill will be erected.
ent: by 500′ tunnel and 400′ vertical shaft, with 2,400′ drifts 100′ raises and 70′ winze.
t: includes hoist at main shaft, Ingersoll-Rand compressor, Gould and Cameron pumps, air hoist in winze, machine drills, etc. tary wrote in June, 1919, that the mine was not worked during the shaft was flooded, power being disconnected. Work will be litigation over the power supply is settled.

ANKLIN MINING CO. **IDAHO**

Norman Ebbley, pres., Wallace, Idaho.
daho. **Cap.,** $1,000,000; shares $5 par; assessable.
7 claims adjoining the Morning mine on north, near Mullan, ty, Idaho. About 3,000′ of work has disclosed bunches of lead- not in commercial amount. Idle for 3 years past.

ORY MINING CO. **IDAHO**

Oscar Nordquist, pres., 424 E. Nora St., Spokane, Wash.
1918. **Cap.,** $150,000; shares 15c par.
the Old Hickory claim of North Star M. & M. Co., adjoin- claim of Federal M. & S. Co. Lead ore was opened in 1919, in a ological conditions were said to be encouraging.

RAN MINING CO. **IDAHO**

arnard Blk., Wallace, Idaho.
M. J. Farrell, pres.-gen. mgr.; Allan G. Kennedy, v. p.; L. L. treas., with B. J. Farrell, directors.
ch, 1915. **Cap.,** $150,000; shares 10c par; assessable; 750,000 old at 2 cts. per share, upon which assessments of 2 cts. are to be wo months.
: 10 claims, 2 miles above Burke, Shoshone county, shows sev- ares.
ent: by 1,500′ of tunnels. No. 3 tunnel cut a few inches of 1.84% copper and ½ oz. of silver in 1918, and drifting continued ng more or less copper, but no large orebody.

MINING CO. **IDAHO**

Kellogg, Idaho.
M. A. Folsom, pres.; H. Nicholson, v. p.; Stanley A. Easton, gen. mgr.
,000; shares $1 par.
: on Ontario Creek, adjoining the Stewart in the Kellogg-

Wardner district, Shoshone county, shows quartz fissure veins carry sphalerite, and galena, and proved to be the southern extension of Stewart orebody. The vein system is faulted, as in the Stewart, a crushed, making mine operations troublesome.

An apex suit brought by the Stewart Mining Co. was decided, favor of the Ontario Mining Co., giving the latter company a verdict f

Development: by 800′ crosscut tunnel from which a shaft wa 320′ depth.

Equipment: compressor, 200-ton mill, and complete plant.

Production: 8,209 tons of ore worth $712,666 in 1915, and worth $32,811 in 1917. It is generally understood that this mine h profit of over $500,000, but this cannot be verified.

OOM PAUL CONSOLIDATED MINING CO.

Office: Wallace, Idaho.

Officers: Jas. F. McCarthy, pres.-mgr.-treas.; F. H. Richards supt.; L. E. Hanley, sec., with Edward Ryan, J. B. Sloan and Walte directors.

Inc. April, 1907, in Idaho. **Cap.,** $1,600,000; shares $1 par; a 7 assessments of 1c. each levied; 1,397,598 shares issued. Stock listed and Spokane Stock Exchanges.

Property: 10 patented claims, 200 acres in Coeur d'Alene dist Burke, shows silver-lead ore in fissure veins traversing a quartzite

Development: by 3,500′ crosscut tunnel, driven to cut the d extension of the ore found above. A vein was cut but contained no

Equipment: consists of compressor. Work suspended, 1917 of disappointing results. The Ajax Mining Co. which adjoins it, arr use of the tunnel to prospect its own ground during 1918.

PANDORA COPPER MINING CO., LTD.

Address: care J. C. Weatherhead, Larson, Shoshone county,

Inc. Oct., 1906, in Idaho. **Cap.,** $1,000,000; shares $1 par; a issued 450,000. Annual meeting, fourth Wednesday in October.

Property: 10 claims, 150 acres, adjoining the Snowstorm min east, and supposed to carry about 3,000′ of the Snowstorm ore zone. shows St. Regis and Revett quartzites, with copper impregnations in

Development: includes 1,750′ main, or working tunnel, which yet crosscut the vein. Only assessment work done in recent years.

PARAGON CONSOLIDATED MINING CO.

Office: 436 Sibley St., St. Paul, Minn. **Mine office:** Paragon, I

Officers: Geo. S. Monson, pres.; M. O. Nelson, v. p.; F. O. sec.-treas., with W. W. Dunn, Geo. J. Rank, R. C. Patterson, director Stedman, mgr.

Inc. Nov., 1908, in Minnesota. **Cap.,** $1,500,000; $10 par; ou 1,205,430. Bonds: authorized $100,000; outstanding, $25,000. Annual in November. Listed on New York Curb.

Property: 43 claims, 19 patented, about 850 acres, in the Coeu district, Shoshone county, shows fissure and contact orebodies. Valu lead, zinc, silver and gold. Extent of workings, about 16,000′.

Ore is concentrated in a mill, capacity about 100 tons, leased from Horse Co. Mainly zinc and lead concentrates are shipped. Power is at water-fall nearby, but operations have been hampered by scarcity The mine has been an intermittent shipper during the past few years, b are not made public.

PARROT MINING CO.

Absorbed by Sunshine Coeur Mining Co., which see.

PATUXENT MINING CO.

Address: Wallace, Idaho.

Officers: Jas. F. Callahan, pres.; F. H. Wingate, v. p.; F. L. Ba

Property: [illegible]

rict, Shoshone county, reported to show a 4' vein of high- in a fissure zone 50' wide.
totals 3,000' of tunneling, crosscutting and drifting. De- is are conducted through the Rex, Cons. workings.

ER-LEAD MINING CO. **IDAHO**

ogg, Idaho.
Schaefer, pres.; Geo. Moison, v. p., with M. Mosauer, eyer, and Chas. Bollinger, directors.
0; shares $1 par.
ead-silver claims, adjoining the Jack Waite, in Eagle dis- Shoshone county.
about 1,000' of workings.

NG & MILLING CO., LTD. **IDAHO**

lace, Idaho.
nan Ebbley, pres.; Jos. Whelan, sec., with R. H. Kings- erts, directors.
0; shares $1 par; assessable, 800,000 shares outstanding. econd Monday in May.
ead-silver claims, in Coeur d'Alene district, near Wallace, ened by 1,500' of workings, but still only in exploration stage.

EVELOPMENT CO. **IDAHO**

l. XIII for data.
herman Development Co., and Sherman Lead Co., which see.

INING & MILLING CO. **IDAHO**

ed in Vol. XIII. Consolidated Jan., 1917, with the Hilarity ich see.

K MINING & MILLING CO. **IDAHO**

. Bailey, mgr., 2903 Sinto St., Spokane, Wash.; J. W. Geo. Yancy, v. p.; Ray E. Bigelow, sec.-treas., with Elmer ick, directors.
0; $1 par.
laims, on Placer creek, 6 miles from Wallace, Shoshone y a 1,400' tunnel, said to cut the vein at a vertical depth of en no change in two years.

NG & DEVELOPMENT CO. **IDAHO**

lace, Idaho.
E. Mann, pres.; P. J. Gearon, mgr.; L. C. Wilson, sec.- mitz and H. M. Davenport, directors.
5, in Idaho. **Cap.**, $50,000; shares 5c par.
mented claims between Osborne and Kellogg, in the Coeur county. Ore carries lead and silver, with some copper. by 1,100' of tunnels, winze, and several hundred feet of

everal carloads shipped reported to average 140 to 200 oz. copper, and in 1916, 7 cars netted $25,163. No recent figures

ING CO. **IDAHO**

. O'Reilly, pres., Bates Bldg., Portland, Oregon. F. A.

shares 5c par; $53,000 issued.
laims in Beaver district, Shoshone county, showing lead- 1,300' of tunnels, etc.

NG CO. **IDAHO**

lace, Idaho.
Rourke, pres.; Theo. Anderson, v. p.; Jas. F. Callahan, ..., with O. B. Olsson, and John H. Roberts, directors.
0; shares $1 par.
mineral lead-silver claims in Placer Center mining district, W of the Tamarack & Chesapeake.

Development: by 1,100' tunnel and over 2,000' of other w
recent information published.

RAINBOW MINING & MILLING CO., LTD.

Office: Peyton Bldg., Spokane, Wash.

Officers: Geo. Austin, pres.; S. Hofslund, v. p.; R. P. Wo
treas., with Terrett Towles, H. A. Nourse and A. E. Bronson, di

Inc. June, 1907, in Idaho. **Cap.,** $300,000, increased 191
shares 25 cts. par, assessable; 800,000 in treasury, Aug., 1919. A
June 1st.

Property: 19 claims, 7 patented, 360 acres, in 2 groups.
No. 1 group, 3 miles west of Wallace on Shields creek, Shosho
St. Regis and Burke quartzite cut by the Sunshine and the Rainb
Sunshine vein carries grey copper ore with iron and quartz gang

Development: 2,200', includes a 40' tunnel on the Sunsh
the main No. 3 tunnel on the Rainbow vein. Latter follows v
for 1,350', exposing 3" to 4' of vein filling with black footwall s
tetrahedrite, galena and chalcopyrite. Another tunnel on the o
the creek is 450' long. Commercial ore is expected at greater d

Equipment is ample, and railroad but ¾ mile away.

The second group, of 5 claims, bought 1910, is about 3 miles f
spike mine, and 15 miles from a railway, at the mouth of Bo
tributary of the North fork of the Coeur d'Alene river, in Secs. 2
N., R 1 W., in an unorganized district. This property shows
estimated average width, traceable 6,000', carrying lead and co
ciated with iron carbonate, in a quartz gangue.

Development: by crossent and drift, by tunnels 800' l

Equipment: engine house, 25-h. p. oil engine, 8 by 9" co
air pipe and flume supplying water to operate an air blast. Comp
ing steadily with funds derived from stock assessments.

RAY-JEFFERSON MINING CO.

Address: Daniel L. McGrath, mgr., Wallace, Idaho.

Officers: E. R. Day, pres.; J. J. Murphy, v. p.; P. J. Mau
Geo. K. Garrett and D. L. McGrath, directors.

Cap., $2,000,000; $1 par; assessable. An assessment of
cents at a time, was levied in May, 1919.

In May, 1916, control passed to the Day interests, owners of
Tamarack and Custer mines, and of the Northport S. & R. Co.
treasury stock to finance construction of mill and installation of
system, 1916.

Property: 38 claims, 600 acres in a compact group, adjoi
solidated Interstate-Callahan holdings and including the Hill grou
to show the Interstate-Callahan, Amazon and Manhattan veins, o
body 400' long. The Carlisle is a cross vein running northerly a
the Interstate. The latter is supposed to be of the Hercules vein.

Development: by the Blue Grouse and Carlisle tunnels.
Goat tunnel opens a shoot 300' long, showing 3' of shipping ore
ore on the Callahan vein. The Carlisle tunnel has 400' of drifti
of this name, said to carry 5' to 10' of mill ore for the entire dis
tunnel was driven in 1918 to cut the vein 1,000' below the upper
The Beaver Creek branch of the O.-W. R. & N. line was co
Ray-Jefferson in Feb., 1917.

Equipment: compressor, drills, shops, tramway, and 40
No figures of output are obtainable. The 12 cent assessment
fatal blow to shareholders.

MONARCH CONSOLIDATED MINING CO

Offices: 310 Title Bldg., Spokane, Wash., and Wallace, Ida
[illegible]

5, in Washington. **Cap.**, $2,000,000; shares $1 par; assessable; . Annual meeting, first Tuesday in April.

43 claims, about 800 acres, in Beaver Creek district, Shoshone north of Wallace, adjoins Cons. Interstate-Callahan on the west; . W. slope of Sunset Mt. and on opposite side of the mountain tate. Said to show 5 well defined fissure veins of silver-lead-zinc slate and Burke quartzite. Veins are parallel, strike N. 70° W., W.

nt: up to the time acquired by the present company, Nov., of 2,000' of prospect tunnels and open cuts. Ore had been found 50' long, at a depth of 500'. Company has since been driving m Missoula gulch, one north to attain a depth of 1,000' within 0', and one south to attain a depth of 2,000' within a length of 1918, the latter was in 4,410'. It cut three promising lead-zinc to be developed.

: includes compressor, capacity 2,000 cu. ft., operated by a motor.

considered promising. Work was suspended for several months, sumed late in 1919.

QUEEN MINING CO. **IDAHO**

llace, Idaho. **Mine address:** Mullan, Idaho.

C. Glahe, pres.; A. P. McRae, v. p.; J. R. Bean, sec.; S. D. with D. E. Keyes, directors.

19, 1915, in Idaho. **Cap.**, $200,000; shares 10 cts. par; assess- is a consolidation of the Copper Queen and the Reindeer Queen se holdings are contiguous and cover extensive copper exposures. ny assumed all obligations of the old corporations and exchanged share. The consolidation makes possible the speedy development already cut by the Reindeer tunnel, which has been extended as e vein into the ground heretofore owned by the Copper Queen. 15 claims in the Mullan copper belt, including the Stevens r Queen) group and the Reindeer group of 6 claims, all at the Creek. The outcropping shows a big copper-stained fissure vein,

nt: by a crosscut tunnel which has cut the vein at a depth g bornite and chalcopyrite ore opened by a drift on the vein. r ore occurring in Burke quartzite was encountered in drift, e in 1918 there had been opened 150' of 2½% ore.

; includes compressor, 200-ton mill and electric power.

y Rush J. White. No recent returns.

LIDATED MINING CO. **IDAHO**

ed, 1918, to Rex Mining Co., which see.

; CO. **IDAHO**

. Whicher, pres.; Raymond Guyer, v. p.-gen. mgr., 25 Broad

ation of the Rex Consolidated Mining Co., effected during 1918. e tonnage of 5,000,000 shares of new stock, having a par value of which 2,000,000 shares were to be exchanged, on a basis of for the 2,000,000 shares of existing stock, having a par value of offer rights to the present stockholders to subscribe to 1,500,000 shares at 15 cents a share, as well as to pay for the new prop- remaining 1,500,000 new shares. By March, 1919, the Rex ed all the properties and equipment, free of encumbrance, and of about $40,000.

14 claims and a mill-site, 185 acres, in Nine Mile section, including the Sixteen-to-One mine near the Cons. Interstate- groups, mines held under bond and lease. Was extensively by the Finch-Campbell interests of Spokane, but increase made operations unprofitable. In Dec., 1915, this com-

...ment took an option on the property of the Black Bear Cons., whi... ...ing $10,000, the option was relinquished.

...On Sept. 29, 1917, it was decided to complete purchase of the R... ...Rex mill and develop at depth; also to acquire the Friel tract in th... ...belt of Oklahoma, which has been extensively drilled.

The claims are in the slate belt, long considered valueless as a... ...until W. H. Weed challenged this view and demonstrated ... ...work at the Interstate-Callahan. The claims contain 3 strong vei... ...Okanogan, and Delaware, which converge at depth.

Development: through a main working tunnel 900' long. ... ...a 2-compartment shaft has been sunk to No. 9, or 1,280' level. A... ...this depth cut 3 parallel veins. The Okanogan vein is from a few ... ...in width. The Delaware outcrop is stronger than the Rex or Okano... ...350' S. of the latter. Underground work totals over 10,000', ar... ...$350,000. From a relatively small area in the upper workings the... ...duced more than $800,000 of silver-lead ore. Most of the zinc ore ...

Equipment: 75-h. p. electric hoist and 3 air hoists undergro... ...compressor of 1,030 cu. ft. capacity driven by 200-h. p. motor and... ...$200,000. On lead ore the mill had a capacity of 350 tons daily, and... ...ore, 200 tons. Plant includes flotation units and an Oliver filte... ...terminal of the 6,600' aerial tram of 400 tons capacity, a modern ... ...is operated. Surface improvements include repair shops, bunk a... ...houses, dwellings, etc.

Production: during 1917 the mill treated 39,731 tons of o... ...8,446 tons of concentrates producing 2,965,395 lb. of lead, 5,954,280... ...and 58,629 oz. of silver. The gross value was $492,943. Mining, ...equipment, freight, and treatment absorbed the whole amount.

Since the reorganization the upper levels of the mine have bee... ...the main shaft deepened below the 1,380' level, because exploration n... ...has not revealed much ore, although the vein itself was persisten... ...pany work was done for a year ending March, 1919, but the result... ...work is very good. In May, 1919, an arrangement was to be ma... ...Monarch Cons. whereby the Rex shaft and Monarch tunnel could ... ...to their mutual benefit. At the Marrs Hillside mine at Cima, 10 mi... ...Salt Lake Route, a 50' shaft, and a 75' drift had opened 3' of 14% ... ...silver, and $1.50 gold ore. Company will not take up bond on th...

ROBERTA MINING & MILLING CO.

Address: Alex. Penaluna, Wallace, Idaho.

Officers: J. Lutey, Jr., pres.; J. A. Shelton, sec.; Charle... ...treas., with Curtis Lewis and Alex Penaluna, directors.

Property: 12 claims, patented, well timbered, on Nine Mile ... ...Gem, Shoshone county, carry 4 known veins.

Development: by 4,000' of tunnels, the lower to be driven 2,... ...backs of 800' and to cut 4 veins, one of which shows lead and coppe... ...at surface, giving assays up to 6% copper, 10% lead, 16 oz. silver ... ...per ton. In August, 1919, it was reported that a vein 15' wide had ... ...No. 2 tunnel.

RUTH CONSOLIDATED MNG. & MLG. CO.

Address: Box 218, So... Wash.

Officers: C. M. Creve... Wm. Hoare, v. p.; G. D. Crego, ...with C. B. Wallace, F. W. ... S. McCall, and J. F. Thompso... ...the 1917, of W... $1,500,000; shares $1 par; a... ...10...

...Center district, ...

...4,000' of ... ...during 191... ...drills, ...

S MINING & MILLING CO. **IDAHO**
Mrs. Theresa James, pres., Wallace, Idaho.
in Idaho. **Cap.**, $50,000; shares 5c par.
the St. James mine, comprising the Ula and Try Me claims
k near Wallace, Shoshone county. **Ore:** carries lead, silver,
2 tunnel, started Nov., 1915, cut vein at 300', showing 8' of mill-
aly, 1919, the lower tunnel was 1,200' long, and the vein expected
100'. A 20' vein was cut in the upper tunnels. A compressor
April, 1919.

MINING CO. **IDAHO**
Ed. Ehrenberg, 1124 14th St., Spokane, Wash.
Cap., $1,500,000.
the Flynn group of 20 patented claims adjoining those of
any near Mullan, Shoshone county, and considered to contain an
the Federal company's Morning vein. A bond for $500,000 has
2½ years, from July 1, 1918. An arrangement was made with
any to explore the Flynn ground from the former's tunnel, and
ssor and buildings. Two shifts were working in 1918, and in Feb-
iamond-drilling was under way.
is considered to have considerable merit.

DEVELOPMENT CO. **IDAHO**
in Volume XIII. Absorbed by Sherman Lead Co., which see.

LEAD CO. **IDAHO**
Charles McKinniss, v. p., Wallace, Idaho.
, in Idaho. In return for an advance of $100,000, 51% of the
iven to E. R. Day, who controls company.
: the Union claims, formerly owned by Sherman Development
on creek, near Burke, Shoshone county. Ore is lead and silver

nent: by tunnels. In 1918, No. 4 tunnel disclosed 4' to 8' of
for 180', at a depth of 1,000'. To develop this shoot further, the
nel of the Tiger-Poorman mine was cleaned out and is being
is orebody is considered to be on the strike of the Tamarack &
In August, 1919, a raise had opened ore.

NING CO. **IDAHO**
L. W. Gay, Kellogg, Idaho.
L. W. Gay, pres.-treas.; E. H. Baker, v. p.; W. T. Simons, sec.,
, and E. H. Baker, directors.
daho. **Cap.**, $1,500,000; shares $1 par; assessable, 1,275,000 is-

: 19 claims in Pine Creek district of Shoshone county, adjoin-
er mine of the Nabob Cons. Ore carries silver, lead, and zinc,
ped by tunnels. In March, 1918, J. P. Acoam of Spokane, and
d a 3-year option on 900,000 shares of the company stock for

VADA CONSOLIDATED MINING CO. **IDAHO**
of Bunker Hill & Sullivan Mining & Concentrating Co., which see.
Stanly A. Easton, pres.; C. W. Simmons, sec.
in 1914 were $159,339; in 1915, $46,364; in 1918, $188,042.
5 patented claims in Deadwood gulch, Coeur d'Alene region,
ed by about 5,000' of workings.
n: company began shipping ore in July, 1913, selling its out-
ract to April 29, 1915, to the A. S. & R. Co. Management being
ial contract satisfactorily, discontinued production during 1916
output was 15,159 tons in 1915, and 19,234 tons in 1918.

MINING CO. **IDAHO**
Muxen, sec.-treas. Old National Bank Bldg., Spokane,
O, pres.; W. B. Turner, v. p.; C. D. Muxen, sec.-

treas., with W. Patterson, I. C. Newman, E. G. Ross, William Long, and A. O. Eyller, directors.

Inc. in Washington. **Cap.**, $2,500,000; $1 par; about 1,50,0 sued. Has a $4,000 mortgage.

Property: a group of claims near Osborne, Shoshone coun in 1915, after several years' idleness, shows fissure vein in shale, r ward into the underlying quartzite.

Development: 4,000' tunnel, 400' of it a drift on a 1 to 3' 6 to 18" silver-lead and gray copper ore. A 120' winze shows pers ward.

Reserves in September, 1917, were sufficient for several mo At 4,000' in main tunnel and at depth of 1,400', there has been open 3' wide, assaying 0.4% copper, 10.4% lead and 13.4 oz. silver per

Equipment: includes 6-drill compressor and electric powe mill with flotation plant was working one shift daily in Septembe seems to have been erected before enough ore was developed, as suspension of operations during 1918 and 1919.

SILVER CLIFF GOLD AND COPPER MINING CO., LTI

Office: Wallace, Idaho.

Officers: Jas. D. Young, pres., treas. and gen. mgr.; Edw sec., with Gust Oberg, and J. A. McLachlan, directors.

Cap., $1,500,000; shares $1 par; an assessment of 5 mills v Sept., 1919.

Property: 18 claims, 7 miles from Mullan, near Larso county, developed by 3 tunnels, the lower of 850' and longest of 1 copper ore with some lead and fair value in gold.

Equipment: includes a Pelton wheel and an 8-drill air-com

No report received since 1916, save that an assessment had b carry on work this winter.

SILVER DALE & BIG HILL MINING CO.

Address: Kellogg, Idaho.

Officers: E. G. Johnson, pres.; Richard Meineier, v. p.; D. W sec.-treas., with J. Olson, P. Petterson and Carl Arenauder, mgr., d

Inc. Sept. 12, 1917, in Idaho. **Cap.**, $10,000; shares 1 cent able; 425,000 issued. Three mills per share, due Dec. 20, 1919.

Property: 21 claims on Big creek, east slope of Kellogg pe line adjoining the Bunker Hill & Sullivan. Deposit is a contact i Burke quartzite. Ore carries galena, containing silver, and is de 900' tunnel. A 400' tunnel, being driven, 1919, will give a depth o crops are promising. In 1918, $5,783 was spent for labor and $8,080 (compressor, water power, etc.).

Owners are candid in saying that property is a wildcat pr proximity to the Bunker Hill & Sullivan warrants the real exp under way.

SILVER MOON MINING CO., LTD.

Office: Gus Ehrenberg, Box 297, Spokane, Wash.

Officers: Eugene Sage, pres.; H. C. Lamlach, v. p.; G. Ehr treas., with Geo. Steward and Ed. Ehrenberg, directors.

Inc. Sept., 1906, in Idaho. Cap., $1,500,000; $1 par; assess issued.

Property: 9 claims, north side of Canyon creek, 4½ mile loo, Shoshone county, adjoining the Tyler mine, shows 2 veins o quartzite.

Development: by 2,317' crosscut tunnel and 1,511' of ad depth of 600'. Prospecting being continued, with 2 veins cut in to crosscut.

NTAIN MINING CO., LTD. **IDAHO**

ach, Latah county, Idaho.
Tice, pres.; E. D. Wilkins, v. p.; W. E. Horstkotte, sec.;
s., directors. Arthur Horstkotte, mgr.
o. **Cap.**, $1,500,000; shares $1 par; assessable.
claims, 4 patented, near the Alice mine, on St. Joe Gulch,
e Morning mill, about 3½ miles from Mullan, Shoshone county.
ree tunnels, and a 900′ crosscut tunnel intersects an 8′ vein
to give assays of 2% copper, 3 oz. silver, and $1.80 gold per ton.
w work cut 18″ of ore assaying 8% copper and 12 oz. silver

includes a small steam plant and air compressor. Develop-
force.

MINING CO. **IDAHO**

ullan, Shoshone county, Idaho.
J. Gearon, pres.; Paul Lucia, v. p. and gen. mgr.; H. G.
with J. A. Bean, William Wallace, and A. P. McRae, directors.
903, in Idaho. **Cap.**, $1,000,000; $1 par; assessable; fully is-
ents of 5 mills each and one of 2½ mills levied to March, 1917.
on the Spokane and Butte Exchanges.
claims, patented, adjoins the Snowstorm on the east and
s the extension of the Snowstorm fault, at the head of Gentle
r the top of Snowstorm mountain, in the Hunter district, 1
y. Claims show Revett quartzite, mineralized for 30′ in the
with some cuprite, azurite and chalcopyrite, giving assays up
8 oz. silver per ton.
t: by crosscut tunnels, longest 2,000′, and drifts, a total of
orkings, showing a mineralized zone of 30 to 40′ width, carry-
er ores sparsely disseminated. Drifting on the N.-S. fissure
y of high-grade copper ore, 8 to 24″ wide, at 650′ depth and
portal of No. 2 tunnel. The upper crosscut tunnel, 700′ long,
up to 60′ wide and running from 1-20½ copper, at a vertical
second crosscut, 696′ vertically below No. 1, cut the vein 1,700′
sing any values.
includes 3-drill air-compressor, power house and several
er development planned and necessary. No recent returns.

APEX MINING CO. **IDAHO**

re, M. E. Delgrove and B. V. May of Spokane, trustees.
Washington. **Cap.**, $1,500,000; shares $1 par.
on Snowstorm mountain, east of Mullan, shows 2 veins
low shaft and a 130′ tunnel, with about 200′ of workings.
ned from Mullan, Idaho. Probably idle.

EXTENSION COPPER MINING CO. **IDAHO**

ullan, Shoshone county, Idaho.
909, in California, as successor of Snowstorm Extension
. **Cap.**, $1,000,000; assessable.
claims, adjoining the Snowstorm on the east, supposed to
on of the Snowstorm ore zone. Pits and trenches have shown
copper tenor, markedly similar to that of the Snowstorm.
t: by a drift tunnel, starting from North Fork creek, 2,000′
unts, planned to be driven to secure an eventual back of 1,630′,
vein. No recent information.

MINING CO. **IDAHO**

solved July, 1916, and succeeded by Snowstorm Mines Con-
um), which see. For production and description of organiza-
. XIII.

ING & MILLING CO. **IDAHO**

A. Smith, White & Bender Bldg., Wallace, Idaho.
H. Featherstone, pres.; W. A. Smith, sec.-treas., with J. T.
M. Werkheiser, O. A. Dubach and H. S. Tofte, directors.

Cap., $1,000,000; shares $1 par; assessable. Last assessment
per share delinquent on February 14, 1920.

Property: 12 claims, patented, over the hill from the Ma
above Burke, Shoshone county. Is an old mine worked intermitte
1896; $75.00 expended and 3,200′ of work done prior to 1908, when a 6
cut at 1,400′ from portal and at depth of 800′.

In 1914, a contract with John Moffat was made to "find" the
100,000 shares of stock. A shaft and winze was sunk on the Coon
1,950′ from the tunnel mouth, the ore-shoot proving elusive on the So
In 1916, company let contract for 200′ extension of the 1,500′ tunnel,
crosscut another vein. Another extension of 100′ was driven late in 19
workings are over 4,000′.

STANLEY MINING CO.

Address: Burke, Idaho.

Cap., $1,500,000; shares $1 par; treasury, 200,000 shares. Listed
kane. Controlled by Day family, principal owners of Hercules Minin

Property: 12 patented claims, west of Benton and N. E. of
Bird, in George Gulch, half mile N. of Burke, Shoshone county, said
antimony ore. Authentic information is scarce. The Humming Bird
tunnel, run by the Hercules, passes through Stanley ground.

STAR ANTIMONY CO.

Address: Kellogg, Idaho.

Officers: B. A. McIntosh, pres.; J. S. Ross, sec.; W. F. Smit
with W. I. Hall, L. H. Timpe, E. W. Miller, T. Henwood, and T. Beeler,

Inc. March, 1916, in Idaho. **Cap.**, $10,000; shares 1c par.

Property: the Brown & Fennell claims and others, eleven i
Pine creek, Coeur d'Alene district, Idaho. Ore carries stibnite
sulphide).

Development: by 3 tunnels, equal to 1,500′. Exploration unde
1917.

Production: 3 carloads in 1916, assaying 52.4 to 54.8% antimon
assayer reports 50c. to $15.36 gold per ton. No recent returns.

STAR MINING CO.

Address: Mullan, Idaho.

Officers: E. H. Moffitt, pres.; Charles Hussey, sec.-treas., wi
Cunningham and Austin Corbin, directors.

Cap., $1,000,000; shares $1 par.

Property: 7 claims adjoining Morning mine of Federal M
west, 2 miles from Mullan. Late in 1917 the Star company brought su
the Federal for alleged wrongful extraction of ore from its ground.
was heard in March, 1918, many well-known engineers being retained
sides. The Star received an adverse judgment, from which it ap
August. The final decision is not yet available.

STERLING MINING CO., LTD.

Address: J. J. Presley, pres., Kellogg, Idaho.

Inc. 1903, in Idaho. **Cap.**, $1,500,000; shares $1 par.

Property: 12 unpatented claims, 240 acres, in Lake creek, 1
W. of Wallace, Shoshone county. Contains a vein in Revett quartz
samples assaying 13% lead and 8 oz. silver per ton. Developed by a
Examined by R. S. Merriam of Wallace.

STERLING SILVER MOUNTAIN M. CO.

Address: 323 Lindelle Block, Spokane, Wash.

Officers: R. L. Brainerd, pres.; Harry Mac
ner, Shoshone county. Vein
Development: by cro
Equipment: includes
Six men employed. A pro

STEWART MINING CO.

Offices: 1482 Broadway,

ers: J. E. Harrington, pres.; J. L. Williams, sec., with W. H. Weed Harrington, directors. C. C. Griggs, Western mgr. of mines; D. J. ot., in Nevada; W. A. Beaudry, gen. mgr., in Idaho. Nash Rockwood,

Aug. 29, 1902, in Idaho. **Cap.**, $1,250,000; shares $1 par, increased 6. to $3,000,000; shares $1 par; 2,738,362 outstanding. No bonded in- ss. J. L. Williams, New York, transfer agent; Metropolitan Trust Co., rk, registrar. Annual meeting in August. Listed on Boston and New rbs.

pany controls the Coeur d'Alene Development Co. through ownership 8 of 1,000,000 shares; also the Nabob Consolidated Mining Co., holding shares.

ent assets, June 30, 1917, amounted to $159,966, and liabilities, $21,996. ater the respective totals were $256,787 and $100,525. The surplus was in 1917, and $484,486 in 1918.

nuary, 1920, the matter of arranging additional finances for subsidiaries r consideration. On Jan. 23, 1919, there was assigned to the American & Refining Co. a mortgage by the Nabob Consolidated covering the ill in lieu of advances made by the A. S. & R. Co. to the Stewart o.

dends: paid at the rate of 10c quarterly from 1913 to Dec., 1915, a dividends amounting to 32½c. in 1913; 62½c. in 1914; 70c. in 1915. reduced to 5c. quarterly in 1916. None since then.

erty: the Stewart mine at Kellogg, 8 claims, partly patented, 150 long the outcrop of the contact 2,000' carries silver-lead ore averaging ton. Country rock is soft Burke quartzite. Output during 1914 and aged 500 tons daily, but declined to 125 tons in 1916. The mine is worked out, and as extensive development work in 1915 failed to ew orebodies, management purchased properties at Tuscarora, Nevada, oeur d'Alene Development Co. property, which adjoins the Stewart. uscarora property is estimated to contain from 400,000 to 600,000 tons for which a 300-ton mill has been erected.

ho the Nabob and Denver mines on Pine creek were bought. A mill eted Sept., 1919, at the Denver mine. Country rock is one of the sedimentary series, known as Prichard slate. Veins of these mines sures cutting the bedding planes of the slate at nearly right angles. common, though not troublesome. Lead occurs as galena and zinc e. This group, which see under Nabob Cons., is developed by

ent: the Stewart mill at Wallace, 12 miles from the mine, has ity of 500 tons. It includes crusher, 4 sets of rolls, 2 Huntington, 12 s, 18 Frue vanners, 35 Harz jigs, 4 Deister slime-tables, and a flota- oncentration ratio is 6 into 1, the product averaging 50% lead and re run. About 200,000 tons of tailings are still available for treat-

n: few figures are available. In 1915, 189,615 tons of ore was 0,363. The profit from this was $554,433.

ny has been searching for new properties for some time, and ldaho has been investigated and considered, including the Old Sport Bunker Hill & Sullivan Co. comprising 26 patented claims, 2,000 acres, ... on which $10,000 was spent before the option was relinquished. ... with the Cursaro Mining Co., was decided adversely, April, 1915, ... contained ... ore illegally extracted.

... company under the ... dividends for two

... capped ... worth

of ore, but property was abandoned when this vein was worked d development work was under way in 1917 and 1918, but no detail

SUCCESS MINING CO., LTD.

Office, Wallace, Idaho.

Officers: Franklin Pfirman, pres.; E. C. Walker, v. p.; H. treas., with W. R. Mullan, and M. L. Mahoney, directors. A asst. sec.; F. W. Skeels, mgr.

Cap., $1,500,000; shares $1 par, all issued; assessable, an 2 cents was called November 29, 1919. Listed in Butte, Spokane York Curb.

Dividends: suspended April 20, 1913, totaled $345,000 to sumed April 30, 1915, and $550,000 paid in 1915; $345,000 to July since.

Financial statement: at end of 1916, current assets wer excess of liabilities, and $15,587 at end of 1917. The new manag profits amounting to $23,915 for the first two months of 1918. are available since then. The mine had been worked at a loss of July, 1916.

Litigation with the adjoining Alameda company, which cla for ore, said to have been extracted from its ground by Success, v favor of Alameda Co., but the Success Co. appealed and won. lowed by the Alameda appealing, but the court dismissed case in N

Property: 8 claims on Nine Mile creek, 2 miles N. W. o one of the oldest located properties in the Wallace district; firs the Granite Mining Co., taken over in 1905 by H. F. Samuels, w the Success Mining Co., continued under his management unti control passed to "practical" mining men and brokers, and large bl aggregating over 1,000,000 shares, were worked out through the Duluth, Spokane and Butte exchanges.

The company had considerable publicity during 1917, due to st tion, said to have been aided by the management, and to friction management and several publications on mining news. This wa by the seeming aversion of the directors to take stockholders into the especially in connection with the new smelter contract with the Gras Co., effective May 1, 1916. The distrust of the management culm 1916, in the Success officials being summoned to court to show why should not know the terms of contract. This covered 2,000 tons 3 years, with minimum zinc content of 38%, and maximum lea certain prices.

The old management was ousted in Dec., 1917.

The results of operations since Jan., 1918, show that unless a m smelting contract is secured it is advisable to abandon the mine exposed is extracted. A new shoot of lead-zinc ore reported op 1,500′ level in 1918, proved but a temporary help and in April, 19 was closed down, largely on account of an unfavorable and unpro ment contract with the Grasselli Chemical Co.

Geology: according to U. S. G. S. Prof. Paper, No. 62, there the ore occurring in masses of irregular form and size, which are chi ments of quartzite in places where it has been most thoroughly fis ore is strictly confined to the sedimentary rock; surrounding cou monzonite. Some discussion as to the geologic features of the mine the "M. & S. Press" of April, 1918; also in the 1918 report of the Sta of Mines for Idaho. Ore carries zinc, with lead and silver.

Development: by tunnels to 700′ level, and by shaft from 7 level. From July, 1916, to Feb., 1918, 4,000′ of driving was done o 1,300, 1,400, 1,500, and 1,600′ levels, and 480′ of sinking, revealing 25, ore. Two years' work above the 1,200′, amounting to 5,000′, expo tons of ore. Exploration was practically confined to the known or ground to the east was to be explored during 1918, and it is report 1,500′ level shows 6′ of high-grade zinc ore and considerable lead.

nt: includes a 250-ton mill, employing flotation.
on: in 1916, was valued at $693,045 from ore mined and flota-

was operated during part of December, 1918, and January, 1919. 1919, the mine was closed indefinitely, excepting for work being e 700′ level by lessees, who were reported making regular ship-

NNER MINING CO. IDAHO
1918, by Sunshine Consolidated Mining Co., which see.
CONSOLIDATED MINING CO. IDAHO
C. E. Mallette, Jamieson Block, Spokane, Idaho.
1918. **Cap.,** $2,500,000; shares $1 par.
: a consolidation of the Idora Mining Co., Parrot Mining Co., Mining Co., Sunshine Mining Co., Toughnut Mining Co. and Tus- Co., all operating on Beaver creek, Shoshone county. The Con- udes about 30 claims on which over 15,000′ of work has been done ls, the Idora having one of 5,000′, and the Tuscumbia one of 4,000′. o drive a main working tunnel to serve the group and to open ore er depth. Orebodies are in Prichard slate, and carry lead, silver,

nt: each mine has suitable machinery and buildings, including t the Idora, Sunshine, and Tuscumbia mines, drills, and aerial ton concentrator employing flotation at the Idora.
n: the Idora and Tuscumbia have shipped ore and concen- ral years, but figures are lacking.
olidation should ultimately benefit these 5 properties, which have d development for want of funds.
MINING CO., LTD. IDAHO
1918 by Sunshine Consolidated Mining Co., which see.
E MINING & EXPLORATION CO. IDAHO
Wallace, Idaho.
: a group of claims near Wallace, at the mouth of Big creek, nty.
nent: by a crosscut tunnel (1,000′ long Sept., 1919,) in which d the vein would soon be cut.
K & CUSTER CONSOLIDATED MINING CO. IDAHO
Wallace. Idaho.
J. J. Day, pres., gen. mgr. and treas.; E. R. Day, v. p.; H. L. h R. M. Walker, E. H. Knight, E. Boyce, and F. M. Rothrock,

, in Nevada. **Cap.,** $2,000,000; $1 par; 1,776,250 issued.
statement shows net profits for 1914, $187,063; for 1915, $346,796; ,746; and $350,857 in 1918.
s: initial of 2c per share was paid May, 1916; total in 1916 was 37 in 1917; $53,287 in 1918; $56,287 in 1919; total to end of 1919

: about 40 claims and fractions, acquired from the old Tama- peake and Custer companies, on Nine Mile creek, Coeur d'Alene hone county. The Hercules mine nearby is controlled by the . Ore carries galena with silver values and as mined is part direct part concentrating material.
pany, together with the Hercules interests, built and operates the t Northport, Wash.
cific information is available concerning this company, the policy ticence that has resulted in much criticism in the past being com- in 1917 the 500-ton Frisco mill at Gem was purchased fr g Co., for $150,000, also the 8,000′ Hercules aerial tram. d 2½ miles to connect the mine and mill. In June, 1919 umed after 3 months' suspension. The remodeled mill in About 350 men employed when operations are normal.

Production: during 1917, aggregated 16,916 tons shipped $1,338,321, yielding $350,857 net profit.

TEDDY MINING & MILLING CO., LTD.

Address: J. B. Cox., sec., Kellogg, Shoshone county, Idah

Cap., $1,000,000; shares $1 par; assessable.

Property: 7 claims and a mill-site, 1 mile E. of Kellogg, sh 1 of about 15' width, carrying copper ore with quartz gangue, an 12 to 35' width, carrying silver-lead ore giving assays up to 12% le silver per ton.

Development: by crosscut tunnels of 100' and 550', and to of workings.

Property is leased to Kellogg and Wallace people.

TERRIBLE EDITH MINE

Address: Washington Snyder, Murray, Shoshone county, I

Property: 4 claims, 1½ miles E. of Murray.

Development: by 1,300' crosscut and 1,700' of drifting, op zinc ore of shipping grade. Several shipments of 50% ore were to 1916, and that years' output returned $100,000.

TUCKER MINING & MILLING CO.

Address: Box 551, Wallace, Idaho.

Officers; Peter Bahn, pres. and gen. mgr.; J. Pearson, v. p.; sec.-treas., all directors.

Inc. June, 1908, in Idaho. **Cap.,** $1,000,000; $1 par; assessa issued; given in exchange for the property. Annual meeting in Ju

Property: 6 claims, unpatented, 120 acres, in the Hunter d shone county, 3 miles E. of the Snowstorm and 7 miles E. of the Mo Revett quartzite, cut by a diabase dike with veins, 1 to 4' in surfac to carry silver ore.

Development: by a 1,000' tunnel. There is no equipment or to describe. A prospect.

TUSCUMBIA MINING CO.

Absorbed, 1918, by Sunshine Consolidated Mining Co., which s

TYLER MINING & MILLING CO., LTD.

Address: Albert Hausaman, sec., Burke, Idaho.

Cap., $1,000,000; shares $1 par; assessable.

Property: 8 claims, 17 miles from Burke, Shoshone county, Montana side of the divide. Ore carries lead and silver and has by 700' of workings.

VIENNA-INTERNATIONAL MINING CO.

Address: R. A. Marshall, sec., Wallace, Idaho.

Officers: A. H. Featherstone, pres.; Geo. Moison, v. p.; R. sec.-treas., with A. B. Livingston and W. B. Lively, directors.

Cap., $1,500,000; shares $1 par. Annual meeting first Tues tember.

Property: 6 claims, 3 patented, and a mill-site, near the mou gulch, on Placer creek, 6 miles S. of Wallace, shows banded slates a of the middle part of the Newland formation, striking N. 50 to 60° 70° S. Principal vein has a quartz-siderite ore-body, 3 to 5' wide almost E.-W. and vertical dip. Ore on the dump shows galena, pyr copyrite in a quartz-siderite gangue of too poor a grade to be pr centrated.

Development: by a 400' shaft, and 2 tunnels of 700'. Mine w to Spokane people in 1916, but the bond was forfeited in 1917. C did a little more work, but finally suspended development in 1918.

WALLACE MINING, MILLING & REALTY CO.

Address: M. R. Evans, [illegible] Wallace, Idaho.

Property: 9 claim[illegible] Shoshone county, and [illegible]

Development: by [illegible]

need 4' daily in Oct., 1919. Is equipped with electric power,

SING CO. **IDAHO**

Owen, Kellogg, Idaho.
Carnochan, pres.; D. W. Price, v. p.; J. D. Owen, sec.-
rothers, directors. W. A. Beaudry, mgr.
7, in Washington. **Cap.**, $500,000; increased to $600,000
essable.
25-year lease on 60 acres of patented ground in Ward-
pany has definite development plans and sufficient funds.
es are the Caledonia, Last Chance, and Bunker Hill & Sul-
n producers.
by 230' shaft and over 1,000' of lateral workings. The
ontinuation of the Caledonia vein on the east side of the
rosscut tunnel. This was 500' long in January, 1920.

ON MINING CO. **IDAHO**

ion of Aurora-Sampson and H. E. M. companies.
L. Collins, sec.-mgr., Old National Bank Bldg., Spo-

I. Anderson, pres.; Eric Hagnan, v. p.; B. L. Collins,
ns, Spokane; J. E. Burbank, Cheney, Wash; P. A. Bounds,
Wm. Holm, Wm. Bjorklund, directors.
in Idaho. **Cap.**, $200,000; par 10c; 1,800,000 shares is-

claims 2½ miles N. W. of Wallace, known as Aurora-
E. M. groups. **Geology:** fissure veins in quartzite and

aggregates 9,000'; chief working or main tunnel extended
sterly drift exposed 10" ore for 175' at depth of 1,400' below
t ran 58% lead and 58 oz. silver per ton.
00-ton concentrating mill at Wallace was sold in 1918 to the
Co. of Washington.

INING CO. **IDAHO**

mpire State Bldg., Spokane, Wash.
on Webster, pres.; J. V. Pohlman, sec.-treas., with A. A.
ssell, directors.
gton. **Cap.**, $1,500,000; shares $1 par; assessable; 1,450,-

tented claims opposite the Hecla mine, Burke, Shoshone

company was prospecting in quartzite for the Hecla lead-
gs to depth of 650' totaled 1,750'. No recent returns.

MINING CO. **IDAHO**

Martin, Mullan, Idaho.
Davey, pres.; Wm. Flood, v. p.; J. L. Martin, sec.-treas.;
and T. E. Cosgrove, managing directors.
par; assessable.
atented, 7 unpatented claims about one-half mile from
ownsite. The claims show a large body of quartz sprinkled
ave been exposed by surface workings.
a crosscut tunnel is being extended to cut downward
exposed on the surface, and late in 1919 it was near the vein.

E MINING CO. **IDAHO**

pres. and gen. mgr., Wallace, Idaho. H.

assessable.
and Alhambra mines on west
mine.
shows a vein said to carry occasional
being done at last advice.

WISCONSIN MINING CO.

Letters sent to Kellogg returned unanswered.

Officers: Louis Bolduc, pres.-treas.; P. Mason, v. p., with J. Jones and J. W. Thompson, directors; J. S. Ross, sec.

Inc. 1912. **Cap.,** $1,500,000; $1 par; assessable. Company is the successor of the Gold Leaf Consolidated Mines and the Coeur d'A solidated Mining Co., the shares of the old companies being made share for share in the new company, upon payment of back assessm

Property: 4 claims, unpatented, 2½ miles east of Kellogg, h tunnels and crosscuts and one 90' vertical shaft, developing a vein width, carrying copper ore and a little lead.

Equipment: includes a 2-drill compressor, run by water po Moon creek, and a hoist. Development work only has been done

WONDERFUL MINING CO., LTD.

Office: Otterson Blk., Wallace, Idaho. A. H. Featherstone,

Cap., $1,500,000; shares $1 par; assessable.

Property: 4 claims, patented, near Mullan, Shoshone county, of the Bullion mine, on the eastern slope of Stevens peak. A 120 tunnel developed a vein said to give a fair showing of galena and No further information is available.

YANKEE BOY MINING CO.

Address: D. W. Price, Kellogg, Idaho.

Property: up Big creek, near Kellogg, Idaho. Ground below is leased until 1920 to Big Creek Leasing Co., which see. Palmer, S others are leasing the upper workings.

Development: includes 3 tunnels, one 2,150' long, opening ve copper ore.

Equipment: includes gasoline engine and compressor. A mi built.

Production: see Big Creek Leasing Co. The other lessee 1918, shipped one car of 200 oz. and another of 340 oz. silver ore; ore grade was mined in 1919.

A small mine with promising prospects.

YUKON GOLD CO.

Office: 120 Broadway, New York.

Officers: see description of company in United States sectio book. D. H. Ferry is in charge at Murray, Idaho.

Property: acquired in 1916 from Coeur d'Alene Mining Co., on creek, near Murray, Shoshone county. Estimates in that year showe cu. yd. of gravel, containing $1,350,000 of gold, or about 16 cents per

Equipment: a 7½-cu. ft. dredge with steel hull was moved fr son, Yukon territory, in 1917, and started work in December of that y electrically driven, current being transmitted 11 miles from the Burke of the Shoshone County Power Co.

Production: from Dec. 4, 1917, to Dec. 30, 1918, a total of 1,4 yd. was dug, yielding 12.97c. per yd. at a cost of 7.3 cents. The total profit was $82,305.

ILLINOIS

The metal mine output of Illinois is practically confined to lead and These come from two distinct areas of very different geologic charact of northern Illinois occur in gently folded dolomite and limestone [O Platteville beds] of Ordovician age. The deposits of Harden and Pa occur with fluorite in known veins, controlled by crushing and fault fissure limestone in the [illegible] of the Kinderhook formation Zinc [illegible]

1918 were valued at $1,021,081, compared with $1,123,897 in 1917.
e ore in the northern fields may be judged from the following:

	1917	1918
s	237,340	280,900
	1.63	1.60
	0.18	0.50
rates, per cent	29.30	35.70
trate, per cent	75.40	75.50
oncentrate, per ton	$26.18	$28.72
oncentrate, per ton	99.83	87.09

rmation of real value is obtainable from mine-owners in this
our frequent requests for same, so we give the material as re-
r correspondents and various other sources.

ZINC CO. OF ILL. **ILLINOIS**

y of the Amer. Z. L. & Sm. Co. and described under that title.
St. Louis and Hillsboro, Ill.

MINING CO. **ILLINOIS**

lena, Ill.
. H. Billingsly, pres.-mgr.; J. W. Westwick, v. p.; R. I. Mc-

, 1918, in Illinois. **Cap.**, $100,000; $100 par. Company is
Burr Mining Co.
60 acres of zinc-lead land, 1½ miles N. W. of Galena.
ent: 230' shaft to be sunk. **Equipment:** mill handling 200 tons
hour shift.

NG CO. **ILLINOIS**

Connersville, Ind. Controls the Blewett Mng. Co., which see.
F. C. Bosler, pres.; Jos. R. Mountain, v. p.; P. H. Kinsler,
H. Billingsly, gen. mgr., Galena, Ill.; J. H. Banghman, directors.
cons. engr.
diana and Wisconsin. **Cap.**, $30,000; shares $100 par.
the Treganza lease, 40 acres mineralized land, near Galena,
aft develops sheet-ground formation. Output was zinc concen-
at the rate of 160 tons of 45% concentrates weekly, at last

LE ZINC CORPORATION **ILLINOIS**

llinsville, Ill.
Otto F. Meister, pres.; R. W. Barrell, treas.; W. R. Wild,
W. Schultz, Joseph Carr, and C. D. Lukens, directors. A. F.
r., H. E. Gillaspy, gen. supt.; A. J. Meier, director of operations;
upt of Lost Hill mine.
1919, company issued $500,000, 7% first mortgage, convertible
January, 1929.
the Lost Mill mine of 80 acres at Moselle, Missouri, esti-
n 300,000 tons of zinc-lead ore and barite. Also a smelter at
of 50 tons daily capacity of metallic zinc, complete in every
ginal plant was erected in 1873. Property and plant said to
ned by the St. Louis Sampling & Testing Works, Inc.
he bond issue was to equip a quarter of the smelter for the
30 tons of lithopone daily. The demand for this pigment (mix-
ium sulphate and 30% zinc sulphide) is reported large and in-

AD CO. **ILLINOIS**

Broadway, New York, N. Y.
at Alton, Ill.

NING CO. **ILLINOIS**

ter Trust Bldg., Indianapolis, Ind.
ia, Ill.

GREAT WESTERN LEAD MANUFACTURING CO.

Letters returned unclaimed in 1919 from Galena, Ill.

Property: the Pittsburgh lead mine was the second largest northern Illinois. Workings are down 140' and a 100-ton mill wa last report.

GREAT WESTERN SMELTING & REFINING CO.

Office: 41st and Wallace Sts., Chicago, Ill.

Officers: Ivan Reitler, pres.; Zachariah Lippe, sec.; Josu treas., with David Blum, Emile Benjamin, A. Glanz and Adolph Salt Samuel Spiro, mgr.; Charles Granberg, supt.

Inc. in Maine. **Cap.**, $30,000; $100 par; 18,000 outstanding.

Company is a smelter and refiner of metals, mostly secondary has branches at Atlanta, Cincinnati, Cleveland, Portland, Ore., St Francisco, Seattle and Vancouver, B. C. The copper furnaces at a capacity of 7,000 tons per annum.

HEGELER ZINC CO.

Operates a zinc smelter at Danville, Ill.

ILLINOIS ZINC CO.

Operates a zinc smelter at Peru, Ill.

JOPLIN SEPARATING CO.

Address: Galena, Ill.

Company has a roasting and magnetic separtion plant of 50 ton 10 hours. Mill product carrying 16 to 40% zinc is partly roast sizing) in a rotary tube, and then passed through a Cleveland-Knowl which gives a 58% product.

LANYON ZINC & ACID CO., R. H.

Operates a zinc smelter at Hillsboro, Ill.

MATTHIESSEN & HEGELER ZINC CO.

Office: La Salle, Ill.

Officers: C. B. Lihme, pres.; Mary H. Carus and G. P. F. W. Matthiessen, Jr., with F. W. Westmore, directors.

Owns and operates large zinc oxide and spelter furnaces, etc., a buyer of pure and high-grade zinc ores from the Missouri-Oklaho consin fields. Is also a manufacturer of sulphuric acid, zinc shee ribbon.

Company also has a mine in Illinois, producing coal for use at Officers of the subsidiary are Joseph Brennemann, pres.; G. B. Blow Lihme, sec.; H. C. Nichol, treas.; M. A. Field, mgr. and D. McCri

MINERAL POINT ZINC CO.

Subsidiary of the New Jersey Zinc Co., 160 Front St., New office: Galena, Ill.

Property: the Marsden-Black Jack, the largest lead and zi in northern Illinois, 3½ miles S. of Galena. The mine is on the so of profitable ore in this district. The deposits were found in Ma Stephen Marsden, who extracted a large quantity of lead and zinc it in 1877 to the Illinois Zinc Co. of Peru, Ill., for $30,000. This co the Marsden until 1885, mining up [illegible] tons of both classes of o for a while. [illegible] prices of ore, 51 [illegible] caused a shut-down in mill was re[illegible] 1893, but did [illegible] until 1907. The Marsde Mining Co[illegible] week in 1907 [illegible] until spring of 19 drop in pri[illegible] to another [illegible] The mine wes reope See same [illegible] Wisconsin [illegible] details.

NATIONAL [illegible]

Office: 61 [illegible]

Roasting [illegible] Ill. C supt. at Illino[illegible]

NORTHWEST [illegible]

E., near the Illinois-Wisconsin line, and close to rail. The ed by the company. Ore in the Northwestern occurs in thin regular fractures, consisting mainly of blende and galena. The 21' deep. The Paragon is an old mine, one lease dating back to ,000,000 lb. of lead was mined from above water-level. Shafts 10' deep. Ore carries lead and zinc. Equipment consisted of ngine, compressor, hoist, etc.

LEAD & FLUORSPAR CO. **ILLINOIS**

merican Security & Trust Bldg., Washington, D. C.; and

is opened to 500'. Mill has 500-ton capacity. It is the largest n southern Illinois.

ZINC CO. **ILLINOIS**

zinc smelter at Sandoval, Ill.

LL ZINC CO. **ILLINOIS**

Platteville, Wisconsin.

the Unity and Graham mines in the Galena district, just inois-Wisconsin line. The former is the third largest zinc pro- ate. Milling consists of sorting, rolls, trammels, jigs, rolls, and See same company under Wisconsin.

ZINC CO. **ILLINOIS**

of the American Zinc, Lead & Smelting Co., 55 Congress St.,

Platteville, Wisconsin.

the Birbeck zinc mine in the Galena district, northern Illinois.

INDIANA

ZINC PRODUCTS CO. **INDIANA**

eencastle, Ind.

). W. Kerr, pres.; F. W. Stillwagon, v. p.; J. H. Dietz, sec. io. Cap., $1,000,000

nodern zinc-rolling mill on Pennsylvania railroad, with y of 1,000 to 1,500 tons of zinc plates and sheets. Described by 'E. & M. Journal" of Nov. 2, 1918.

ONAL LEAD REFINING CO **INDIANA**

go, Ind. Is a subsidiary of the International Smelting Co., and under, in United States section.

KANSAS

nd lead fields in the State just north of the Oklahoma boundary, n of the Miami district. The low price of spelter curtailed mine the latter part of 1918, though the production for the year was ed, the value being $6,525,638, a gain of $1,874,000. According eological Survey, the total output for 1918 was 1,025,400 tons, 903,400 tons in 1917. The metallic content is shown in the :

	1917	1918
.....	903,400	1,025,400
.....	2.49	3.27
.....	0.33	0.70
e, tons.....	38,766	55,979
te, tons.....	3,929	9,083
ncentrate, per ton.....	$68.96	$52.48
oncentrate, per ton.....	93.91	90.90

output was 77,744 tons of blende and 15,256 tons of galena, worth

operators of other States, those of Kansas and the Tri- are rather secretive as to details of organization and mine

operations, a result of local competition and conditions. Th
this section have been checked so far as possible, but are not c
a relatively few cases.

ABBOTT, REBHOITZ & STEWARTY MINING CO.

Address: J. J. Abbott, supt., Baxter Springs, Kan.

Mill and power plant erected in 1918.

ADMIRALTY ZINC CO.

Address: Douthat, Okla. F. M. Aiken, Tulsa, Okla., pr
ton, mgr.; John Griffard, supt.

Inc. in Delaware. **Cap.**, $750,000.

Property: 180 acres in Oklahoma and Kansas, shows a
between lime and flint, carrying zinc-lead sulphides, said to
metal content.

Development: by vertical shaft to depth of 220'.

Equipment: includes 8"x8" hoist, 3 compressors, 4 electri
way and 4 mills, with a daily capacity of 1,200 tons. Ore treate
amounted to 51,200 tons, concentrates averaging 62.50% zinc a

Recent production has been as follows: in 1915, 936,750 lb.
lead; in 1916, 6,085,400 lb. zinc and 1,014,200 lb. lead. See s
Oklahoma.

AKSARBEN MINING CO.

Address: John Voorhees, pres., Anita, Iowa.

Property: a lease on the Cooper tract, just south of
Operates mine whose output is concentrated in a mill erected i

AMBER MINING CO.

Company composed of J. C. Jennings, Robert Christy, J.
D. Bogam, of Muskogee, Oklahoma.

Property: a lease on 20-acre tract near Lincolnville, on
Six per cent. ore reported cut by drill in 1918.

ANDAYER MINING CO.

Office: Joplin, Mo. Harry L. Ayer, treas., 8 Hawley St.
Is a close corporation, consisting of four stockholders, with n
Kansas. Company has no stock for sale and refuses to furnish

ANDREW BROS. MINING CO.

Address: Galena, Kan.

Production: about 40 tons of blende (60% metal) per we

BADGER MINING & DEVELOPMENT CO

Address: 103 Miners Bank Bldg., Joplin, Mo.

Officers: A. W. Glasgow, pres.; A. W. Baker, sec.; J. B.

Inc. 1917, in Missouri. **Cap.**, $250,000; $1 par.

Property: a lease on 210 acres at Badger, Kansas, develo
from 95 to 185' deep. Ore is high in lead. A 250-ton mill w
Production is said to approach $1,000,000.

BENDENE MINING CO.

Office: 728 American Bank Bldg., Oklahoma City, Okla.

Officers: J. S. Pine, pres.; Will Brird, v. p.; M. G. Mer
J. R. Green, supt.

Inc. Jan., 1918, in Oklahoma. **Cap.**, $200,000.

Property: 20 acres south of Baxter Springs, Kansas, n
Zinc occurs in the usual sheet formation, and is 25 to 35' thick
shaft 90' deep.

Equipment: 400-ton mill (10 hours), closed since late
to be reopened by 1920.

BETHLEHEM ZINC CO

Office: 225 Lee Bldg., Oklahoma City, Okla.

Officers: [illegible]

Cap., $50,000

60 acres at Lincolnville, formerly owned by the Oklahoma
dissolved. Lead ore occurs in a deposit 25 to 45′ thick.
t: shafts are 118 and 130′ deep **Equipment:** 300-ton mill,
reconstructed.

ING CO. **KANSAS**

T. Whaley, pres.; L. R. Ealestor, supt., Treece, Kan.
)-acre lease N. of Treece. Ore was found by drills at 194′.
o shafts.
250-ton mill moved from the Dorris mine at Quapaw, Okla.
ground assaying 30.6% zinc and 17.18% lead has been treated.

NING CO. **KANSAS**

G. Bailey, sec., Muskogee, Okla.
A. Setle, pres.; J. J. Poole, v. p.; with J. E. Horshal, supt.;
S. Goldsmith, E. C. Wright and F. C. Hoffman, directors.
n the Chubb land, also on Cooper land, 5 miles west of Baxter
afts were sunk and 250-ton mill built during 1918.

AD & ZINC CO. **KANSAS**

A. Frates, pres., Miami, Okla.
lease S. W. of Baxter Springs. Drilling exposed ore at
t.

ND MINING CO. **KANSAS**

an Hoffman, Treece, Kansas.

) MINING CO. **KANSAS**

Bryant Bldg., Kansas City, Mo.
m. Kenefick, pres. and treas.; J. W. Hoffman, v. p.-mgr.;
.; N. Wagner, supt.
Kansas. **Cap.,** $20,000; $100 par. Gross returns from ore
07 in 1917.
45 acres, 7 miles S. W. of Baxter Springs, Kansas. Ore
lead, totaling 9.11%. Company controls the adjoining Blue
.
t: with the Blue Diamond, 5 shafts, 210′ deep. Mules are
for haulage.
modern mining and milling plants on both properties. The
t 600 tons in 24 hours, and produce from 1,000 to 1,500 tons of
hly, that averages 61.5 to 62.5% metallic zinc.

G CO. **KANSAS**

lena, Kan.
24 tons of blende (60% metal) per week.

ING CO. **KANSAS**

mer Mayerhoff, Commerce, Okla.
)-acre lease N. W. of Treece, Kan. Drill-holes show an
of 205′. Shafts were sunk and a mill erected in 1918.

IG CO. **KANSAS**

lena, Kan.
5 tons of blende weekly.

AD ZINC CO. **KANSAS**

plin, Mo.
E. Head, Tulsa, Okla, principal owner; A. Rowe, gen. mgr.;
upt.
lease on the Cooper land, just N. W. of Picher, Okla., in
Blue Mound mine. Twenty-five drill-holes showed 7% ore.
t: by 2 shafts, ore occurs at depth of 175 to 255′. A large
uilt at last accounts.

INING CO. **KANSAS**

x 205, Miami, Okla.
A. Frates, Sr., pres.; J. A. Frates, Jr., v. p., with W. Mat-
Brooke (gen. mgr.), directors. J. H. Grant, sec.; G. E. Matt,

homa, **Cap.,** $300,000; $10 par; 8,000 issued.

Property: lease on three 40-acre tracts N. of Picher, Okla., the Kansas line, under development. Royalty payable is 10%.

Development: 12 test holes showed ore from depth of 315 to 3 samples assaying up to 16% zinc. The ore is a dissemination in lime ment done is considered to justify an expenditure of $200,000. A 20 will be moved from Joplin to the mine.

BUNKER HILL MINING CO.

Address: Charles Clark, supt., Baxter Springs, Kan.

Property: S. W. of Baxter. Drilling exposed good ore at 15 and a large mill was erected in 1918.

BUTTE-KANSAS MINES CO.

Address: Box 433, Joplin, Mo.

Officers: C. I. Stralem, pres.; John MacGinnis, v. p.; L. P. E mgr.; D. C. Corner, supt. Halgarten & Co., 5 Nassau Street, New Y agents.

Property: a lease on 120 acres, in Cherokee county, Kansas, acres in the Waco camp, Joplin district, Missouri. Ore carries 8% Reserves placed at 750,000 tons. Orebodies are long but narrow with 5

Development: by five 200′, one 120′ and one 160′ shaft in Kan

Equipment: steam power plant, air-compressors, oil engines, mills (in Kansas) of 500 tons capacity in 10 hours. The 400-ton mill Mo., was burned in Dec., 1918.

Production: 300 tons of concentrate monthly, assaying 62.5% 0.05% lead. Costs are $1.70 per ton for mining and 40 cents for milli of $2.10.

CATHOLIC MINING CO.

Address: Lincolnville, Kan. Fathers Wagoner and Ketchum,

Property: the Alabama Coon, S. E. of Lincolnville. Formerly by hand jigs, but mill was to be built at last accounts.

CHANUTE SPELTER CO.

Subsidiary of American Metal Co., Ltd.

Offices: 61 Broadway, New York; Frisco Bldg., Joplin, Mo Burke Bldg., Baxter Springs, Kan. and 1625 Boatmen's Bldg., St. L

Officers: Sol Roos, pres.; J. F. Haley, v. p.-mgr.; Otto mg. director., with Wm. Simon and E. R. Rombauer, directors. G. asst. mgr.; T. J. Rightly, supt. of operations; H. E. Kingsbury sub-leasing, and M. M. Moritz, cashier.

Property: owns 628 acres and leases 17,000 acres in Cherokee Kan., selected after careful study of the geologic conditions gove occurrences in the district. About $1,000,000 has been spent in develo lease fees. Over 30 drills used to block out ore. Royalties vary from on sales-value of the ore produced. Water was troublesome during ing, 20 pumps were connected drill-holes. On 5 properties 700 Mills were erec 1918.

CO[illegible]US M. & D. CO

sold 1917 to rial Co. for $3,000, and a output.

CO[illegible] MINING CO.

Kansas-Oklahoma field.

Pich[illegible] Picher, the [illegible] At the L. Co[illegible] pt.: whi latter [illegible] Webs[illegible] ird mil homa [illegible] ommel and [illegible]

COOK & [illegible]

a 150-ton mill and complete mining plant was to be erected
its.

D MINING CO. **KANSAS**
M. M. DeArmond, mgr., Treece, Kan.
near Treece. By mid-1918 two shafts were down 160′ and
which was remodeled early in 1919.

MINING CO. **KANSAS**
Galena, Kan.
n: 65 tons of blende (60% metal) weekly.

MINING CO. **KANSAS**
C. Clark, supt., Baxter Springs, Kan.
200-ton concentrating mill, at Baxter Springs.

MINING & SMELTING CO. **KANSAS**
0 Broadway, New York.
O. K. Mining Co.

AD & ZINC CO. **KANSAS**
Galena, Kan.
n: 2 tons of galena concentrate weekly.

LKER MINING CO. **KANSAS**
l by Commerce M. & R. Co. The 250-ton mill at Baxter
lestroyed by fire, in 1918.

DEVELOPMENT CO. **KANSAS**
Carl Carmen, supt., Louisville, Kan.
one and mill contemplated at last accounts.

ON MINING CO. **KANSAS**
Baxter Springs, Kan. B. E. Brown, supt. for the controller,

zinc claims 7 miles W. of Baxter Springs. Drilling showed a
ong, from a depth of 225′ to 275′. Ore carries 7% blende.
e 250′ deep. The A. R. G. 400-ton (in 10 hours) mill, formerly
Mo., was rebuilt here.

IINING & DEVELOPMENT CO. **KANSAS**
a lease 1 mile N. of Baxter Springs. Ore said to have been
f 180′.

E AND SPELTER CORPORATION **KANSAS**
0 Exchange Place, New York, and Joplin, Mo. Works at
n.
Wm. Barrett Ridgely, pres., Salt Lake City, Utah. E. Allen-
Mo., treas.
, 1916, in West Virginia, to take over the property of the
Spelter Co., of Missouri. Cap., $2,000,000; shares $1 par,
$5 July, 1916; all issued and fully paid. Empire Trust Co.,
gistrar. Stock transferred at company's office.
initial one of 5.5% paid May 25, 1916, followed by others in

a zinc smelter at Pittsburg, Kan., about 37 miles from Jop-
t consists of 6 blocks of furnaces, each having 224 retorts, a
retorts. Two additional blocks, of 224 retorts, built in 1916,
any a total of 1,792 retorts and an estimated capacity of
of spelter annually.
months ended Dec. 31, 1916, gross income was $813,006, less
e purchased, leaving a gross profit of $266,267. Operations
leaving $56,506 net profit. Full capacity was not attained
low price of spelter in 1916.
s exploited by Ridgely & Co. (Geo. Graham Rice), of
arrett Ridgely, former Treasurer of the United States,
ad. On the New York Curb shares skyrocketted to $5
c. Appears to be a good property that was used for
ather than mine profits.

KANOMA ZINC CO.

Address: C. Playter, Treece, Kan.

KANSOURI MINING CO.

Address: C. B. Boylan, pres., Miami, Okla.

Property: a lease northwest of Treece, in Blue Mound terr drill-holes cut ore to depth of 270'. Two shafts were sunk an erected. Shut down at mid-1919 on account of metal marke

KING-BRAND MINING CO.

Office: Jefferson City, Mo.

Officers: A. W. Happy, pres.; D. W. Oberman, v. p.; F sec.-treas. Directors: Joseph Pope, Felix Senevey, Dr. C. Jordan, Horick McHenry.

Inc. August, 10, 1918, Missouri. **Cap.**, $20,000; $10 par, sold 100,000 shares.

Property: 45 acres in Cherokee county, Kansas. Ore co and zinc blende in limestone and is mined by 280' shaft. Or stated as equivalent to 26,000 tons of concentrates, with dumps.

Equipment: steam hoist, 650 cu. ft. compressor. Repor 1919, letting contract for 200-ton concentrator with flotation.

LADD MINING CO.

Mail returned unclaimed in March, 1919, from former Ladd, supt., Baxter Springs, Kans.

Property: north of Quapaw, Okla. Water interfered wi ing early in 1919. A 200-ton mill was to be built.

LAWYERS MINING CO.

E. G. McAdams, Oklahoma City, Okla., pres.; George Treece, Kans. at last accounts.

Property: 36 acres, west of Treece and near Monarch. mined and a 250-ton mill was erected late in 1918.

LENABEE MINING CO.

J. R. McCorkle, supt., Coffeyville, Kans., at last account mill was to be built in 1919.

LUCKY GIRL MINING CO.

Address: Emma Knell, sec., Carthage, Mo. W. H. Berr Wilson, directors.

Property: lease on Ballard land, 1½ miles west of Baxte

Development: drilling cut good zinc ore from 160 to 254' was sunk and 300-ton mill proposed in 1918.

LUCKY JACK MINING CO.

Address: G. K. Williams, Farmington, Mo., principal ow

Property: near Baxter Springs. Drilling showed ore at to 200'. Shaft sunk and mill operating at last accounts.

LUCKY JENNY MINING CO.

Address: Ira Turner, pres., Miami, Okla. Mine leased to George Sullivan in March, 1919.

Property: 4 miles W. of Baxter Springs, near Hocker holes drilled on the lease showed 3.6 to 19.9% blende, with places, and the dump contained 25,000 tons of rich ore. A was erected late in 1918.

LUCKY JEW LEAD & ZINC CO.

Address: Westville, Kan. John West, mgr., Picher, Okl

Officers: Ira Smith, pres., Commerce, Okla.; W. M. We [illegible] Controlled by Bowman-Hicks Lumber Co.,

[illegible] in Baxter Springs district, Kan., [illegible] drilled showed rich zin [illegible], 240' and 260' deep. Wa

a 300-ton mill was erected in 1919, and upwards of $200,000 been spent in preparing the property for production.

IINING CO. **KANSAS**

C. Hamilton, supt., Galena, Kan.
ll and mining plant was erected late in 1918. In January, 1920, being sunk to cut ore at 110′ depth.

MINING CO. **KANSAS**

0 Broadway, New York, and P. W. George, mgr., Baxter

f Federal Mng. & Sm. Co., of Idaho, which invested $171,- of 55% interest. First earnings are to be devoted to re-pay- at 6% interest, after which profits will be divided between rmer owners on basis of 55 and 45% respectively.
e Lucky O. K. mine in Kansas, just north of Hockerville. orizontal, being in chert, at depth of 180 to 230′, carrying d 3 to 15% of zinc. Mining is by room and pillar system. includes steam hoist, compressor, pumps, electric motors for general power, and 300-ton mill employing the flotation

s carry 61% zinc and 82% lead. One month recently of lead and 280 tons of zinc concentrates.

MINING CO. **KANSAS**

Screvner, supt., Lincolnville, Kan.
0.
of Lincolnville. A 200-ton mill was completed in 1919.

EWART MINING CO. **KANSAS**

ed to Harry Barndollar, Treece, Kan., returned unclaimed

erated a lease N. W. of Treece, Kan. A 300-ton mill was roperty from Duenweg, Mo.

NING CO. **KANSAS**

xter Springs, Kan.
erated a lease on the L. D. Brewster land S. W. of Bax- me extremely rich ore.

MINING CO. **KANSAS**

W. Stallings, supt., Treece, Kan.
lease N. W. of Treece. A 250-ton mill was moved from , to the ground in 1918.

QUEEN MINING CO. **KANSAS**

H. Berry, mgr., Baxter Springs, Kan.
lease just S. of Baxter. Eleven drill-holes showed ore from 120′. A shaft was sunk, hand-jigs cleaned some ore ex- nking, and 250-ton mill erected late in 1918.

NC CO. **KANSAS**

gentine, Kan.
ade 10 De Spirlet zinc-blende roasters, described in "Met. of January 1, 1918.

CO. **KANSAS**

ill was to be erected at the Old Abe mine in Lincolnville ccounts.

G CO. **KANSAS**

M. Kersh, Lincolnville, Kan.
ill was erected in 1918.

RO MINING CO. **KANSAS**

xter Springs, Kan.

LEY MINING CO. **KANSAS**

W. Wakeman, supt., Baxter Springs, Kan. Company was n mill, at last accounts.

QUEEN ESTHER MINING CO

Office: 805 Cosden Bldg., Tulsa, Okla.

Officers: F. M. Aiken, pres.; W. L. Curtis, v. p.; E. R. Perry Cosden, treas., also directors. W. B. Shackelford, mgr.; F. supt.

Inc. Aug. 18, 1915, in Oklahoma. **Cap.**, $50,000; $100 par; all Revenue from ore sales in 1918 was $47,388.

Property: a lease of 20 acres, 3 miles S. W. of Baxter Spr sas. A mine was worked at Webb City, Mo., until it was ex 1918, abandoned, and the machinery moved to present site. D dissemination of galena and sphalerite in limestone, at depths o and 120' to 240'. Ore assays 0.672% lead and 4.704% zinc.

Development: by 180' shaft. **Equipment:** steam and elect hoist, compressor, pump, and 300-ton mill with 3 jigs and 14 tab

Production: from July to Dec., 1918, 302,000 lb. of lead and 3 of zinc.

Mine is yet in development stage, but management con there are reasonable prospects for profits.

REBECCA MINING CO.

Address: Treece, Kan.

Property: 252 acres N. W. of Picher, just over the State li sas, was purchased a year ago for $30,000. Drilling revealed zinc ore. Two shafts were sunk and a 300-ton mill constructe

REDSKIN MINING CO.

Address: F. R. Bouldin, mgr., Treece, Kan.

Officers: M. T. Stauffer, pres.; Fred Shaw, v. p.; L. B. He treas.

Property: a mile N. of Picher, Okla., and a mile W. of Tr on the State line.

Development: rich ore was opened at depth of 50' and 30 engine driven) mill erected.

RIALTO MINING CO.

Address: Baxter Springs, Kan.

RIGHT GOOD MINING CO.

Address: W. T. Dunlap, mgr., Lincolnville, Kan.

Officers: Walter Glidden, pres.; E. D. Reed, v. p.; Arthur G

Property: a 40-acre tract W. of Lincolnville, in which 13 found ore at 72'. It is 15' thick, lying under flint formation. A sunk and a 250-ton mill proposed.

R. & N. KANSAS LINE MINING CO.

Address: W. A. Meece, supt., Joplin, Mo.

Property: a 70-acre lease just across the State line. Nineteen drilled, seventeen showing pay-ore. Lead starts at 116', contin where blende comes into 226'. Hand-jigs were used for a 250-ton mill was to be erected at last accounts.

ROYAL SHELL MINING CO.

Address: Baxter Springs, Kan.

SILVER FOX MINING CO.

Address: F. J. Childress, mgr., Galena, Kan.

Property: a lease 1½ miles N. W. of Treece, Kan. Picher, Okla., field. The 300-ton mill, erected in July, 1919, but was to be re-built.

SOUTHERN LEAD & ZINC CO.

Address: Charles Neal, supt. 676, Miami, Okla.

Property: [illegible] been sunk and a 500-ton mill [illegible] some.

E MINING CO. **KANSAS**
Galena, Kan.
: about 43 tons of blende and 9 tons of galena weekly during

NING CO., C. W. **KANSAS**
Galena, Kan.
: 35 tons of blende weekly.

G CO. **KANSAS**
ned 1919, from F. L. Cook, gen. supt., Galena, Kan.
mill was planned at last accounts.

ATES SMELTING CO. **KANSAS**
J. S. S. R. & M. Co., 120 Broadway, New York City; or D.
ce, Kan.
the Naylor tract; an extension of the Miami, Oklahoma de-
d in 1917. Drilling revealed enough ore to open the mine
ll. In 1918, developments came up to expectations.
also had zinc smelters at Altoona, Iola, and La Harpe, Kan.
917 the supply of natural gas for fuel was so irregular that
re all closed.

ILL MINING CO. **KANSAS**
. G. Trewatha, Baxter Springs, Kan.

MINING CO. **KANSAS**
. H. Phillips, mgr., Galena, Kan.
½ miles S. W. of Galena. Rich ore was opened to a depth
wn in the following log of one hole, in feet:

of ground	From	To	Thickness
ard white flint.....	...	59	..
th good ore.....	59	69	10
ith good ore.....	69	84	15
nt with 'shines'.....	84	114	30
.....	114	121	7
.....	121	181	60
ne flint.....	181	234	53
with good ore assaying for from each 4 ft., making an 6.8% zinc.....	234	274	40
od flint 'shines'.....	274	296	22
.....	296	300	4

by 2 shafts and equipped with a mill.
: was 43 tons of blende and 53 tons of galena per week dur-
art of 1918.

NIA MINING CO. **KANSAS**
V. W. Mucklow, Galena, Kan.

MAINE

OPPER MINE **MAINE**
Maine. Was operated by American Smelting & Refining
(?) tons of fluxing ore developed on property.

S IRON CO. **MAINE**
ederick Hill, pres.; Bangor House, Bangor, Maine.
e Katahdin iron mine, on the Bangor and Aroostock rail-
ore country, Maine, 85 miles from tidewater. Examined
Bayley for U. S. Geological Survey. Under option to
Street, Portland, Maine. Mine was worked from
, the ore being mined. Beneath this is
ft. wide and 2,300' long, estimated to contain 5,000,000
ntaining 47 [illegible] iron and 26 to 35% sulphur. It was
[illegible] and sell it for its sulphur con-

tent. Total costs of delivering ore to New York or nearby at $4 per ton under conditions prevailing in 1918 and $2 times.

MARYLAND

BALTIMORE COPPER SM. & ROLLING CO.

Address: Baltimore Copper Works, Fourth Ave. and Fif Baltimore, Md.

Officers: Jos. Clendenin, pres.; Wm. H. Peirce, v. p.; H sec.; Chas. N. Sappington, treas. Company succeeded the Cuba Smelting & Refining Co., which built the first Am smelter, 1845, and is controlled, through stock ownership, Smelting & Refining Co. (American Smelters Securities Co.)

Lands: 45 acres, located on one of the best harbors o seaboard, with direct rail connections, being advantageous both domestic and foreign business. The plant is large an cluding a nickel refinery, electrolytic plant, and sheet coppe The electrolytic refinery, of 1,000 tons daily capacity, has ar on both series and multiple plan. Material treated is enti and argentiferous, being received in the form of blister coppe western states, and from several foreign countries. Works 3,500 men.

GREAT FALLS MINE

Formerly called the Hill-Townsend gold mine, in Montg Md. In 1914 the old workings were cleaned out, the shaft re new drifts run. The 25-ton tube mill was only used to mak mined. Small shipments made to smelter with satisfactory re

MARYLAND CHROME CORPORATION

Address: F. A. Dolfield, pres., Canton National Bank more, Md.

Property: chrome deposit at Owings Mills, 15 miles fr opened in 1827 was the first chrome mine of this country.

UNITED M. M. & COPPER SM. CO. MD. AND PEN

Idle. **Office:** Frederick, Md. Mines at New London, M mian, Pa. A. L. Wickart, sec., Allentown, Pa.

Inc. 1913, in New Jersey, as a merger of the Eagle Metal and the Linganore Copper Co., now dead. Owns all th Linganore C. Co. **Cap.,** $2,000,000.

Property: 806 acres, in 2 groups, include the Dolly Hyde, and Eagle mines, on the Western Maryland and Baltimore roads.

The Dolly Hyde mine, 220 acres, was for many years copper property of Maryland, though never a large produc has contact deposits in dolomite and phyllite carrying a l in the upper workings, succeeded at shallow depth by bor copyrite in white marble.

The New London or Linganore mine, 2½ acres, with 14 a land, was opened and worked 1835-55, apparently at a profit after 1861, until reopened, May, 1907, but is again idle. The two 4 to 5' fissure veins in slate, with N. E. strike carryin gray copper, estimated to average 3% copper and to be with a trace of gold. Development is by a 230' shaft and 4 l 340', with a total of 1,085' of workings, estimated to block of ore for stoping.

rage width, carrying native copper, chalcocite, bornite, tetrahedrite, averaging about 2 oz. silver per ton, with Mine has a 480' shaft at 40° incline, in ore from surface, o 6% copper, but is worked opencast.
ncludes a 175-ton smelter and 150-h. p. steam plant.

MASSACHUSETTS

UR ORE CO. **MASSACHUSETTS**

3. Stranahan, pres., 65 Wall St., New York.
New York. **Cap.**, $25,000; $100 par; all issued.
old and long-worked pyrite mine at Davis, Franklin e several years.

D MINING CO. **MASSACHUSETTS**

ool St., Greenfield, Mass. **Mine office:** Chalemont, Frank- Othello A. Fay, pres.; E. Forrest Sweet, sec.; Capt. rt. treas. and gen. mgr., at last accounts.
ap., $500,000; shares $5 par.
out 1,000 acres, 2 miles west of the Davis pyrite mine. 0', is approximately vertical, conforming closely in dip e Savoy schist in which it occurs. Deposit apparently is g well-defined walls, ore occurring scattered through 15 t, with 6 to 12" of quartz, well mineralized, on the south impregnation of chalcopyrite, 1 to 2' wide, on the north as been partly stripped, and vein trenched across. Idle.

ER CO. **MASSACHUSETTS**

New Bedford Copper Co.

V BEDFORD COPPER CO. **MASSACHUSETTS**

nton, Mass.
ry F. Bassett, pres. and agt.; J. H. Barrows, treas.; F. J.

831. **Cap.**, $1,200,000; $100 par. Corporation does a copper siness, making sheet brass, copper print rollers, etc.

MICHIGAN

ndustry of Michigan is confined to the iron mines of l to the copper mines of the peninsular region commonly Range. The descriptions of all the copper companies are and those of the iron mining companies are given in lists being arranged alphabetically, irrespective of coun- The annual production of each metal and its value is as olonial Survey figures:

Copper

Fine tons	Copper, lb.	Silver, oz.	Total value
	163,000,000	.....	.....
113,231,765	226,794,139	509,467	$56,527,619
133,499,223	255,710,128	688,351	70,376,231

Iron Ore

Tons	Value
13,068,000	.....
17,305,000	$63,920,000
17,712,916	62,833,624
18,905,797	49,054,340

Engineering and Mining Journal.

COPPER MINES OF MICHIGAN

ADVENTURE CONSOLIDATED COPPER CO.

Office: 32 Broadway, New York. **Mine office:** Greenl county, Mich.

Officers: W. Parsons Todd, pres.; Charles G. Lund, Devereaux, W. R. Todd, Jas. L. Bishop and Chas. D. Han W. A. O. Paul, sec.-treas.; E. W. Walker, supt.

Inc. Oct. 17, 1898, in Michigan. **Cap.**, $2,500,000; shar in, $24. American Loan & Trust Co., Boston, registrar; O Co., Boston, transfer agt. Annual meeting, first Thursday nesday in June. Stock listed on Boston Stock Exchange.

An assessment of $1 per share was levied July 20, 19 March, 1916. On December 31, 1918, debit balance was $11 pared with $11,892 on December, 1917 and $53,784 credit bal ber, 1916. Gross receipts for 1918 totals $14,436 and expen which compares with gross of $205,832 and expenses of The 1918 receipts came from rent, and sale of copper and

Property: consists of 3 old mines, the Adventure, Kn ton opened in 1850, 1853 and 1863 respectively, 1,696 acres belt, also a mill site on Lake Superior. The mineral land Secs. 35 and 36, T. 51 N., R. 38 W., and in Secs. 1 and 2, W. The tract is surrounded by the Toltec, South Lake an The village of Greenland lies on the northwestern corner of principal tract, and the village of Maple Grove, controll pany, is near the mine.

The old Adventure mine was opened 1850, along a lin showing prehistoric mining. The largest annual product lbs. fine copper, 1857. After being closed by owners, the ol worked for years by tributors, proving notably rich in sil

The Hilton, or Ohio mine, opened 1863, on the Mass worked vigorously. The Knowlton was opened in 1853. mines made 1,949,173 lbs. fine copper, previous to their Adventure Consolidated which started work November 1,

The **Adventure** property is crossed by the Evergreen gon county, a series of upturned beds of trap, amygdaloid rate, 7 of these amygdaloidal beds carrying copper on tract in a distance of 1,200'.

The cupriferous beds of the Evergreen belt though ve are bunchy. On the Adventure tract the lodes run N. 73° tract, where operations were conducted, shafts being sunk 45°. The old mine had 4 tunnels and 4 shafts, all except N the Merchant lode, being sunk on the Knowlton bed, at 45°

Production from the old mines ceased, January, 1908, and development work being done since. Shipments w November, 1916, and ceased due to labor shortage, high ore, etc., on October 26, 1917; exploration of adjoining lan early in 1919.

There are 5 shafts, No. 3 being 1,520' deep, and vert 1909 and is 6x16' inside measurement, with two 6' hoistin and a 4x6' compartment for ladders and pipes. It is ab of No. 3 shaft, is lined with concrete for a depth of 50' fro is solidly timbered from surface. The shaft cuts No. 1 at depth of 894', and is expected to cut No. 2 lode at ab and No. 3 at about 2,600' depth. The No. 1 lode opened cut on the 1,021' level has been drifted upon for 5 distan and discloses very little copper. A 1,150' exploratory cro west on the 1,500' level intersects 3 beds, designated as 4, cutting the first at a di ond at 600' 1,015' from the shaft. T to cross cut to

y without promise so far as opened, the No. 2 lode, 29' wide, or a distance of 145', carrying much copper in the first 7' with r practically barren; No. three, 32' wide, and opened 547', show- amounts and generally poor, and No. 4, 65' wide, carrying copper in the 34' drift run along the footwall of the lode, No. 1½, first encountered in shaft sinking, is opened for a bout 130' at a depth of 1,190' in the shaft, and had a fair ork was suspended June, 1913, resumed in May, 1916 and sus- October, 1917. No. 3 shaft had been unwatered to the 8th was mined from 3rd-8th levels.

Mass lode, so-called, lying about 120' S. E. of the Evergreen ed by test pitting, May, 1909, and some crosscutting was done rgreen bed, down to the 6th level of No. 2 shaft, but only a drifting was done. This bed shows a width of 8 to 12', but copper, with considerable epidote.

enture mine equipment includes a 38x59' steel boiler house with p. boilers; a 50x59' steel engine house having duplex double- irect-acting hoist with 42x60" cylinders, capable of raising a rom a depth of 5,000' on an incline of 45° at a speed of 2,000' nd a 38x65' steel compressor house having a 60-drill air com- re is a complete electric light and power plant and protection furnished by water mains. The principal mine buildings are steel and painted, and the property is served by a spur of the e railroad.

on has been as follows: 23,572 lbs. in 1900; 29,361 lbs. in 1901; 1902; 2,182,608 lbs. in 1903; 1,380,480 lbs. in 1904; 1,606,208 lbs. 628 lbs. in 1906; 1,244,874 lbs. in 1907; 16,500 lbs. in 1916, and 1917. Shipments to the Winona mill recommenced in No- , and gradually increased up to May, 1917, when about 300 were sent out.

INING CO. **MICHIGAN**

2 Ashburton Place, Boston, Mass. **Mine office:** Kearsarge, unty, Mich.

Rodolphe L. Agassiz, pres.; Jas. MacNaughton, v. p. and gen. m. A. Hodgson, Thomas L. Chadbourne, Jr., John T. Burnett, Perkins, directors; Clarence H. Bissell, sec.-treas.; G. L. Os- c.-treas.; S. Russell Smith, supt.; Thos. Rapson, mgr. cap.; J. rch. agt.; A. L. Burgan, mill supt.

eb 22, 1880, in Michigan and charter extended, 1910, for 30 $5,000,000; shares $25 par; full paid, all issued; increased June a capitalization of $1,250,000, par $25, paid in $17. In the ew shares were given for each old share issued. Last assess- February 5, 1905. American Trust Co., Boston, registrar; Trust Co., Boston, transfer agent. Listed on Boston Stock Annual meeting, second Tuesday in April.

s in 1911, $5; 1912, $22; 1913, $17; 1914, $4; 1915, $13, on old and $5 on new; 1916, $14; 1917, $14; 1918, $8; 1919, $3; mak- $11,850,000 paid by company.

lled by Calumet & Hecla Mining Co., through ownership of ur of a total issue of 200,000 shares.

of Assets, years ended December 31:

1917	1916	1915	1914
$1,505,444	$2,233,364	$1,583,654	$968,772

ears ended December 31:

	Net	Real Est.				
	Inc.	Purch'd.	Taxes	Dividends		Balance
[illegible]	[illegible]	$3,117,383	$375	$1,640,000	$1,600,000	$122,992(a)
[illegible]	[illegible]	38,173	1,047,635	2,800,000		727,920(a)

(a) Deficit. In 1918, the increase in reserves for depreciatio
pletion totaled $624,456, making a surplus balance of $501,464.

Net income for 1918 was $3,117,383; $3,157,889 in 1917; $3,
1916; $2,180,000 in 1915; $463,000 in 1914; $207,420 in 1913, and $1
1912.

Property: 931 acres, lying between the Mohawk and Allouez
off, 1880, by the Seneca Mining Co., to work the Kearsarge or
conglomerate. Under the management of Capt. John Daniell,
were sunk on this bed, which averages about 70' width, with 3
of 2 to 3', aggregating 7' width, each carrying copper in good
but bed not payable as a whole, owing to great width of partly
barren rock. Boundary lines were rectified, by exchange of
with Allouez, July, 1903, and by a similar exchange of 20 acres,
hawk, 1909, giving straight boundary lines on the dip of the bed
ting easier development by all mines concerned. Work on th
mine was started 1902, after work at the Mohawk had disclosed th
and trend of the Kearsarge lode.

The Kearsarge bed, on which the present mine is opened, va
14 to 18' in width, with but little poor ground in the entire mine
ings are considerably ahead of stoping requirements, and bloc
is almost entirely by drift stopes, which are carried about 9' wi
high, to the boundary limits, where extraction is begun and broug
ward to the shafts, thus reducing timber requirements to a minim
mine keeps 3,000,000 to 3,500,000 tons of stamp rock blocked out
ing. All levels below the first are 125' apart. A Richmond ele
signal system connects all underground workings with the engin
and underground stations are connected with surface by telephon
crete is substituted for timber in the construction of the shaft
other places where practicable, rendering the shafts as nearly fir
possible. Mules are used in tramming rock underground.

On July 15, 1918, a fire broke out in No. 3 shaft which ne
closing the north end of the mine and sealing shafts No. 3 and
200' of concrete sets and 180' of timber were destroyed. Hoistin
sumed in January, 1919.

Development: the mine has 4 shafts, numbered from south
planned to develop the entire tract. Nos. 1 and 2 shafts, 1,445' a
at 42°, are each 8x17' 4" in size, with 2 hoisting compartments and
way. These shafts were 2,799' and 3,379' deep respectively at en
Each shaft has, between the 9th and 10th levels, a 400-ton rock bin
with a measuring hopper holding exactly one 7-ton skip load, fro
seconds by one man, this system saving much time, and combining
of all rock mined down to 10th level to one point in the shaft. No
is 43' below 22nd level, in a shattered area, requiring close timbe
makes further sinking costly. The 20th level has been holed to
corresponding level of No. 2 shaft, through which rock mined b
22nd is hoisted. No. 2 shaft can be sunk much deeper before hol
into Allouez ground.

The No. 1 shaft workings all show ore of average quality
stopes on No. 10, 11, 14, and 16 levels south, beyond the shaft
The 10th and 16th levels south have reached property boundaries

During 1916 and up to April, 1917, exploration was continued
Kearsarge conglomerate, when work was temporarily suspended
to labor shortage. The Kearsarge conformity was cut in 1916
No. 10, shaft No. 2, when a drift was driven at right angles
the hole and continued as a crosscut, [illegible] ft. in
[illegible] is 30' wide, and carries [illegible]
1917 and 1918, extensions [illegible]
[illegible] and on No. 5
15, 16, 17, 18 and

ies during 1917 and 1918. Two electric pumps were installed, one 11th and one on 21st level. These are handling the water formerly d by 8 air pumps.

e northern end of the mine is developed by two shafts known as and 4, which have a common collar, being only 6' apart at surface, verging north and south, from the surface, at an angle of 42°. These are sunk through 70' of overburden, and are concreted into the solid edge for depth of 95' from surface. The outcrop of the Kearsarge eing owned by the Mohawk, Ahmeek having only the underlay at its rn end, shafts 3 and 4 are sunk in the hanging, at an angle of 80° plane corresponding longitudinally to the strike of the bedded forma- and bend at depth of 980', in a curve with a radius of about 400', bring- e shafts to 34°, to correspond with the rather flat dip at the Kearsarge both shafts entering the bed at depth of 1,275'. Concrete sets and gers have been used in these shafts wherever ground would permit. shaft has 3 compartments, with two 8x8' skipways and a 4x8' ladder- The upper portion of the bed was worked by crosscuts, beginning at in No. 4 shaft which is the 1st level in Nos. 3 and 4 shafts, though are 3 stations above the point where the bed intersects, from which cuts will be run to the Kearsarge bed, to the Mohawk line. No. 3 was 2,938' and No. 4 was 2,773' deep at end of 1918.

luring 1917 and 1918 a commercial grade of "rock" showed in all penings of shafts No. 3 and 4. In shaft No. 3, the 17, 18 and 19 levels reached the Mohawk boundary and levels N. 16 to 19 north corres- with those of No. 4 shaft.

ew openings totaled 13,528' in 1918; 17,049' in 1917; 13,654' in 1916, 769' in 1915.

quipment: the main power house is in 2 parts, of brick and steel, with sition roof. Equipment of No. 1 power house includes 60-drill and Nordberg cross-compound 2-stage air compressors, and a 32x72" r Nordberg hoist. The electrical plant consists of a 13x26" Nord- oist. The electrical plant consists of a 13x26" Nordberg tandem- nd engine, direct-connected to a 200 k. w. 250-volt Northern Elec- nerator. Condenser pumps and reheaters are located in the base- No. 2 engine house is a duplicate of No. 1, containing a similar th double conical drums with maximum diameter of 18'-6", capable ing 10-ton skips in counterbalance from 1 mile depth. Nos. 1 and 2 houses are connected to a steel-frame boiler house, having six 200 ilers, with room for 8 equipped with feed pumps, ash sluices, coal etc. The boiler house has a self-supporting steel smokestack, 150' d 7'-6" in diameter, on a sandstone-faced concrete base. A 1,360 Sullivan compressor was installed early in 1917.

and 4 are equipped with two 32x72" cylinder Nordberg hoists, -expansion Nordberg compressor, and turbo-generator, housed in structure 65' wide by 140' long, with corrugated-iron roof; a steel ng 5' wide and 84' long with corrugated-iron roof, housing eight ilers and a steel self-supporting brick-lined smokestack, 7' d 140' high. There is also a change house of brick construc- the shaft rock house serves both shafts. Storage battery ns, and electric trammers were installed 1917-1918 as follows: 4 on shaft No. 3 and 5 on shaft No. 4.

[illegible] plant, of brick, is 800' north of No. 1 shaft, and with water the plant is connected by a temporary [illegible] 24" wide, carrying a double track for 7-ton tram [illegible] cars of cradles, and rock directed by grizzlies [illegible] below which is a hopper, feeding directly into a [illegible] motor, crushed ore being fed auto- [illegible] driven by a 35 h. p. motor, going to [illegible] contains 3 Farrell crushers,

driven by a 12x24" Nordberg engine, and tram cars are actua
35 h. p. motors, located in the 2nd story of the building. C
goes to a 1,600-ton cylindrical steel rock bin, 32' in diameter a
set on concrete piers, with tunnel and railway track beneath,
the filling of cars by gravity, 1 man loading a 40-ton car in 10 s

Mine buildings include office building, machine shops, ware
necting with railway tracks; an office for mining captains and
smithy, cold-storage shed, and about 100 dwellings. The loca
tected by a water system having 6,000' of 6" mains with 16
drants. Water is taken from an 8' dam across the outlet of
A large water supply could be developed from Ahmeek lands
louez boundary, and an inexhaustible supply is available fro
perior, 4 miles distant, but about 600' lower. The fire-protec
connects with that of the Calumet & Hecla.

The Mineral Range and Keweenaw Central railway lines
mine, the former connecting mine and mill over a steel trestle

The stamp mill, at Hubbell, on Torch lake, has 8 heads,
breaking about 500 tons of rock daily. The mill site has a
Torch lake, of about 2,000' with a maximum water depth of 9
for tailing sands for many years.

The mill is steel and concrete throughout. Stamps rest
piers, each standing on a concrete slab 4'6" thick that rests d
a hard pan of closely-cemented gravel. Each slab holds abo
wire cable, interlaced upward on its surface and reaching i
above, which is 40x40' at the base, pyramidal in form and 38'
the stamps an elevation of about 50' above lake level. There ar
ton rock bins. The mill has double-deck floors, the jigs being
the upper or roughing floor, and sands overflowing to Wilfley
tors on the ground floor. The jigs and tables are run by electr

The mill power house has six 200 h. p. boilers, and a 1
steam turbine. The plant has a 300 k. w. generator, and a pum
000-gal. daily capacity, capable of supplying water for 8 head
with Torch lake by a 600' pipe intake.

Production:

Year	Tons Ore Treated	Lb. Mineral Produced	Lb. Cu. per Ton Ore Stpd.	Cost(a) per Ton	Lb. Copper Produced	Tot. per
1919...	.....	.....	...	...	17,023,111	
1918...	1,196,541	.....	20.8	$2.18	24,851,235	1
1917...	1,271,275	.....	22.0	1.74	27,919,812	
1916...	1,164,010	.....	20.7	1.46	24,142,158	1
1915...	948,874	32,292,325	23.0	1.26	21,800,492	
1914...	590,519	20,333,000	23.1	1.55	13,634,605	
1913...	383,749	13,742,140	24.0	1.77	9,220,874	1
1912...	652,260	23,945,315	25.2	1.39	16,455,760	
1911...	598,549	21,917,925	25.4	1.42	15,196,127	
1910...	530,365	16,758,521	22.3	1.42	11,844,954	1
1909...	406,045	.....	22.7	....	9,198,110	1
1908...	298,178	.....	21.1	....	6,280,241	1

(a) Includes mining, transportation, stamping and taxes. unusually heavy construction costs. (c) This includes a ch preciation and depletion amounted to 2.52 cents per pound.

Copper production is marketed through the United Metal Reserves not officially given are maintained at about 5,000,0 the mine is estimated at 18 years, with present ou

MINING CO

Boston, Mass Mine office: Lake

R. M. Edwards, pres. and gen. mgr.; S. L. Powers, v. p.; man, sec.; Henry Tolman, treas.; R. M. Edwards, J. H. Rice, n, S. L. Powers and Arthur C. Paine, directors; Thos. Ben- Wm. Wearne, mg. capt.

, 1910, in Michigan. Cap., $2,500,000; shares $25 par; issued ; paid in $13. Last assessment, May 18, 1916, $1. Of the 60,000 shares were given land owners in full payment for 10,000 shares were sold to public at $10 per share. Annual d Tuesday in April. American Trust Co., Boston, transfer l Trust Co., Boston, registrar. Stock is listed on the Boston ge.

surer's statement, December 31, 1918, showed: surplus of ared with $16,868 in 1917; excess assets $26,470 in 1916, excess 133 in 1915; $14,597 surplus assets, 1914 and $27,707 in 1913.

: 480 acres, adjoining the Lake mine in Ontonagon county, ing the N. ½ and S. W. ¼ of Sec. 3, T. 50 N. R. 30 W. formerly owned by a company of the same name, which began and did a little prospecting with negative results, expending

nent: an 8x12′ exploratory shaft, started in an amygdaloidal definte data as to pitch, was over 560′ deep at end of 1916. For he shaft continued in vein material, passing into the hanging t 95′ from surface. The first level, opened at 104′, has about ts, and a 90′ crosscut to the eastern sandstone. The second om surface, has a crosscut northwest across the formation ore than 1,000′, exposes almost solid trap, a small amygdaloid, shaft, showing some native copper in about 680′ of drifts. The , in which the shaft is sunk, apparently has a dip of about 80° ranging from about 40′ at the first level to about 60′ at a depth ated by diamond-drill borings.

omah bed is peculiar in both strike and contents, strike appar- early north and south, in line with the strike at the Lake mine, nd the bed carrying copper oxide instead of native copper, as ith all of the other copper mines of the Lake Superior district e bedded formation of the Keweenawan series. Ore is mainly or melaconite, carrying traces of native copper, and chrysocolla assay tenor was found in a test pit near the shaft. Assays mall quantity of selected ore, removed in the course of shaft a copper value of 24.1%, this selected ore representing one- entire body of material taken from the shaft.

able diamond-drilling has been done in the area west of the to great depth, but results are conflicting and nothing definite ncerning either the dip, strike or value of the several copper- ations there encountered. No mining work was done on the ing 1914, but one shipment of selected ore was made, which lb. copper and sold for $1,695. A few shipments of ore, taken the 40′ level, were made in 1915, the first assaying 14% copper. , resumed in the summer of 1915. It is expected that in depth l encounter some of the lodes worked in the Lake and South as they flatten downward and dip toward the Algomah ground. and 1918, the shaft sinking and all mining operations were dis- to high costs and adverse labor situation.

nt: includes a steam hoist, with capacity to lift a 3-ton load h of about 500′, and an air-compressor. Buildings include a office and boarding houses. Property considered promising nent good.

MINING CO. **MICHIGAN**

2 Ashburton Place, Boston, Mass. **Mine office:** Allouez, Ke nty, Mich.

Officers: Rodolphe L. Agassiz, pres.; Jas. MacNaughton, v. p mgr.; with Harry F. Fay, D. S. Dean, E. B. Dane, Geo. S. Mumf Pickman and Alex. Whiteside, directors; Geo. G. Endicott, sec.-tr Bennett, asst sec.-asst treas.; F. W. Ridley, supt.; J. J. Gibbens, m tain.

Inc. Sept., 1859, in Michigan. **Cap.,** $2,500,000; shares $25 pa $22.25; last assessment, $3 a share, levied 1904. Capital was in 1889, from $500,000, shares $25 par. At that time, company was re and reincorporated. Annual meeting, second Wednesday in A Colony Trust Co., Boston, registrar; American Trust Co., Bosto agent. Listed on Boston Stock Exchange. Owns a half inter Lake Milling, Smelting & Refining Co. Is controlled through ow 41,000 shares, by Calumet & Hecla Mining Co.

Dividends: initial dividend, $1 per share, July 31, 1915; $7 in in 1917; $7.50 in 1918, and $1 in March, 1919, totaling $28.50 pe $2,850,000.

Balance Sheet, December 31, shows:

	Cash	Other Quick Assets	Accts. Payable	Reserve for Taxes	Q
1918.....	$363,401	$873,373	$115,450	$228,765	
1917.....	715,567	960,159	273,230	244,793	

Income Account:

	Receipts	Costs	Constr.	Taxes	Divs.	
1918.....	$1,819,148	$1,386,882	$4,652	$242,782	$600,000	$
1917.....	2,101,303	1,015,666	24,503	273,092	1,050,000	
1916.....	2,633,679	1,086,847	22,321	.....	900,000	

(a) Includes deduction of assessments, levied by The Lake Mill ing and Refining Co., which totaled $48,902 in 1918; $126,152 in 1917 in 1916. (b) Surplus.

In 1918, company added $198,927 as increase in reserves for depre depletion, which made decrease in current assets $265,143 instead of $4

Property: 3,400 acres, including mineral ground 640 acres, adj Ahmeek Mining Co., which contains the Kearsarge amygdaloid at g

The old mine, opened 1859, is on the Allouez conglomerate, a bed the greenstone. The conglomerate, 30' wide in many places, with s 39° E., and dip of 39°, average 0.7 to 1% copper, and is very refrac the stamps. Mining was begun actively in 1869, and stopped in 187 exhausted treasury. The mine was then leased to Watson & Walls, money from it, after paying a royalty of one-eighth on gross prod 1880 the company resumed control, to quit once more, financially ex 1885. Watson & Walls took the mine again, and once more did well pany resumed work on its own account for the third time, and again stopping all work in 1892. The old mine had been idle for some ye for exploratory and development work in 1898 to 1900, when a shaf 1,200' on the Osceola lode, and nearly 4,000' of openings secured the indifferent results. The old Allouez made 26,051,528 lb. fine copper, 1

Development: the Allouez mine is on the Kearsarge am bed, which does not outcrop on Allouez lands, though underlying 640-acre tract, hence was reopened on the underlay. The mine ha producing shaft, until late 1909. Shafts Nos. 1 and 2 are connected cuts and drifts, on several levels. The Kearsarge bed, above the 14 opened by crosscuts, uppermost being at the 6th level, below which been cut in the shafts at the 8th, 10th and 12th levels, for crosscuts to the bed. The Kearsarge bed averages about 16' width in the Allouez

Underground openings totaled 2,759' in 1918; 2,838' in 1917; 3,50 4,458' in 1915; 3,526' in 1914; 4,400' in 1913; 8,517' in 1912.

No. 1 shaft, at the extreme southeastern corner of the tract, w partments, started May, 1903, and 3,978' deep, leaves surface at an an but at slight depth takes an angle of 80°, continuing thereon to a

curve of 60' brings the shaft to an angle of 38° 30', which is the
At the change of angle, on reaching the bed, a single idler with
ange cares for the cables passing at either end. Owing to the
he shaft, back rails of 6x10" timber are set so close to the wheels
at their flanges cannot leave the steel rails, the wooden timbers
es. The first level is opened at depth of 1,264'. In order to save
s on surface water, a gutter, cut entirely around the shaft, leads
long, used as a sump. This shaft showed very fine ground in its
it deeper openings are not so good. Equipment at No. 1 shaft
2' steel shaft rock house having two 18x34" crushers. The floor
during 1916.
it in 1917 and 1918 brought the shaft 72' below the 22nd level,
and. Openings were made on the 19, 20, 21 and 22 levels while
the 17, 18, and 19 levels. The 19th level south reached the
dary. The 20th level was holed to shaft No. 2. Storage battery
re installed on the 19th and 20th levels.
, 1,500' northeast of No. 1, is similar to No. 1 in general design,
ch when entering the bed at 2,307' from surface, from 80 to 42°.
the point of intersection will be reached, to the boundary, by
shaft is sunk further in the hanging than No. 1, owing to the
lake. The collar of No. 2 shaft is of concrete. Washington fir
l I beams, with 14x14" square timber wall plats and 4" planks
interior, from collar to solid rock ledge, is lined with 22" of
rs having their ends bedded in concrete, this giving an impreg-
k through 32' of treacherous quicksand overburden. Both shafts
about 9,400' before reaching the western boundary line. No. 2
leep.
aft during 1917 and 1918. No. 21 level reached shaft No. 1. Six
ives have been installed.
: includes a hoist with 32x72' duplex cylinders and 18"
drum for No. 1 shaft, and No. 2 has a 20x30" engine good for
. No. 1 engine house, of mine rock, with redstone trimmings,
l 18-drill air compressors, and No. 2 engine house has a 60-drill
The stone boiler house has five 125-h. p. boilers and a 120' self-
l smokestack. Buildings include a redstone machine shop and
rge warehouse. There is a very considerable mine location, with
lings, some remaining from 40 years ago, and some new. The
l by a spur of the Mineral Range railroad.
mill. Point mills, Hardinge conical mills replaced Chilean mills
At No. 2 mill, Hubbell, the 4th stamp, was put into commission
mping plant to dump tailings farther out into Torch lake, was
ion in spring of 1919.

:

re l	Lb. Min Produced	Lb. Cu. per Ton Ore Stpd.	Mine Cost per Ton (a)	Lb. Cu. Produced	Total Cost per Lb. Cts.	Rec'd per lb. Cts.
	.....	.....	.....	3,749,984	.....	.....
	.....	13.73	$2.119	7,071,218	19.09 (b)	24.49
	.....	15.69	1.869	8,892,915	13.84	27.95
	.....	18.02	1.589	10,219,290	10.47	25.305
	10,043,459	18.78	1.365	10,043,459	9.31	18.166
	9,408,470	17.09	1.583	6,056,548	11.18	12.853
	6,640,000	17.29	1.687	4,091,129	12.09	15.672
	8,767,120	16.56	1.613	5,525,455	13.52	16.668
	7,532,490	16.56	1.668	4,780,494	13.30	.....
	8,406,970	18.84	1.769	4,655,702	11.57	.....

s mining, transportation, stamping and taxes.
es a charge for depreciation and depletion amounting to 2.81
.
a considerable disappointment in earlier years, earned a net

profit of $171,264 in 1912, turning a deficit of $77,700 of former ye
of assets of $93,564 over all liabilities, and in 1914 net profits were
surplus of cash and quick assets on Dec. 31, 1918, totaled $892,56

ARCADIAN CONSOLIDATED MINING CO.

An amalgamation of the New Arcadian and New Baltic
panies, effected Oct. 7, 1919. **Office:** Houghton, Mich.

Officers: Robert H. Shields, pres.; S. T. Everett, v. p.;
sec.-treas., with W. B. Anderson, J. C. and J. W. Shields, L. W. F
Fesing, and A. F. Rees, directors.

Inc. Oct., 1919, in Michigan. **Cap.**, $6,250,000; $25 par; 2
assessable. Of the 250,000 shares, 150,000 go to New Arcadia
New Baltic.

The company's capitalization is equal to that of the two co
bined. Shares of the new company were issued, share for share
New Baltic and New Arcadian, 24,000 shares of the new company
New Arcadian, because it owned 24,000 shares of New Baltic;
18,958 shares becoming treasury stock of new company. The sh
well as all treasury stock are on a basis of $13.50 per share pai

Transfer office, American Trust Co., Boston; and registrar,
Deposit & Trust Co. Listed on Boston Stock Exchange.

New Arcadian Property: 3,500 acres, includes five old min
various periods in the past. The Arcadian Copper Co., operated
with great vigor, 1898-1901, and equipped it with machinery, a
mill at Grosse Point. Operations on the Isle Royale bed proving
all work was suspended, 1903; the hoist, machinery and shaft-hou
to the Trimountain Mining Co., the stamp-mill to the Centennial C
Co., and the property dismantled. The floating debt of the old
liquidated by the sale of 800 acres of land, for $750,000, to the C
Co. The old mine and equipment were fully described in Vols. I
Copper Handbook.

Development: exploratory work was resumed Oct., 1905,
dian company, on an amygdaloidal bed about one-fourth mile ea
Royale amygdaloid previously worked, and crosscutting from the
the exploratory shaft disclosed 5 cupriferous beds in a distance o
was suspended March, 1908, until organization, and was resumed
by diamond-drill boring from the bottom of the 200' exploratory
is in the S. W. ¼ of Sec. 29. Exploratory work, 1910-13, include
trenching and test pitting, but was devoted mainly to securing 3
nearly 1 mile apart, by diamond drilling, and 26 holes, aggregatin
have been drilled. Drill-hole No. 22 cut a promising amygdaloi
north area. A shaft started June, 1912, on this lode, was 1,860'
1919, and is to be sunk to a depth of 2,500 to 3,000'.

Crosscutting was done on the 750' level to explore the 2
amygdaloid beds disclosed by diamond drilling, one 300' east,
west of the shaft. On this level an amygdaloid vein of great
opened up 150' east of the shaft. Crosscuts and drifts have also b
the 250', 600', 900' and 1,050' levels and disclosed good copper co

The Old Arcadian vein was exposed in 1918 in the west ex
1,500' level crosscut. The No. 8 conglomerate, which was well
the 900' level, was encountered on the 1,700' level east crosscut
shaft. It is 26' wide, with some fine copper, but not of commercial
New Arcadian vein is exposed 47' from shaft on both the 1,700'
levels; it is 18' thick and heavily charged with copper.

During 1918, development work totaled 5,762' of drifting
crosscutting, which compares with 788' of drifting and 648' of
1917.

Equipment: includes a steam [illegible] for 2,500
compressor, necessary mine buildings, and a [illegible] equipped with
18 by 24" crusher.

Production: in 1918 [illegible]

c, 4,900 tons yielded 10.87 lb.; in 1918, 10,195 tons yielded 16.16 lb.

its immense acreage on the mineral belt, the property is considered

tic Property: 800 acres, Sec. 16, T. 55 N., R. 33 W., with min- N. W. ¼ of the N. W. ¼ reserved by the New Arcadian. Ex- un June 10, 1909, included extensive trenching in the horizon glomerate, supplemented by boreholes put down by a Calyx shot- 3½" core, considerable trouble having been experienced in getting pes. No. 3 borehole, at a depth of 330', cut 2' of exceptionally earing rock, with 6" of heavy copper, and a drill core fairly copper was taken, Sept., 1909, from what was thought to be the bed, at depth of 300'. In Nov., 1909, a drill-hole pitched at an cut an amygdaloidal bed estimated to pitch at 60° in opposition, f 105' aggregate depth, showing copper at various points, the final harged with fine stamp copper and a considerable amount of very copper. The drilling also disclosed an unidentified amygdaloidal 75' width, carrying considerable copper in masses approaching ze. Deepest hole bored was 1,200'.

as broken June, 1910, for an exploratory shaft, which was started e footwall trap, and sunk to a depth of 500'. Although the shaft the foot, the formation rolls so that the bed was cut at 3 points in 10'. At 200' the shaft cut the footwall of the amygdaloidal bed, calcite but devoid of copper. At depth of 310' the bed was cut g extremely heavy copper of a grade materially better than the payable mines of the district. Drifts on the 350' and 500' levels edingly bunchy ground, with occasional pockets of rich copper, on the 500' level showed further copper ground in an unidentified bed underlying No. 4 conglomerate bed, distant about 1,500' from is crosscut was continued to a point over 1,900' from the shaft. ing this vein were obtained from work done on it by the New adjoining property.

ng campaign ended with No. 7 hole at a depth of 1,235' in 1916. erate was 41' thick at depth of 1,192'. Hole passed through good- aloid veins, with copper in beds at 329', 493', 652', 792', and 1,192'. adian vein was probably that cut at 792'. A shaft was started to ension of this vein, and was down 500' in August, 1918. At 60', where the vein was cut, it was well charged with copper. Company ceptionally good showing on the 400' level.

ent in feet:

	Sinking	Drifting	Crosscutting	Total
.....	170	100	185	455
.....	180	185	105	770

s suspended in Sept., 1918, due to abnormal labor and supply

it: includes a hoist, compressor, boiler-house, etc.

company has good management and a property that offers great profitable and long continued mine operations.

INING CO. **MICHIGAN**

Devonshire St., Boston, Mass. **Mine office:** Copper Falls, ntyre, Mich.

Francis L. Maguire, pres.; John Brooks, sec.-treas.; Capt. Wes- ., with Edward F. Newton and John E. Fitzgerald, directors. c. second Tuesday in May.

in Michigan. **Cap.**, $2,500,000; $25 par; issued, $1,550,000. ion from Cochituate.

[illegible] acres, in T. 56 N., R. 31 W., in 2 tracts, including the [illegible] mine and the Arnold mine proper, with frontage of about 3 [illegible]. The Copper Falls mine, worked 1850, until Aug., 1893, [illegible] copper, mainly from the Owl Creek fissure, and paid

dividends of $100,000. The Arnold mine proper developed on the A
was opened 1863, reopened 1897, and closed 1901. Ore stamped av
0.8% copper. Has a stamp-mill and 2½-mile narrow-gauge railro
Arnold & Eagle Harbor, rolling stock of which has been sold. No.
Arnold is about 1,000' deep, sunk at an angle of 26° with the ho
production, 1899 to 1911, inclusive, was 2,065,817 lb. fine copper.

Idle for several years.

ASHBED MINING CO. M

Office: 78 Devonshire St., Boston, Mass. **Mine office:** C
Keweenaw county, Mich.

Officers: Francis L. Maguire, pres.; John Brooks, sec.-t
Wesley Clark, supt., with Edward F. Newton, directors.

Inc. 1880, in Michigan. **Cap.**, $1,000,000; $25 par. Listed
Stock Exchange. Annual meeting, second Tuesday in March.

Property: 1,143 acres, Petherick mine, in vicinity of Coppe
joining the Arnold mine. The last mining work was done 1905-1906
in Vol. II of the Copper Handbook.

BALTIC MINING CO. M

Dissolved. Property now owned by Copper Range Co., which s

BOHEMIA MINING CO. M

Office: 85 Devonshire St., Boston, Mass. **Mine office:**
Ontonagon county, Mich. **Operating office:** Dee Bldg., Houg

Officers: Wm. A. Payne, pres.; Chas. A. Snow, v. p.; Robt
sec.-treas., with John H. Rice, Thos. S. Dee, Richard M. Edwards a
Paine, directors.

Inc. Jan. 29, 1910, in Michigan. **Cap.**, $2,500,000; $25 par;
paid in, $8; issued, $1,875,000. Of the 75,000 shares issued, 30,000
for lands, and 45,000 were sold to the public at $8. Boston Saf
Trust Co., transfer agent. Registrar, State Street Trust Co., Bost
meeting, third Wednesday in April. Shares listed on Boston Curb.

Annual report, Feb., 1918, shows cash in bank, $132,059, co
$131,088 in Feb., 1017. As soon as sufficiently important developmen
on adjoining properties, development work will be resumed.

Property: 960 acres, originally known as the Piscataqua, a
the Henwood, is traversed by the cupriferous amygdaloidal bed
Copper Co. Diamond-drilling was done 1910. Drill-holes have yie
ber of cores, from various amygdaloidal beds, with copper in fai
but with nothing remarkably promising or that would justify sink
Suspended operations March, 1911.

BOSTON & LAKE SUPERIOR MINERAL LAND CO. M

Office: Leopold Bldg., Houghton, Mich. Fred W. Nicho
agent. Property is mineral land in the Lake Superior copper
mining work ever done.

CALUMET AND HECLA MINING CO. M

Office: 12 Ashburton Place, Boston, Mass. **Mine office:** Cal

Officers: Rodolphe L. Agassiz, pres.; Jas. MacNaughton, v.
mgr.; Robt. F. Herrick and W. Hunnewell, directors; John F. P
treas.; Chas. A. Hall, asst. treas.; A. J. Garceau, asst. sec.; W.
asst. supt.; E. S. Grierson, chief engr.; John Knox, chief mg.
Potter, chief efficiency engr.; J. G. Bennett, chief clerk. **Mill**
Linden, Mich. Henry Fisher, supt.; C. H. Benedict, mill
Smelter offices: Hubbell, Mich. H. D. Conant, supt.; L. C. Gr
gist.

Inc. 1871, in Michigan. **Cap.**, $[illegible]; shares $25 par;
Charter renewed, 1900, for 30 years, and amended, 1[illegible] under
of Michigan, making the corporation [illegible]
a mining and smelting company. [illegible]
Hecla, Calumet, Portland and [illegible]
[illegible] Stock Exchange, and traded [illegible]
[illegible] Stock Exchange. Annual [illegible]

ston, transfer office: American Trust Co., Boston, registrar of

any controls the following subsidiaries, each described under its

Allouez, Centennial, Cliff, Gratiot, Isle Royale, La Salle, Lake Laurium, Osceola, Superior, Tamarack and White Pine C. Co

f 1919, company had about 28,000,000 lbs. of unsold copper on s approximately three months' output. Curtailed mine operations of normal, coupled with a policy of retaining as many skilled ible, ran up copper costs to 18c.

eet, years ended Dec. 31 (as filed with Massachusetts Secretary

Assets.

	1918	1917
	$21,243,589	$21,267,179
d equipment	35,746,443	34,599,849
ock in process	6,261,253	5,483,600
receivable	5,421,698	6,607,821
	65,013	84,972
	20,862,064	17,855,581
	$89,600,060	$85,899,002

Liabilities.

	1918	1917
	$1,200,000	$1,200,000
ble	3,519,925	2,634,937
eserve	14,973,364	12,444,286
rve	5,259,674	3,821,878
rplus	14,094,684	14,094,694
	50,552,413	51,703,217
	$89,600,060	$85,899,002

(100,000 shares outstanding):

	$10	1912	$42	1906	$70
	55	1911	24	1905	50
	85	1910	29	1904	40
	75	1909	27	1903	35
	50	1908	20	1902	25
	10	1907	65	1871-1901	830
	32				

received from other mining companies amounted to $3,011,205 900,747 in 1918.

change in charter, 1905, permitting the acquisition of stock in ons, the Calumet & Hecla has secured control of various other eral tracts by organizing subsidiary corporations and also by n companies previously organized. In 1905 the company bought rks, at a cost of $8,592,129.99 in cash and notes; 9,600 shares of shares of Tamarack; 24,796 shares of Ahmeek; 27,507 shares of 016 shares of Seneca; 25,000 shares of Laurium. The attempt ol control of the Osceola Consolidated Mining Co., at the March, 1917, was met by determined opposition, which took the Michigan legislature and the Federal courts. After nearly 2 years gation the Calumet & Hecla assumed control of the Osceola and perior mining companies formerly under the management of ompass a bargain with Mr. Bigelow, by which his entire stock ol in the Calumet & Hecla.

Securities Owned on December 31, 1918.

	Shares Owned	Shares Issued		Own
Ahmeek Mining Co..	99,168	200,000	Superior Copper Co..	50,1
Allouez Mining Co..	41,000	100,000	White Pine Co.(Common)	42,(
Centennial Cop. Mg. Co.	41,500	90,000	White Pine Co.(Pfd.)	10,(
Cliff Mg. Co.....	28,785	60,000	Calumet Transp. Co..	3,4
Gratiot Mg. Co.....	50,100	100,000	Great Lakes Transit Corp (Pfd.).....	1,(
Isle Royale Cop. Co..	33,187	150,000	Great Lakes Transit	
La Salle Cop. Co....	152,979	302,977	Corp. (Com.).....	1,(
Osceola Cons. Mg. Co.	33,560	96,150		

The Frontenac Laurium, Manitou, Dana, St. Louis, and Tam panies have been completely absorbed.

On Dec. 23, 1916, the company sold its 11,207 shares of Seneca to the Seneca Copper Corporation, receiving $60 per share, a total

In June, 1919, it was reported that the company had sold its 50,100 shares of a total capitalization of 100,000 shares of the Gra Co. to the Seneca Copper Corp. The financing was said to call for of $25,000, with additional payments extending over a period of y

Property: the mine and landed holdings of the Calumet & cluding property owned outright, property controlled through subs porations, mining lands under options, and timber and miscellaneou Houghton, Keweenaw and Ontonagon counties, Michigan, amounts mately 165,000 acres, of which 102,804 acres are in Keweenaw county. pany, with its subsidiaries, has a water-front of more than 34 mi shores of Lake Superior, Lac La Belle and Torch Lake, and ap 60,000 people are supported by the operations of the company an interests.

The Calumet & Hecla mine proper, about 2,750 acres, lies in a co in Secs. 11, 13, 14, 15, 22, 23 and 24, T. 56 N., R. 33 W., in additio the company owns extensive tracts, all west of the Tamarack mine, c underlay of the Calumet conglomerate at such stupendous depth th would require a 2-mile vertical shaft, and it is very doubtful wh lands ever will become available for mining on the Calumet conglom lands west of the Tamarack were explored in 1904 by diamond-drill of a supposed cupriferous conglomerate, but nothing of promise was

The original **Calumet & Hecla** mine is opened on the Cal glomerate bed, and a parallel mine has been developed on th amygdaloid, while a third parallel mine has been partly develop Kearsarge amygdaloidal bed.

The Calumet conglomerate proved unprofitable both to the north of the Calumet & Hecla, though workable at the Tamarack mine developed the underlay by vertical shafts. The conglomerate has strike of N. 33° 30' E., with average dip of 37° 30' with the footwall is of 5' to 26' maximum width, with an average of 14', giving about 2,4 of stoping ground, or about 43,200 tons of stamp rock per acre. The richer portions of the conglomerate are in the central part of the Hecla tract. The walls of the conglomerate carry copper, the amygdaloidal footwall, and much of the [illegible] is now milled. Pillars of 75' and [illegible] every conglomerate shaft, contain [illegible] stoping ground available before [illegible]

About 18,000,000' of timber and to the end of 1918, [illegible] pillars are used as [illegible] drifts on the bed, and Iron, mainly scrap [illegible] placed above I-beams, [illegible] bed in the lower workings

. It has decreased in average copper contents with depth, but
ed in 1915, 3.36 lb.; in 1916, 3.59 lb.; in 1917, 2.40 lb.; and in
nore than in 1914, partly because old pillars, etc., were robbed.
18, there were 81 drills at work removing shaft-pillars, cleaning up
cks of stopes. This yielded 477,541 tons of ore.
met & Hecla has suffered severely from underground fires. The
ative metal cannot burn, like sulphide ore, but the old timbering
comes nearly as inflammable as tinder.
ent: the Conglomerate Property of the Calumet & Hecla is
eparate mines, known as the Hecla and Calumet branches, the
eing a southerly continuation of the Hecla branch, and the Red
shaft a part of the Calumet mine. The Calumet to the north,
he center, and the South Hecla at the south, form one continuous
ng the Calumet conglomerate by incline shafts, the Red Jacket
the same bed vertically. The conglomerate, opened for 2 miles
rop, has 11 shafts, 8 being single compartment shafts, two being
tment, and one vertical, with 6 compartments. Also opened by
and the Tamarack property adds 3 shafts.
ecla, 2,400' deep, showed poor ground at the bottom. All pillars
and shaft abandoned in 1918.
cla shaft, at the company's southern line, is 5,643' deep, bottomed
d, disclosing a formation nearly barren of copper at depth. This
extended to connect with the 81st level haulage system, and also
, supplies, and safety.
Red Jacket vertical shaft, of 1,800 tons daily capacity cuts the
Rock temperature was 87° F., reduced to about 70° by connection
lumet shaft, exhaust air from the power drills aiding in cooling
e Red Jacket shaft is 14' 6"x24' 6" within timbers, and is built
cement from collar to the solid rock, and timbered below with
There are 6 compartments, 2 used for hoisting, 2 for water, and
supplies. The 2 hoisting compartments, at the eastern end, have
ton Kimberly self-dumping skips swing under. The 2 western
have double-deck cages for men and material, and the 2 middle
have large cylindrical steel bailers, for raising water. Timber
cket shaft is lowered through No. 4 Calumet, with which the Red
nected by a crosscut. The Red Jacket shaft hoists rock from
hern shafts below the 56th level, at which point the conglomerate
There are 9-ton steel storage bins at the various productive
il in maintaining the uninterrupted hoisting service that is abso-
in a shaft of a mile depth. The shaft ore-house of the Red
y 100' on the ground, and 110' high with 4 crushers, 1 for poor
1916-1918 shaft pillars and arches were being removed from the
rd levels.
as been discontinued at shafts No. 6 and 7 Hecla and No. 9
Hecla, due to excessive cost of maintenance, but in order to
er ground at this end of the mine, a haulage-level (at eleva-
th level) was commenced in 1918, to connect this area with
t shaft. This [illegible] driven in an amygdaloid lode,
e Conglomerate [illegible] 7,800' long when completed.
w haulage level [illegible] sunk, and the lower part
[illegible] will be trammed by electric-
[illegible] completed in 1920.
[illegible] 5,253' from surface.
[illegible] below the sur-
[illegible] surface.
[illegible] mile and 1¼
[illegible] mines, car-
[illegible] to alleviate
[illegible] final shaft
[illegible] are ver-

tical shaft. The blind shaft is sunk 40° under the footwall
angle as the dip of the conglomerate, thus assuring solidity
saving long and expensive crosscuts to the bed on each
wall lateral on the 57th level parallels the regular drift, at
40' in the footwall between the Red Jacket vertical shaft and t
offering an avenue for operations that obviates the con
to result were the regular mine drifts given double duty. T
starts in the footwall drift, under and parallel with the 57th le
ually will be about 1 mile in depth, opening four of the five
leaving the 5th and last to be opened by a sub-shaft from th
which doubtless will be sunk on the same system. The nec
peculiar method of development arose from the fact that the
of the property run north and south, while the strike of the be
E., giving a plane of dip of N. 56°-30' W. Owing to the inclin
sunk on the dip of the bed, while the blind shaft must follo
lines, the latter descends diagonally on the dip of the bed, gi
shaft an average dip of about 22° only, although the bed di
This unusually flat incline permits the hoisting of rock in tra
electric hoist on the 57th level, cars being hauled through
and dumped into the steel bins of the Red Jacket shaft for
saving a transfer at the mouth of the blind shaft. The wo
"Five Forties" show the conglomerate bed to average about
10' carrying milling ore, the bed as a whole being very lean
depth. The abandoned workings of the Tamarack Junior
Osceola Consolidated, which adjoins the "Five Forties" ar
holes bored by diamond-drill from the boundary stopes.

A drainage drift is driven, at depth of about 5,000', me
incline, 250' from the conglomerate, with a length of 5,100', e
No. 10 South Hecla shaft to No. 7 Hecla and from Tamar
to Nos. 5 and 6 Calumet. This drift drains water to shafts
6, from which it is lifted to surface by centrifugal electric pum

The shaft ore (or "rock" of Lake Superior usage) hou
uniform pattern and accommodate 40-ton railroad cars. Roc
the top of each shaft house, passing thence over grizzlies t
finer rock to fall through, the larger masses being reduc
crushers. Crushed ore falls by gravity into storage bins,
dumped into cars that take it to the mills, railroad tracks r
neath each rock house. The standard equipment includes a
tion motor at each shaft, for driving crushers.

Work on the Conglomerate lode totaled 10,841' in 1918, c
2,942' in 1917; 5,142' in 1916, and 5,522' in 1915.

The Amygdaloid Mine of the Calumet & Hecla is opened
amygdaloidal bed, which outcrops 730' east of the Calumet
with parallel strike and average dip of about 38°, underlying t
tract of the Calumet & Hecla mine. There are 6 shafts in
mine, Nos. 13 to 18 inclusive, numbered from south to nor
duplicate in size, each having 3 compartments, of which
hoisting and 1 for pipes and ladder-ways. The
35 miles of workings and [illegible]
by crosscuts. The
In this mine the
along the
in the
hangin
of the
ex

fts Jan. 1, 1919

.....	3,232′
.....	2,958′
.....	3,002′
.....	3,274′
.....	2,279′
.....	1,460′

Distance between Shafts

13 to 14.....	2,780′
14 to 15.....	2,400′
15 to 16.....	2,100′
16 to 17.....	1,800′
17 to 18.....	1,600′

18, 14 storage-battery locomotives were installed, for tram-sceola lode.

on the Osceola lode covered 10,192′ in 1918, compared with

rsarge Amygdaloid bed outcrops about 2,200′ east of the gdaloid and 2,900′ east of the Calumet conglomerate, with and dip of about 38°, underlying the entire main tract. De-s begun August, 1903, and there are 3 shafts, numbered from , each having 3 compartments and being practically duplicates the Osceola amygdaloid. The shafts above the ledge are th steel, brick and concrete, the hanging wall being lined with rick, laid in 3 to 5 courses, thickness being increased with ted by 2 rows of I-beams, which serve also as dividers for the Kearsarge bed, as opened by these shafts, is erratic, though ches of ground that probably will yield 18 to 22 lb. fine copper reasonable selection. No work has been done on this lode inning of the strike, July 23, 1913.

aft, about 1,000′ south of the Centennial boundary line is 1,350′ s closed down December, 1907. No. 20 shaft, next south of No. ,350′ in depth, and idle also.

ie southernmost shaft on the Kearsarge bed, is 8,000′ south of at shallow depth, showed well in copper, but deeper workings promising, the rock yielding only about 12 lbs. of copper per nined. The shaft is 2,291′ deep; not working since July, 1913.

rium property carries about 1½ miles of the strike of the ed, with 280 acres of underlay. The Laurium shaft, started 09, as a result of previous diamond-drill borings, is about 2,200′ W. corner of Sec. 26, and about one-half mile N. of No. 1 aft. The shaft is 1,661′ deep, with about 7,000′ of workings. s closed in 1913, at the time of labor strike. When operations ed, workings on the 12th, 14th and 15th levels were in poor wing little copper. Equipment included a boiler-house, en-ith a large hoist and air-compressor, and a change-house.

met amygdaloid, lying between the conglomerate and the Osceola has been little opened, but might prove payable, as it shows round in a crosscut on the 900′ level.

ntt on surface at the Calumet & Hecla is probably the most allation to be found in the world. With few exceptions every-ieated, to prevent possible delay or suspension, by reason of nt.

er-plants at the main mine, on the Calumet conglomerate, e boiler plants and 6 hoisting plants. The hoists of the con-e are very powerful, ranging in capacity from 1,000 to 5,600 men are carried to and from work, in the incline shafts, by ong trucks having tiers of circus seats, replacing hifted quickly on or off the skip tracks by large ven the safest, quickest and cheapest for ncline shafts.

group of the most powerful mining contains the 2,500-h. p. Corliss 72″ stroke; the auxiliary engines 600 h. p., respectively; 2 Rand

air compressors, of 25 and 40-drill capacity, and the engine "M
4,000-h. p. quadruple-cylinder triple-expansion steel giant, operat
berg air compressors with a combined capacity of 500 drills.
are four 35-drill auxiliary compressors. In the old Riedler
water was injected into the compression cylinders, while the
machines deliver the compressed and greatly heated air to a
steel cooler, 12' in diameter and 30' high, into which water is sp
above and drawn off at the bottom, this cooling the air to 80°
is supplied by batteries of boilers in 2 boiler houses adjoining. L
haul the coal into the boiler-houses, where it is fed to the grates

The Hecla engine-house, flanked by a large boiler-hous
the 1,200-h. p. compound hoisting engine "Frontenac" and
engines, of 600 h. p. each, also a 30-drill Rand air compressor an
water-plunger air compressors, with combined capacity of 144
the largest machines of this type ever constructed.

South of the Hecla plant is the "G. H. & S." engine house,
"Houghton" and "Seneca" engines, of 1,300 h. p. each. The B
house has 5 large boilers and a 200' smokestack, of 9' 6" interna

The engine house operating Hecla shafts Nos. 7 and 9 c
engines "Hancock" and "Pewabic," each of 1,400 h. p., which
drums by spur gearing, and two 600 h. p. vertical compound
man cars. Boiler-house has 5 boilers and a 250' smokestack
internal diameter.

The South Hecla engine-house at shaft No. 11 has a 1,000-h
wood hoist.

The Red Jacket shaft has two 2,850-h. p. triple expansion
in an adjoining building are five 300-h. p. boilers. In raising 1
perpendicularly from a depth of 1 mile, the weight of the cag
cable nearly equals that of the cargo of rock, but with the aid
balance the engines can hoist 10-ton loads at a speed of 40 mile
the regular hoisting time being about 90 seconds for the vertic
of nearly a mile, including time taken for starting and stopping,
ment no locomotive could duplicate on a horizontal plane. The e
ates on a system devised by S. B. Whiting, formerly manager
pany. To overcome the dangerous strain caused by unequa
Walker differential rings are placed on the sheaves, the cable
complete turns around the driving sheaves.

Equipment at the Amygdaloid shafts on the Osceola bed is
the same at shafts 13, 14, 15 and 16, the new shaft No. 18, hav
hined engine and boiler house, with a small Lidgerwood hoist.
and 16 have Nordberg first-motion double conical-drum hoists
7½-ton skips in balance, good for 5,000' depth each. No. 14 a
Corliss hoists with 25' cylindrical drums, good for 5,000' depth.
17 and 18 are equipped with small Lake Shore and Lidgerwood
single 5 and 2½-ton skips. All the shafts have permanent shaft r
similar to those of the conglomerate workings. All engine-hous
connections with the main compressor-plants at the old mine.

The machine-shop has an equipment excelled by only a
largest shops in the country, including a 25-ton electric traveling
mammoth planers, with electric power throughout. These shops
of handling anything and everything in the line of repair wor
have complete manufacturing facilities for the making of mini
and smelting machinery, and have turned out hundreds of Wi
and other special machinery, under agreement with the own
patents.

The foundry has 2 iron cupolas and a brass foundry, wi
electric [illegible] crane. The pattern shop has 2 departments,
shop [illegible] for storing patterns.

[illegible] with as complete a line of
[illegible] conical woodworking mach

ith shops are as large as those of the largest manufac-
ery, and are fully equipped. The Calumet shop alone
s of 50 tons of steel drills daily. The Hecla shop does
l forging for the entire mine. The various shops employ
lacksmiths.

ctric plant of 12,000 h. p. capacity is at the mills, in Lake
bstation at the mine.

ilding is a large and handsome stone structure, housing
tive departments and the engineering force of the mine.
rivate telephone system has an exchange with about 220
ding a number of deep underground stations, with local
connections.

& Hecla public library had 45,000 volumes in 1917; ranks
circulation in the State of Michigan, with an attendance
of 88,040 in 1917. In addition to books in English, there
nan, French, Italian, Swedish, Norwegian, Slavonian, Pol-
innish and Croatian, with periodicals and newspapers in a
s, about 30 different nationalities being represented on the
l. There also is a branch library and reading room at
employees of the stamp-mill and smelters.

maintains a hospital, for employees solely, with com-
l laboratory apparatus and a dozen physicians.

owns about 1,200 dwellings, furnished to employees at an
6% on actual cost, plus cost of maintenance, and upwards
are owned by employees on lands leased from the com-
ly rentals. This low rent is equivalent to an increased
with Western mines.

school houses on the lands of the Calumet & Hecla, most
lt by the company, including a fine manual training school,
ificent high school building at Calumet.

t Hecla lands there are upwards of 30 churches, of a dozen
ations. All of these sites were donated by the company,
substantial aid has been given in their erection and main-
regardless of creed.

built a $50,000 bath-house containing tubs, showers and a
g pool. A charge of 2½ cts. per bath is made, except in
rtment, which is free to women and children. The charge
cost of washing the towels and in no way compensates
of the bath-house proper.

919, C. & H. and its subsidiaries announced that it had
et life insurance policy covering the life of each of its
s ranging from $1,000 to $1,500, without cost to the in-
act amounted to $10,000,000.

maintains 4 distinct systems of waterworks, one at the
one at the mills in Lake Linden, and two on the shore
4 miles N. W. of Calumet. The Lake Superior plants
omestic uses at Calumet against a head of 733', with an
l pump of 3,000,000 gals. daily capacity and also fur-
mill and smelter boilers, on Torch lake. At the Calu-
e there are 7 pumps, having a combined daily capacity
00,000 gallons.

maintains a fire department, affording protection to the
d locations, and responding to calls from Red Jacket,
other towns that go to make up the mining camp of
00 population.

Torch Lake standard gauge railroad, owned by the com-
mines, mills, smelter and shops by upwards of 20 miles
urs and sidings. Equipped with 250 forty-ton steel rock
comotives.

in front and 3 railways at the rear. The smelter has 4-stone fr
ings, and a 50x70' furnace building, both blast-furnaces and re
having been rebuilt within the past few years. There are 18 rev
which are top-charged, having platforms above on which th
thoroughly dried before charging. The blast furnace is 40
tuyeres its comparatively small size being due to the use of r
furnaces for the bulk of the smelting work. A new steel-fr
building houses three 150-ton reverberatory-furnaces, of so-c
pattern, modeled after the furnaces of the Lake Superior Sme
fining Co. The practice of the smelting plant is fully abreast
in all essentials. In November, 1916, another furnace was blo
smelting works have an assay-office, a laboratory, and a large w
supplies.

The electrolytic plant, 155x270', at Hubbell, has superseded
reduction plant, which has been abandoned. It is built of stee
contains four 7½-ton traveling cranes and 512 lead-lined wo
3'x11'x3' 9" deep, in 4 sets of 128 tanks. Each set is arranged
of 32 tanks, and each section in two tiers. The electric current
by four 125-volt direct current generators driven by alterna
motors operating on current transmitted at 13,000 volts from
plant at Lake Linden, transformed to 2,300 volts. There is a
circulation through the deposition tanks of the electrolyte wi
about 3 to 4% copper and 10 to 12% sulphuric acid. The
capacity of 65,000,000 lb. copper per year. Company mark
copper. This plant also recovers several hundred thousand o
ver yearly.

There is 1 concentrate or mineral house, with a storage
18,000 tons, at Hubbell. Calumet & Hecla concentrate, locally
eral, carries less than 60% copper.

The power plant at the smelter has three 125-h. p. boiler
of the two large reverberatory furnaces has a 300-h. p. boi
through which the waste gases pass.

The dock system of the Calumet & Hecla is extensive, inclu
of very large coal sheds at Lake Linden and a series of docks
and smelters on Torch lake. An electrically operated coal bri
of handling, from vessels, 10,000 tons per 24 hours was comp
spring of 1918. This bridge will unload all coal formerly hand
and 2 docks.

The Calumet & Hecla owns and operates the ship canal
Torch lake with the government waterways on Portage lake
being 21' deep and accommodating the largest vessels plying
Lakes. Tolls, ranging from 10 cts. on soft coal to 50 cts. per ton
freight, are charged by the company on independent cargo
Torch lake through this canal.

The company owns extensive tracts of pine, hemlock an
timber along the southern shore of Lake Superior, this land
tween 400,000,000' and 500,000,000' of standing timber. The co
has a long term timber contract with the Keweenaw Associatio
buys extensively of jobbers, the requirements for undergroun
alone being 18,000,000' annually, in addition to the many mil
timber and lumber used on surface at the mines, mills and sme

Conservation: In 1918 cost $1,179,588, which compared wi
in 1917

[illegible] conglomerate from the old Calumet & H
[illegible] tendency in metal conte
[illegible] 100 lb. of fine co
[illegible] in 1880, [illegible]
[illegible] or 5.244 lb. in

Recent Net Returns.

	Cu. per ton			Cu. per ton	
	%	Lb.		%	Lb.
..	1.98	39.68	1913.....	1.39	27.85
..	1.80	35.96	1914.....	1.32	26.38
..	1.66	33.14	1915.....	1.49	29.74
..	1.51	30.12	1916.....	1.50	29.97
..	1.52	30.38	1917.....	1.44	28.78
..	1.49	29.73	1918.....	1.40	28.00

ceola Amygdaloid Returned:

Lb. of Ore per ton		Lb. of Ore per ton		Lb. of Ore per ton
18.45	1911.....	15.89	1915.....	13.31
17.67	1912.....	15.08	1916.....	13.60
16.40	1913.....	14.31	1917.....	12.79
15.82	1914.....	13.62	1918.....	11.58

as shown a steady decline since 1906, in which year the ,023,420 lb. fine copper was reached, and in 1913 was only per, climbing to 53,691,562 lb. in 1914 and 71,030,518 lb. ion in 1913 and 1914 was seriously affected by the labor the Western Federation of Miners on July 23, 1913, and April 12, 1914, and by the extraordinary conditions pre- per market in 1914, due to the European war. The mine a ¾-time basis from September 1, 1914, until February 1, was resumed on full time.

nd costs since 1910:

	Lb. Cu. per Ton Ore	Mine Cost per Ton Exc. Cons.	Copper Production Lb. *	Cost per Lb. for Cons. Cents	Net Cost per Lb. Cents	Rec'd. per Lb. Cents
ed						
92	20.42	$3.07	18,419,826	....	19.29	24.28
70	21.65	2.52	58,722,969	....	13.01	28.39
74	22.53	2.03	71,349,591	0.60	11.03	25.48
83	22.28	1.71	71,030,518	0.47	9.33	18.11
62	20.70	1.85	53,691,562	1.00	11.35	14.01
25	22.11	2.38	45,016,890	1.54	14.25	15.77
10	24.18	1.91	67,856,429	0.80	9.86	16.65
72	25.47	1.84	74,130,977	0.27	8.52	12.82
e Lode:						
03	28.00	4.09	43,329,816	....	.....	.....
21	28.78	3.26	50,415,860	....	.....	.....
94	29.97	2.63	51,785,016	....	10.75	.....
84	29.74	2.13	51,738,588	....	8.69	.....
86	26.38	2.37	37,996,045	....	10.42	.....
59	27.85	2.99	32,731,768	....	12.67	.....
60	29.73	2.23	51,935,243	....	8.86	.....
80	30.38	2.07	58,469,399	....	8.25	.....

Osceola Lode, Amygdaloid:

	Tons Treated	Lbs. Cu. per Ton	Cost p. t. Excl. Cons.	Copper Lbs.*	N pe
1918.....	1,328,789	11.58	1.88	15,393,153	....
1917.....	1,407,949	12.79	1.60	18,003,966	....
1916.....	1,438,480	13.60	1.32	19,564,575	....
1915.....	1,448,599	13.32	1.07	19,291,930	....
1914.....	1,152,476	13.62	1.19	15,695,517	....
1913.....	842,162	14.31	1.53	12,051,238	....
1912.....	1,040,600	15.08	1.36	15,692,199	....
1911.....	985,492	15.89	1.34	15,661,578	....

* Plus copper recovered from Torch lake which totaled 1918, 9,075,457 lb. in 1917 and 5,412,649 lb. in 1916.

Production for 1919 was 53,859,146 lb.

Kearsarge Lode, Amygdaloid:

1913.....	18,203	.....	....	233,915	....
1912.....	19,050	.....	....	228,985	....

In 1904 the Calumet & Hecla Mining Co. started a pensi tain employees who had attained the age of sixty years or had been in the company's employ twenty years or more, we pension proportionate to their length of service and their pensions have run from $9 per month to $38 per month.

On July 15, 1916, the C. & H. celebrated its 50th anniv service medals were given to 1,371 employees; of these, 169 who had worked over 40 years, 380 for between 30 and 40 mainder for between 20 and 30 years.

Reviewing the 53 years' career of this company, several fe attention. To the investor, the total dividends, $155,750,000 vestment of $1,200,000 is not only remarkable for its amou dividends have been continuous.

To the technical man this record is particularly notewo mining record is considered. Beginning in 1866, with a sm from the rich native copper ore of the Calumet conglomerate, present daily production is 10,000 tons, mined by 17 shafts, s a mile deep. The yearly production of copper is from 65 pounds, with a record amount, 100 million, in 1906.

This production comes from very low-grade ore—lower that of the Utah Copper or other great porphyry deposits. nally mined, carried nearly 5% or 100 lb. of copper per ton, of ore decreased from year to year as depth was gained until 1.4% or 28 lb. copper per ton of ore. The maintenance of spite this decrease in metal content is due to the ability of th in keeping down costs, so that a pound of copper is no cheaply from the lean ore as it was from the richest ore. T also saving over 9,000,000 lb. of copper annually by retreating or tailings made many years ago at its mills and dumped in [illegible] plant which gives a new youth to [illegible] carrying flake copper.

[illegible] Calumet conglo [illegible] ually be extra

CO. **MICHIGAN**

ughton, Mich.

l Smith, pres.; John T. Reeder, v. p.; John W. Black, sec.-
H. Rice and Jas. P. Corgan, directors; A. H. Meuche, supt.
Michigan, to take over the Norwich mine, owned by the
Mining Co. **Cap.**, $3.750,000; shares $25 par; 40,000 shares
e property and 20,000 issued to the public at $3 per share,
nd-drill campaign. Annual meeting, last Monday in June.
980 acres, in Ontonagon county, T. 49 N. R. 41 W., near the
R. R., has several well-known lodes crossing the ground.
t: by 9,550′ of diamond-drilling, which discovered an un-
f shot and mass-copper. This will probably be developed
tunnel. Work stopped August, 1917, until materials and
le at reasonable prices.

COPPER MINING CO. **MICHIGAN**

f Calumet and Hecla Mining Co.

Ashburton Place, Boston, Mass. **Mine office:** Calumet,
ty, Mich.

Rodolphe L. Agassiz, pres.; Jas. MacNaughton, v. p.-gen.,
Fay, Dudley S. Dean, E. B. Dane, and J. T. Burnett, direc-
sell, sec.-treas.; G. L. Osgood, Jr., asst. sec.-treas.; J. H.
capt.

Michigan, as successor of Centennial Mining Co. **Cap.**,
s $25 par; issued, $2,250,000; paid in, $19.50. Last assess-
$4. Calumet and Hecla owns 41,500, or 46%, of the 90,000
ng. Company owns 16,164 shares of the 100,000 shares of
g, Smelting and Ref. Co. American Trust Co., Boston,
Old Colony Trust Co., Boston, registrar. Annual meeting,
April. Listed on Boston Stock Exchange.
Sept., 1916, $1 per share; 1917, $1; 1918, $2, amounting to

$6,046 net in 1911, $50.511 net in 1912, $31,397 in 1913, $3,213
$142,440 in 1915, $276,546 in 1916, $145,399 in 1917 and

eet, December 31:

Current Assets			Current Liabilities		Excess
, etc.	Supplies	Total	Acct's. Pay	Reserve	of Assets
3,467	$45,637	$479,104	$33,387	$15,000	$430,717
3,333	66,389	474,722	34,230	4,384	436,108
4,858	30,344	485,204	36,835	.....	448,368

the Centennial and Wolverine companies exchanged rights
t 1 acre of ground each.

70 acres, Sec. 12, T. 56 N., R. 33 W., and a triangular patch
es, at the S. E. corner of the main tract, bought to secure
the Kearsarge lode, and including about 10 acres, bought
l Colony, for the surface plant. The first work was done,
hoolcraft Mining Co., which failed to open a paying mine,
nized, 1876, as the Centennial Mining Co., and again re-
with present title. Expenditures of upwards of $1,500,000
he old company in unsuccessful efforts to open a payable
thern extension of Calumet conglomerate. Seven shafts,
depth, were sunk on this bed, No. 3, the deepest, being
. The Centennial lands are in the great mining area of
available for building purposes. Two additions have been
rights sold at good prices, mineral rights being reserved
in did a little work, 1897, on the old conglomerate
to the Osceola bed, deepening 2 shallow shafts

2,339' deep; "E" shaft, 1,300' south of "B" and 3,900' nort
boundary, is 2,388' deep. The third level of "E" shaft has b
toward the Globe boundary. "F" shaft, started 1,300' sou
abandoned on account of treacherous overburden, but the
located, 1907, by diamond drill at a new site, 1,800' south o
north of the Globe boundary.

New work in 1918 was 3,348' of drifting, 35' of cross-c
raising and 95' of shaft sinking.

Equipment: the shafts are practically duplicates in all e
lars, having 40x50' shaft rock houses, with 90-ton ore bins.
each rock house includes a steam hammer for heavy copper,
rock crusher, taking everything hoisted from the mine dir
The shafts have duplicate first-motion hoists with 24x60"
and double conical drums of 14' diameter, with capacity for
each, hoisting 6-ton skips. The boiler houses have Bradley
with coal trestles connecting. Water for boilers is furnishe
000-gal. dam.

Extensive use is made of electric power on surface,
some underground electric pumps. The electric plant at
250-k. w. generator, direct connected to a cross-compound

The main steel compressor building at "F" shaft has
berg quadruple expansion 2-stage air compressor, with capa
9,120 cu. ft. of free air per minute to a pressure of 70 lbs.
compressor operates at a steam pressure of 280 lbs., and ha
feed-water system. Power is furnished by three 250-h. p. w
At "B" shaft there is a 40-drill cross-compound 2-stage air
vertical receiver inter-cooler. The electric plant, with a 100
is in the main compressor building.

Buildings at the mine include a change house, dwellin
shop, with traveling crane and trolley rail for its entire
30-h. p. electric motor.

The stamp-mill is at Freda, on Lake Superior, 2 miles w
Low-pressure turbine and accessories were installed in 191
6 stamps, there being 4 compound stamps, with 15½" cylin
ing about 700 tons daily, and 2 simple stamps, with 28" cy
660 tons daily capacity each, giving the mill a total capac
tons daily.

The concentration department was remodeled, 1908,
tional tables and larger settling tanks. The wash for the
gradnated adjustable-speed jigs, with plungers working si
alternately, in pairs, jigs and concentrating tables. Raggin
by crushing rolls having 1 roll fixed and the other in a spri
preliminary discharge from the stamp heads is treated on
having 30x48" sieves, of punched steel, with one-eighth in
stalled in connection with the head. Each head has a V
tank, 40' long, 9' deep, 12' wide at the top and 6" wide at th
being drawn from spigots at the bottom. The flow of w
settling tanks does not exceed 6' per minute.

The boiler house has four 200-h. p. Stirling and 5 Scote
In 1916 a 215' concrete stack, 100" dia. at top, was constru
boiler installed. Coal is brought to the boilers by tram,
un[illegible] be a grinder before feeding to the grates, and
ins[illegible] boiler. Exhaust steam passes
d[illegible] which water is fed to th
[illegible]-compound engi
[illegible] traveling crane
[illegible] and boilers co
[illegible] coal with lo
[illegible] ashes and

ib has an area of 45 sq. ft. and, with a second crib, the tunnel could for 10 stamps. Water cost was less than 1½ cents per ton of ore eens have been installed in the tunnel, obviating the trouble former- sand and wood pulp in the water. A sand loading plant was erect-

on:

Ore Stamped Tons	Copper Produced Pounds	Yield per Ton Pounds	Cost per Pound	Price Received	Net Profits
.. ..	19,886,917	....	....	....	.....
594,235	21,748,514	36.59	12.03c	24.75c	$2,791,800.38
776,036	27,550,343	35.50	10.40c	28.73c	5,050,171.57
936,656	33,601,136	35.87	07.80c	25.28c	5,870,606.26
923,743	33,407,599	36.17	06.30c	17.40c	3,709,049.02
614,854	15,807,206	25.71	09.21c	13.38c	658,175.99
421,849	12,080,594	28.64	10.71c	14.89c	504,767.61
765,306	17,225,508	22.51	08.88c	16.16c	1,251,619.40
734,392	15,639,426	21.29	09.63c	12.54c	454,588.61
722,051	19,224,174	26.62	07.85c	12.74c	939,205,03
753,908	18,005,071	23.88	08.45c	13.00c	816,637.55
794,703	17,786,763	22.38	09.01c	13.39c	777,480.14
708,685	16,489,436	23.26	11.76c	17.28c	909,383.88
671,785	16,954,986	25.24	09.30c	10.06c	1,654,435.23

mpion is one of the largest and richest of Lake Superior mines and irably managed.

E COPPER CO. **MICHIGAN**

: J. A. Thomas, supt., Houghton, Mich. **Mine office:** Winona, ounty, Mich.

: W. A. Hodgson, pres.; Linus Stannard, 1st v. p.; Deen L. nd v. p.; Wm. D. Calverly, sec.-treas.; with J. H. Rice, B. F. F. W. Nichols, directors.

ril, 1910, in Michigan. **Cap.**, $2,500,000; $25 par; issued, $1,750,- h 49,000 shares were given for lands, 5,000 shares went to the and 16,000 shares were sold to the public at $5. Paid in $5.50 st assessment of 50c. paid March 26, 1917. Boston Safe Deposit o., transfer agent; International Trust Co., Boston, registrar. oston Curb. Annual meeting second Tuesday in April.

t for December 31, 1917, shows receipts of $22,227; previous 926. Expenditures was $27,066, of which $25,264 was spent aving cash on hand $12,486. In August, 1919, there was $20,000 y.

880 acres, Sec. 2 and S. E. ¼ of Sec. 31, T. 51 N. R. 37 W., the Bohemia and King Philip, 1 to 2 miles S. W. of the latter, owned by the Penn Mining Co., and later by the ill-starred Ltd. Land entirely on the mineral belt, formerly included e Lake mine of the Lake Copper Co., and carries upwards copper-bearing formation, presumably carrying the Ever- nond-drilling began in 1913. No. 6 drill-hole cut a cupriferd bed of 32' width, of which 5' carried good copper. mygdaloid to epidotal amygdaloid in character with gen- and dip of 62°, having barrel and shot copper in surface idth of 30' to 45°.

by shaft down 450', with openings at 110', 220', 320' and fts following the vein (N. E.-S. W.), from each station 53' A fault plane crosses shaft at No. 3 station; it dips disturbed ground is unknown.

compressor, pumps, etc. Work suspended Dec., 1917. 1920.

CLARK MINE

Office: care Dr. Leon Estivant, owner, 47 Ave. de l'Alma, P
Mine office: Copper Falls, Keweenaw county, Mich. Fred W.

Property: 2,433 acres, includes mine formerly known as th and Montreal, about 3 miles south of Copper Harbor, between Hooe on the north and Breakfast on the south, including Lak Mine, opened 1858, for copper, also carries a promising 2' of pyro of assays, 1900, by Duparc, of Geneva, giving 55.73% mangane copper. Was tested, 1905, and again, 1910, by diamond-drills. 1,200 tons of high-grade manganese ore. Was under option, 19 States Smelting, Refining & Mining Co. Fully described Vol. II.

Idle for years.

CLIFF MINING CO.

Subsidiary of Calumet and Hecla Mining Co.

Office: 12 Ashburton Place, Boston, Mass. **Operating off** Mich. **Mine office:** Phoenix, Keweenaw county, Mich.

Officers: Rodolphe L. Agassiz, pres.; Jas. MacNaughton, mgr., with Geo. A. Flagg, R. C. Grew, W. E. L. Dillaway and W well, directors; C. H. Bissell, sec.-treas.; Geo. L. Osgood, Jr., asst.

Inc. Jan., 1910, in Michigan. **Cap.**, $2,500,000; shares $25 $1,500,000, $13 paid in. Is controlled through ownership 28,785 sh met & Hecla Mining Co. State Street Trust Co., Boston, registr Trust Co., Boston, transfer agent. Listed on Boston Stock Exch meeting, first Wednesday in April.

Assets and Liabilities:

	Current Assets			
	Cash & Accts. Rec.	U. S. Cert.	Supplies	Accounts
1918.....	$16,209	$10,000	...	$137
1917.....	19,854	.....	$495	1,731
1916.....	20,954	.....	492	110

Property: includes the Cliff mine proper, and the South Cl underground on the third level. The Cliff mine, 2 miles N. E. of is the oldest mine in the Lake Superior district, opened 1846, clos reopened 1872, and abandoned 1878, paying dividends, 1849-79, of $ old mine was opened on a fissure vein crossing the bedded form tically right angles, and was pretty thoroughly worked out befor was abandoned. The main fissure vein had several feeders, and independent fissure veins, including the West vein, which was rich surface, and the East Cliff vein, about an eighth of a mile east of The Cliff was notably rich in native silver.

The Cliff carries the Kearsarge amygdaloidal bed for about for practically unlimited depth, the shaft being a trifle less than the most northerly shaft of the Ojibway, which is the nearest o Kearsarge lode. The Tamarack Mining Co., which owned the C secured a complete geological cross-section of the tract, by dia 1903-'07, the location of the Kearsarge bed being proven by 12 majority of which were said to show commercial values, and, in property carries about 20 other amygdaloidal beds, east of the gr which is such a prominent feature of the landscape, rising to a hei hundred feet. A 217' vertical shaft was sunk, 1910, entering the ground is considerably disturbed. Work in this shaft was ab as the Kearsarge vein at this place proved narrow, dry and barre

Five diamond-drill holes were put down dur[illegible] the beds eastward in the hope of finding a prof[illegible] sandstone. The cross-section crossed the horizo[illegible] and St. Louis amygdaloid lodes and the Bohen[illegible] lodes, but very little copper was disclosed by thi[illegible]

s the first mine ever opened for native copper, and production,
b., which was the first commercial output of copper from Lake
production, 1845-'82, was 38,054,340 lb. fine copper.
919, company sold a mill-site of 346 acres on the northerly side
oint to the Seneca Corporation.
includes a power house, with boilers, duplex hoist, and a 5-
sor. Buildings include a smithy, changing house, combination
ouse, boarding house and a number of dwellings. The mine is
eewenaw Central railway.
unsatisfactory assays of the drill cores, property has been idle

)PPER CO. **MICHIGAN**

tate St., Boston, Mass. **Mine office:** Houghton, Mich.
arry F. Fay, pres.; C. J. Morrisey, sec.-treas.; with W. A.
3. Cram and John G. Stone, directors. G. S. Goodale, supt.
910, in Michigan. **Cap.**, $2,500,000; $25 par; paid in $2.50.
cholders, March 21, 1918, the capital stock was reduced from
500,000 by redemption of 100,000 shares in treasury. Annual
ursday in March. American Trust Co., Boston, transfer agent.
t Co., Boston, registrar. Listed on Boston Curb.
a reorganization of the Elm River Copper Co., whose share-
ven the privilege of exchanging their stock for shares in the
Co. on the basis of share for share, on condition that they sub-
ional shares at $2 each, to the extent of 50% of their holdings
ractically 75% of Elm River stock was exchanged and the Con-
title to all the real estate and personal property of the former
has been dissolved.
ary 1, 1919, showed cash on hand, $4,450.
,360 acres, in one continuous tract, within the limits of the
ormations in Houghton county, Mich. Within these limits the
naximum distance along the strike of 16,900', a width of cross-
' and embraces the horizons of all the copper-bearing beds of
ormation, between the Eastern Sandstone and the upper part of
s.
nt: nearly a complete cross-section has been secured by
0' of diamond-drill holes, despite the heavy overburden on nearly
Cores show copper in a number of different beds, but not in
ities. On July 1, 1915, drilling was resumed in the S. E. ¼ of
gate the horizon believed to contain the so-called No. 8 Amigda-
e neighboring Wyandot property and correlated with the Baltic
the mines of the Copper Range Co. are located. Up to March,
' of drilling had been done and the lode definitely located at
d 950',' respectively, from the outcrop. In hole No. 20, 2,518' of
mplished between March 1 and June 29, 1916. In hole No. 20
ted between 1,878' and 1,958'; in No. 21 between 641' and 671'.
a formation has been indicated of about 35' average thickness
mly favorable character of rock.
includes a duplex hoist good for 1,000', 2 Burt marine
drill air-compressor. Water is taken from a dam by a Blake
include a carpenter shop, two-story warehouse, boarding hous-
ons for 100 men, school house and a number of dwellings.
rotect the company's cash, work was suspended in 1916 and no
loration has been carried on awaiting the result of
on the ground north and south of the company holdings.

N MINING CO. **MICHIGAN**

1902, in Michigan. **Cap.**, $2,500,000; increas
par; issued, 66,200 shares. Company in
ss Copper Co., for 40,000 shares of latt

COPPER RANGE COMPANY

Office: 82 Devonshire St., Boston, Mass. **Mine offic** Houghton county, Mich. Sales Dept.: 32 Broadway, New York.

Officers: Wm. A. Paine, pres.; F. W. Denton, v. p.; F. V treas., with L. P. Yandell and R. H. Gross, directors; William H mgr. W. Parsons Todd, sales mgr., New York; John M. Wagne Houghton, Mich. American Trust Co., Boston, transfer agen Trust Co., Boston, registrar. Annual meeting, first Wednesday

Inc. 1899, in Michigan. **Cap.**, $10,000,000; increased 1915 fr shares $25 par; 394,309 shares issued December 31, 1918; reserve of 691 shares treasury stock, 5,000 shares. The company is the s Copper Range Consolidated, which December, 1901, took over 9 that company's stock. On October 18, 1915, this holding compan dissolved and the shares exchanged for those of the Copper Ra on Boston Stock Exchange.

Dividends: $1,536,086 in 1905; $2,304,810 in 1906; $2,30 $1,536,740 in 1908; $1,536,930 in 1909; $1,537,340 in 1910; $1,3 $788,428 in 1912; $1,084,498 in 1913; $1,182,003 in 1915; $3,941, share, in 1916; $3,943,912, or $10 per share in 1917; $2,366,390, in 1918; $3.50 per share in 1919; 50 cents in March, 1920; total, $

Balance Sheet for years ending December 31:

Assets—

	1918	19
Cash at Boston	$1,020,575	$60
Cash and supplies at mine	931,076	1,10
U. S. Bonds and Cert. of Indebt.	2,700,000	3,16
Copper on hand	470,329	1,71
Copper delivered, not paid for	675,843	..
Employees unpaid Lib. Loan and subscriptions	49,945	..
Michigan Smelting Co. stock	340,000	34
Balance due from U. S. Government as compensation for Co. Range R. R. Co.	108,781	..
Copper Range R. R. Co. bonds	870,000	87
Accounts receivable	280,425	3
	$7,446,974	$7,83

Liabilities:

	1918	19
Mine indebtedness	$355,000	$21
Accounts payable	44,565	28
One-half Champion	1,039,881	1,12
Excess of assets	1,007,528	6,21
	$7,446,974	$7,83

At close of 1919, company had about $5,000,000 in net quick of copper metal stocks. Exclusive of taxes and reservations, co 15c a pound, for the 33,000,000 lb. output.

Net income for 1918 from operations of all the subsidiary c deducting dividends was $2,895,615, which compared with $4, and $6,078,189 in 1916. Federal income and excess profit tax, 1917 operations amounted to $711,905, taken out of the surplu 1917 account. Taxes as due 1919 are taken from previous years'

Holdings consist of the entire assets of the Copper Ran Company's treasury holds: 50,000 shares of Champion Copper the total issue; 97,001 shares Atlantic Mining Co.; 99,690 shar Mining Co., and 42,443 shares Copper Range Railroad Co.

The Baltic Mining Co., absorbed by the Copper Range Co solved and the mine operated as the Baltic mine of the Copper R

ıntain Mining Co. was ordered dissolved by Houghton County
January, 1917. On appeal of dissenting stockholders, the de-
rsed in March, 1918, and company will continue to operate as a
ıtion.

23,517 acres, mainly in Houghton county. Mining companies
an additional 12,240 acres. In 1916 company secured an option
lying to the south from the St. Mary's Mineral Land Co. and
00 scattered lands to the extent of 5,000 acres in Houghton and
ıties, from the South Range Mining Co. During 1917, company
acres, surface and mineral rights, also the mineral rights on
e price paid was approximately $50,000.

ny's original tract of 9,360 acres mineral and 441 acres non-
s between the Baltic mine (800 acres) on the south and the Tri-
l acres) on the north. The Champion lies between the Baltic
ry's Mineral Land property. The Atlantic mine has been idle
was wrecked by air blasts in 1911. The Baltic mines a highly
ygdaloid bed 15'-60' wide, through three shafts more than 2,500'
ampion works three separate amygdaloid beds mined by four
2,000 deep. The Trimountain output comes from the Baltic
shafts, one 3,225' deep.

ıy is the second largest producer of the Lake Superior district.
total production of copper from the Baltic, Trimountain and one-
Champion mine was 26,623,940 lb., as compared with 32,368,103
37,946,930 lb. in 1916. The average yield in 1918 was 34.42 lb. of
from 1,089,269 tons stamped, compared with 32.97 lb. per ton
tons stamped in 1917.

Costs and Profits, 1918.

	Production, lb.		Cost p. lb.		Price Rec'd.	
	1917	1918	1917	1918	1917	1918
.....11,214,861		10,406,097	13.769c	15.07c	28.735c	24.757c
..... 6,278,097		5,343,586	15.223c	18.42c	28.735c	24.757c
) 13,775,172		10,874,257	10.404c	11.92c	28.735c	24.757c
31,268,130		26,623,940	12.579c	14.46c	28.735c	24.757c

Copper Range Co.

	Production, Lb.	Cost Per Lb.	Profits	Price Rec'd., c.
.....	22,082,499	.....	.....	.....
.....	26,623,940	14.46c	$2,741,468(a)	24.757
.....	31,268,130	12.58c	5,051,650	28.735
.....	37,946,930	9.56c	5,964,020	25.28c
.....	37,035,642	8.06c	3,459,236.44	17.4c
.....	19,953,854	10.66c	541,961.06	13.38c
.....	18,767,359	11.71c	595,958.01	14.89c
.....	28,967,428	10.51c	1,631,676.10	16.16c
.....	29,310,579	9.74c	817,879.86	12.54c

ximately; exclusive of depreciation and depletion, which amount-
lb. of copper produced in 1918; 3.2c in 1917 and 3.1c in 1916.

fell off in 1917 and 1918 due to scarcity and inefficiency of

ent: new work in 1918 totaled 25,536' compared with 37,766'
dition, raises in 1918 totaled 2,526' compared with 4,184' in 1917.
57,364 was expended diamond-drilling the lands under option from
Mineral Land Co., but no important discoveries were made.
any's output was sold in 1917 for the highest average price ever
y copper company, namely, 28.735c per lb. In 1918, despite the
h copper was sold at prices established by the Government, the

high price received of 24.757 cents was due to fact that company well forward. Copper Range is an assured success, and worthy that has been given it.

Copper Range Consolidated Co.

Company dissolved October 18, 1915, shareholders receiving ber of Copper Range Co. stock in exchange.

Copper Range Railroad Co.

Office: 82 Devonshire St., Boston, Mass. **Operating off** Mich.

Officers: Wm. A. Paine, pres.; F. W. Paine, v. p. and s John H. Rice, Frederick W. Denton, Thos. S. Dee, Wm. D. Cal Stanton, directors.

Inc. 1899, in Michigan. Cap., $5,000,000; shares $10 $4,244,300. Debentures outstanding, $2,280,000 first-mortgage 5% pany is authorized to issue bonds to extent of $20,000 per mile of line, and $15,000 per mile of completed branch lines and side- trolled by Copper Range Company. Balance sheet of Decembe cost of road at $6,249,264, with equipment inventoried at $954,6 pares with 1917 cost of road, $6,235,621; equipment, $931,628. $930,606 gross and $324,131 net in 1916; $960,275 gross and $228, in 1918, road was taken over by United States Railroad Admi amount due from Government as standard return would be $22 certain adjustments of contracts made in 1917. The gross revenu Government operation was $1,171,804; the net, $100,880. Credit was $799,096. About 75% of the gross income is derived from t ore, mineral and freight.

The railroad has upwards of 100 miles of track, the 65-mil ning from Calumet to McKeever, and connecting with the Ka at Calumet; the Duluth, South Shore & Atlantic, Hancock Mineral Range railways at Hancock and Houghton, and the Chi & St. Paul railway at McKeever. The company also has track miles of the Chicago, Milwaukee & St. Paul railway, between Ontonagon, with additional trackage rights of 73 miles over the which fast freights are operated between Calumet and Channin rights have been given the Chicago, Milwaukee & St. Paul Range between McKeever and Houghton, and a direct passeng exceptionally good equipment, is operated jointly by the Chicag St. Paul and Copper Range lines, between Chicago and Hough nect the main lines with all of the principal mines along the righ

The company owns a half-interest in a bridge crossing tween Houghton and Hancock; also extensive water frontage in the western part of Houghton, with general office building, sh warehouses and wharves for merchandise and coal. The coal w with modern unloading machinery, and has deep water alongs accommodating the largest freighters plying the Great Lake Range railway is a model small road.

Baltic Mine.

Property: 800 acres, near the eastern limit of the Michi about 75 acres being on the eastern sandstone and non-miner comprise all of Sec. 21 except the S. E. ¼, and W. ½ of Sec. 20, T Lands are bounded on the north by the Wheal Kate and Sec. 16 on the east by St. Mary's Mineral Land Co.; on the south by lands of Hussey, Howe & Co., and the Trimountain mine; on Trimountain. Exchanged 39 acres, 1905, with the Atlantic min able the Baltic to sink No. 5 shaft to much greater depth tha sible. To the southward the Trimountain and Champion mine the same lied, which has a strike of N. 63° E., from Baltic sha the northward is the Superior mine, on the same lied. The dip

°, being the sharpest of any developed cupriferous bed in the Lake

ic amygdaloidal bed is exceptionally strong, ranging 15 to 60′ in well mineralized that at most points it can be more or less thorough- m wall to wall. The great width of the stopes has brought about valling system, by which waste rock is built into dry walls along the aving timbering, while giving stronger walls than any timber could aving the cost of hoisting lean rock. The walling system of the oven a success under actual test, and is now in general use in the the credit being due Mr. Denton. A little melaconite is found in es crossing the lode, these being too small to follow, but the black ed in the stopes is saved in milling, with 35 to 40% copper as dressed, eadily with the native copper mineral. The native copper of the nical, and it is probable that some copper arsenides are mined and rrow arsenical fissure veins occur occasionally in the district south ke. While the finished copper is arsenical, it makes wire of great th.

ment: in 1918, amounted to 13,693′ of new openings and 178′ ing, which compares with 14,121′ of new openings and 398′ of shaft 17.

re numbered from South to North.

he discovery shaft, located between Nos. 2 and 3, was sunk at a and was abandoned at depth of 219′.

ie southernmost shaft, 2,839′ deep, began production 1906 and fur- of the 1918 production. The surface plant at No. 2 includes a boiler wo 250 h. p. boilers, and an engine house with an air-compressor re- of free air per minute to a pressure of 70 lb. per square inch, and double-conical drum. The shaft rock house has a crusher operated nd the shaft has concrete stringers.

aft, 1,170′ northeast of No. 2 and 3,498′ deep, has a steel shaft rock circular type, with 1,200-ton bins, equipment including a 16x18″ 18x24″ crushers and a large crusher operated electrically.

aft, 900′ northeast of No. 3 and 2,982′ deep, has a frame shaft rock ed with steel, 36x71′, with 17x31′ wing, 88′ high, with 1,400-ton two 18x24″ crushers.

aft, the northernmost, 885′ N. E. of No. 4 and 1,624′ deep, has a duplicating that at No. 4. Stoping was done on the 9th and 14th ive, and drifts run to the Atlantic boundary. The ground was con- turbed in the upper levels, but is growing more settled at the bottom, owings are reported on the West lode. Hoist is a duplex Nordberg, 00′ depth. Shaft has been abandoned and ground tributary thereto ore hoisted through the No. 4 shaft.

ent: hand power cranes for handling mass copper have been in- shafts, and the mine has electric pumps. In 1915 installation of enerator for underground haulage and construction of transformer w transmission line from stamp-mill was completed.

pressor house, between shafts Nos. 3 and 4, is 36x58′ in size, with ndations, stone walls and steel roof, housing a compressor with educe 4,000′ cu. ft. of free air per minute to a pressure of 70 lbs. djoining is a boiler house of similar material, 49x76′, with wing g four 250-h. p. boilers and a 140′ self-supported steel smokestack. plant supplies steam for shafts 3 and 4. A new boiler plant was n 1916. Adjoining the boiler house is a 360′ coal trestle, of 5,000 tons lerneath being a 5x8′ concrete tunnel, through which coal is hauled , on a down grade, by endless cable. The mine has a complete plant. A considerable town has grown up about the mine with ellings for employees, on lands owned by the company. The prop- d by the Painesdale branch of the Copper Range railroad.

, on Lake Superior, one-half mile west of the Atlantic mill, went ion, 1901, and was enlarged, 1907. The building is of structural

steel, on stone foundation, equipped with 4 Allis simple heads of 5 daily capacity each, and 2 Nordberg compound heads of about capacity each, giving the mill a capacity of about 4,000 tons daily. Wilfley tables, Woodbury jigs and Deister concentrating tables fo finer slimes. The mill has crushing rolls and a Huntington mill and a settling tank for slimes. Mineral carries about 60% fine cop furnished by a 500-h. p. 14x32" Nordberg cross-compound engin h. p. auxiliary engine.

Adjoining the mill is a boiler house with five 250-h. p. boil secured by a set of duplex fans, driven by the mill engine, with a co stack 226' high and 8' in diameter. Behind the boiler house is a 2 storage yard, for the joint use of the Baltic and Atlantic mil brought to the boilers, through tunnels, by gravity. A 1,250-k. plant, installed 1912, at the Baltic mill, supplied power for a number mills at this and other stamp mills of the parent company.

Water for the Baltic and Atlantic mills is furnished by a 51 dam across the mouth of Salmon Trout river. The entire steel st chored to a 2" steel base plate, at the bottom of the concrete, by a of 1½", 2", and 2½" steel rods of 15 to 30' length. Water is ta dam about 20' below the crest by three 38" riveted steel pipes Atlantic and two on the Baltic side. Surmounting this structure the Copper Range railroad.

Production:

	Ore Stamped Tons	Copper Produced Pounds	Yield per Ton, Lb.	Cost pe Pound,
1908	764,117	17,724,854	23.19	08.28
1909	814,260	17,817,836	21.88	07.98
1910	781,419	17,549,762	22.46	08.32
1911	696,795	15,370,449	22.06	09.09
1912	652,433	13,373,961	20.50	10.94
1913	333,289	7,736,126	23.21	11.91
1914	324,433	7,001,945	21.58	11.17
1915	378,443	12,028,947	31.79	09.50
1916	369,287	12,425,804	33.65	10.85
1917	325,342	11,214,861	34.47	13.77
1918	.....	10,406,097	.....	.....
1919	.....	7,864,653	.....	.....
Total	5,439,818	150,515,295	24.31	09.79

The ultimate productive capacity of the mine cannot be predicte but the present milling capacity is equal to making nearly 25,00 copper yearly, and ultimately this output, or even a greater prod be reached.

Trimountain Mining Co.

Company was ordered dissolved January, 1917, by Circuit Cou Houghton, but on appeal by dissenting stockholders the Supre Michigan reversed the dissolution order and company will contin as a separate corporation.

Office: 82 Devonshire St., Boston, Mass. **Mine office:** Michigan.

Officers: W. A. Paine, pres.; F. W. Paine, sec.-treas.; J. asst. sec.-treas., with J. R. Stanton, F. P. Son and F. W. Denton, d Jolly, supt.; Edw. Koepel, mill supt.; H. T. Mercer, engr.; Benj clerk; Richard Bowden, mng. capt.; Wm. J. Richards, master me

Inc. 1899, in Michigan. **Cap.,** $2,500,000; shares $25 par; Controlled by Copper Range Co. through ownership of 99,8 stock. Company owns $110,000 worth of Michigan Smelter Co. st

: $3 in 1903, $5 in 1908, $1.50 in 1910, $3 in 1912, and $2 in
8. Total dividends, $1,950,000.
assets, January 1, 1919, $3,224,325, including $1,696,831 cash and
l amounting to $111,113, compared with January 1, '1918, assets
uding $2,786,899 cash and copper on hand amounting to $57,572.
$96,504 on January 1, 1919, leaving surplus of $3,127,821, com-
ilities of $69,201 and surplus $3,344,776, January 1st, 1918.
1,120 acres, the E. ½ of Sec. 19, W. ½ of Sec. 20, N. ½ of
-E. ¼ of Sec. 30, all in T. 54 N., R. 34 W. The Baltic mine lies
he Champion to the S., with undeveloped lands to the E. and W.
a very heavy sand overburden the mine was opened by drop-
rough alluvium, with raises to surface on the angle of the dip
l formation. The Baltic bed runs 15 to 50', with an average width
Trimountain property. Heavy copper is found near the walls, and
ls of a ton in weight have been found, but values occur mainly
stamp rock.
ountain shafts enter lean streaks or shoots, sometimes 500' in
gth, with flat northerly pitch or rake, underlain by copper ore.
with and about 65' W. from the Baltic bed, is a wide amygdaloid,
heavy copper and considerable ore. This bed has not yet been
ay be made available for production at some time in the future.
th of the lode has led to a dry-walling with waste rock, which is
building underground chutes, which are roughly circular, with
of about 5' and are filled about with waste, as stopes are carried
chutes being built at a sharp pitch, the wedging of the surround-
ng to hold the walls immovable. The saving in timbering brought
valling and building chutes of mine rock is large.
ent: No. 1 shaft, 210' north of the Champion boundary line,
angle of 68°, with first level opened 168' below the collar, levels
00' intervals. The upper levels tributary to No. 1 shaft have been
d the shaft abandoned at depth of 2,284'. It now serves as a waste

ft, 1,023' N. E. of No. 1, was 3,125' deep in the end of 1918, and
improvement has been noted in ground below the 14th level, with
els the best opened in this shaft. The shaft rock house, has 2,000-
nd is equipped with an engine, steam hammer and two crushers.
by a 2,500-h. p. direct-connected duplex hoist, with double-conical
maximum diameter, capable of raising 6-ton skips from 1 mile

ft, 1,027' N. E. of No. 2, sunk at an angle of 68° was 2,563' deep
1918. Beneath 60' of sand, the rock was found to be badly frac-
en down to the 2nd level, only becoming solid and payable below

t, the northernmost, 3,007' deep at the end of 1918, is the best shaft

918, 7,405' of openings were made and 313' of shaft sinking was
f rock hoisted were 252,545, of which 51,112 tons were waste.
nt: the mine buildings near shafts Nos. 2 and 3, include ma-
enter shops, smithy and warehouse. There is a 35-drill air-com-
2 shaft, with a condensing plant in a separate building. The power
3 shaft includes a battery of water-tube boilers and a 4,500' air-
The mine has electric pumps and works about 60 drills. The
ved by the main line of the Copper Range railway, which reaches
and principal shops. Mine has underground electric haulage, on
levels.
property has macadamized roads, a large boarding house, upwards
gs, general store, hospital and a nurses' home.
mill, at Beacon Hill, 2 miles west of Redridge, having been
re, the mine output is treated in the Baltic mill.

The mill boiler house has six 250-h. p. and two 200-h. p. maintaining a steam pressure of 180 to 200 lb. per sq. inch.

The pump house at the mill has a 20,000,000-gal. pump, taki well connected with a tunnel running 1,960' to an intake crib in

Production was begun January 4, 1902, with a leased head mill, and with a return of 37 lbs. fine copper per ton, but fell o and still later production fell sharply to 18 lb. fine copper per to

Production:

	Ore Stamped, Tons	Copper Produced, Lb.	Yield per Ton, Lb.	Cost, c. per Lb.	Pri R
1919.....	.....	5,274,387	.....	.....	...
1918.....	.....	5,543,586	.....	.....	...
1917.....	264,655	6,278,097	23.72	15.22	28
1916.....	349,504	8,720,558	24.94	11.01	25
1915.....	349,684	8,302,896	23.75	09.53	17
1914.....	277,251	5,048,306	18.21	12.21	13
1913.....	229,149	4,990,938	21.78	12.62	14
1912.....	366,663	6,980,713	19.04	11.73	16
1911.....	347,885	6,120,417	17.59	11.55	12
1910.....	317,299	5,694,868	17.95	12.17	12
1909.....	323,408	5,282,404	16.33	13.89	13
1908.....	334,929	6,034,908	18.00	12.69	13
	3,160,427	74,272,078	20.08	12.10	17

(d) Deficit.

Champion Copper Co.

Owned jointly by St. Mary's Mineral Land Co. and Copper is described under its own title.

Atlantic Mining Co.

Office: 82 Devonshire St., Boston, Mass. **Mine offi** Houghton county, Mich.

Officers: Wm. A. Paine, pres.; F. W. Paine, sec.-treas. Stanton, Frank P. Son, F. W. Denton and J. H. Blodget, direct

Inc. Dec., 1872, in Michigan; reincorporated, 1901, for increased, 1902, to $2,500,000, shares $25 par; fully issued; paid assessment was $2, October 11, 1909; the first in 30 years. Has p $990,000, last in 1905. Owns $40,000 stock in Michigan Smelt Safe Deposit & Trust Co., registrar; American Loan & Trust Co fer agent. Annual meeting, second Tuesday in March. The controlled by Copper Range Consolidated Co., through ownership of the capital stock. Balance sheet of December 31, 1918, sho $337,577, compared with $286,887 in 1917.

Property: 8,217 acres, including 1,351 acres of mineral la of timber lands, and 2,106 acres miscellaneous lands, latter in site, and a valuable frontage on Portage Lake. Mineral lands ar except S. E. ¼ of S. E. ¼; N. ½ of Sec. 9; N. W. ¼ of Sec all in T. 54 N. R. 34 W. Principal holdings are the old Atlantic including the mines known before 1872 as the South Pewabic an about 2 miles south of Portage Lake and 4 miles southwest of the Sec. 16 tract of 640 acres. The mines, idle since 1911, are Vol. X of the Copper Handbook.

DOUGLAS COPPER CO.

Office: 705 Sears Bldg., Boston, Mass. Property north west of Ahmeek holdings in Allouez township, Keweenaw coun

Officers: Charles L. Paine, pres.; George P. Gardner, v Sheldon C. C. Douglass, W. A. S. Holmes and A. S. Knight, Dublin, secretary.

in Michigan. **Cap.**, $2,500,000; shares $25 par; **assessable**; ven for land, making $10 paid in value.
440 acres in a compact tract, being E. ½ of Sec. 30 and W. ½ acing eleven 40-acre tracts formerly owned by the Sheldon Doug- rthey estates, and the St. Mary's Mineral Land Co. This tract rlay, or deep extension of the Kearsarge lode into which the rich vorked in the Ahmeek, pitches. To open this ground a 3,300′ ver- t be sunk.
it planned selling treasury stock to raise necessary funds for rk.

I BLUFF MINING CO. **MICHIGAN**
Property owned by Mass Consolidated Copper Co.

YNDICATE COPPER CO. **MICHIGAN**
sking Blk., Calumet, Mich.
. C. Stielow, pres.; H. E. Murray, v. p.; Harry Olson, 2nd MacNaughton, sec.-treas.; John D. Kerr, asst. sec., with P. E. hn R. Ryan, directors; Mortimer North, engr.
12, 1916, in South Dakota. **Cap.**, $1,000,000; shares $1 par; n organization. The initial offering of stock May, 1917, was at ne, 1917, to $1 a share.
approximately 360 acres in T. 57 and 58, N. R. 31 W., being formerly owned by the Federal Copper Co., south of the Phoenix weenaw Copper Co. Lands cover a 1½ mile stretch across the pper lode and near the Phoenix, St. Clair and Eagle River prop- weenaw Copper Co., with Ojibway lands on west and east. Lands Kearsarge amygdaloid which dips 30° N. W., giving 292 acres is lode, whose copper content in this part of the range is as yet

rted in 1917, that company, acting under name of Bear Lake Ex- ured option on 2,000 acres, S. W. of Calumet, in T. 55, 56 R. 34, Longyear-Michigan options in T. 56 R. 34 aggregating 1,240 acres, ve been absorbed by Federal. The Bear Lake Pool options on . 56 R. 34, were later reported acquired by the Federal.
: includes compressor with 2 drills, and 1,000′ hoist. Dur- ix diamond-drill holes were opened and four said to show com- haft down about 40′.

MINING CO. **MICHIGAN**
Congress St., Boston, Mass. **Mine office**: Demmon, Hough- ch. **Mill office**: Point Mills, Houghton county, Mich.
. M. Edwards, pres.-gen. mgr.; Henry D. Forbes, v. p.; treas., with C. F. Moore, C. A. Hight, Sidney J. Jennings and ard, directors. Albert L. Wyman, sec. Enoch Henderson, supt.
3, 1857, in Michigan; re-incorporated in 1887 for 30 years, ion renewed in 1917. **Cap.**, $500,000; increased, 1899, to gain increased, Nov., 1908, to $5,000,000; shares $25 par; issued, $17.20. Last assessment of $1 per share levied on June 3, 1919. l $1,919,519.
ock has been set aside for the purpose of acquiring the total 0 shares of the Rhode Island Copper Co. Has paid dividends ederal Trust Co., Boston, registrar; American Trust Co., Boston, Annual meeting, third Wednesday in April. Listed on Boston

controlled by U. S. Smelting Co., through a majority of directors. et of December 31, 1918, showed a deficit of $109,123, as com- ns of $286,198 in 1917. The revenue in 1918 totaled $697,672 and was $1,048,303. Cash on hand early in 1920 was about $178,000. ,280 acres of mineral property, and a 217-acre mill-site, with age on Portage lake. The old Franklin mine (described Vol. s, was sold, July, 1908, to the Quincy Mining Co., for $170,000, 5 N., R. 33 W., 640 acres, lying directly north of the Franklin

Junior and west of the Rhode Island, was bought from St. Mary's Co., 1909, for 33,333 shares.

Property carries 2 miles of the strike of the Pewabic amygda cupriferous beds of the Keweenawan series. In addition to t there are 3 other tracts of mineral lands, of 160, 480 and 640 ac pany also controls, and is absorbing, the Rhode Island Copper 800 acres immediately north of the Franklin Junior mine.

Development: early work was on the Franklin Junior pr two parallel lodes, the Allouez conglomerate and the Pewabic an apart, have been worked. The amygdaloid worked prior to 1902, lb. copper per ton, and was abandoned in favor of the conglom latter, decreasing in width and value on the 2,000' to 2,400' levels, and work resumed on the Pewabic in the Franklin, Jr., shaft about 20' in the footwall. The copper content being extremely lo stopped, and only exploratory work done. In 1913, a crosscut wa ward from the shaft at 3,200' level to explore the entire eastern pa pany's holdings. At 550' from the amygdaloid this crosscut entere able ore in the Allouez conglomerate and drifts were started to pr and copper content of the orebody. Work continued until August, resumed in July, 1915, the orebody being developed for 1,100' on It is opened for stoping on each level from the 27th down to the 3 of 900' on each level, or about 9,000' of drifting, with a continuo as an ore-chute from the 2,700' to the 3,700' level, where ore is gath motor trains and carried to the shaft. Besides this main raise th for men and supplies, the new raises in 1918, aggregating 121'. down to the 39th level, and shows considerable improvement bel 2,000'. Shaft is equipped with a steel circular ore-house (Edward merly used at No. 2 conglomerate shaft. On the 28th level a cro 1915 connects the lode with the shaft, and a similar crosscut has the 37th level. The conglomerate shaft, bottomed at 2,400' on the i been connected.

An extension of No. 27 and 22 levels S. from No. 1 shaft to No. 2 shaft was completed in 1916. The conglomerate was much ri than the average. The ground above this up to No. 17 level was u 2 shaft, which had caved, was re-opened and repaired from the 4 bottom of the 17th level, but work here was stopped in 1918 for

Mechanical haulage installed on No. 29, 30 and 31 levels g costs.

A long crosscut on No. 32 level driven through the Kearsarge on the footwall side of the Wolverine sandstone, 4,542' from the Pe loid.

This crosscut passed through a thickness of 25' of Calumet c 2,150', the 10' Osceola amygdaloid at 2,820' and the Kearsarge co wide, at 3,380' from the shaft, but all three lodes were devoid Twenty-two other amygdaloids were also cut, 9 of them copp only 2 rich enough to warrant exploratory drifts and raises; th were barren. Ore of sufficiently good grade to warrant further found on the footwall side of the Kearsarge amygdaloid.

During 1917, the 30th level was carried forward 540', to a total of No. 1 shaft (on the Pewabic), and the best copper seen in the a opened. This level was driven 115' farther in 1918, all with same Management believes this same condition will be found in the exte drifts on lower levels.

Production in 1917 came almost entirely from the Allouez Co No. 1 shaft; in 1918, 24.6% of the output came from the Pewabic from the Allouez lode. Total 1918 development amounted to 2 compared with 1,916' in 1917.

Ore extraction was stopped May, 1919, company announcing ment work only would be carried on until conditions improved an be sold at a profit.

cludes a hoist with a 10-ton skip at No. 1 shaft, and has sion cylinders, storing up energy, otherwise wasted, in compressed air being mixed with steam, in the cylinders, as a

ched by the Mineral Range railroad. Equipment includes 5 ay heads, with 20x24" cylinders, each capable of crushing nerate or 500 tons of amygdaloid rock daily. Each stamp is n ore bin, and equipped with hydraulic separators, which re- heavy copper. The washing plant includes 8 classifiers, 20 ishing jigs, 32 Wilfley and 10 Overstrom tables. The jigs are tric type, with centershield copper discharges, obviating skim-

tars are on concrete foundations. In 1918, an experimental nsisting of one 8'x48" Hardinge mill, one 75-h. p. motor and re set up.

mill is furnished by a 16x32" engine, and steam is supplied oilers. The boiler house has a self-supporting, brick-lined ameter, 165' high, on a 52' brick foundation. Water is fur- 00-gal. vertical compound pump, having 12x42" high-pressure ssure cylinders, with 47" stroke and plungers of 37½" diam- wn through a 36" pipe line, running 200' under the rock to a uarter-inch screens. The mill has a 5x12" duplex fire pump, electric light. There is a 267' wharf at the mill site, equipped sheds, with 18' of clear water alongside. The mill site has for employees.

1903 the recovery of copper was 15.25 lb. per ton of ore 7 was only 11.48 lbs., falling, 1909, to 9.47 lbs. per ton of ore st production ever secured by the mine was 5,259,140 lb. fine ecent production has been 4,206,085 lb. in 1905; 4,228,650 in n 1907; 3,703,421 lb. in 1908; 1,615,556 lb. in 1909; 966,353 lb. in 1911; 1,710,651 lb. in 1912; 1,021,440 lb. in 1913; 93,283 lb. . in 1916; 3,155,574 lb. in 1917. 1918 production was 296,182 3 being discarded and balance, 273,964, stamped, yielding copper, equal to 10.3 lb. per ton.

xcellent and mine on a basis to produce profitably in normal e employed in 1919, mostly sinking the shaft.

NG CO. **MICHIGAN**

burton Place, Boston, Mass. **Operating office:** Calumet,

olphe L. Agassiz, v. p.; Geo. P. Flagg, sec.-treas.; Jas. mgr., and Walter Hunnewell, directors.

906, in Maine. **Cap., $300,000; $3 par, fully paid.** Is con- nership of 50,100 shares, by the Calumet & Hecla Mining Co. s reported that the Seneca Copper Corporation had purchased g $25,000 cash, with additional payments to extend over a

acres, the N. W. ¼ of Sec. 26, N. E. ¼ of Sec. 27, and S. E. ¼ of Sec. 22, except the N. W. ¼ of the N. W. W. Property lies S. and E. of the Seneca and N. and E. of ng the Kearsarge amygdaloidal bed under about 175 acres, to f about 2,700'. Extensive drill borings were made before the The Kearsarge bed averages about 12' in width, with strike verage dip of 33 to 36° with the horizon, and its copper con- ow.

hy two 3-compartment shafts, exact duplicates, sunk at he Kearsarge bed. Levels are opened at 100' intervals.

ut 1,500' from the Seneca boundary, is 1,900' deep, having a ximum width. Drifting has been done on the alternate odd- m the 1st to 9th, inclusive.

75' S. W. of No. 1, and 1,800' N. of Mohawk No. 1, is 1,520'

deep, and drifting has been done on the 2nd, 3rd, 5th and 7th showing being on the 5th.

Property is served by a 2¼-mile spur of the Mineral Range north from the Mohawk mine.

Production: begun July, 1910, was 28,552 tons of ore yi lb. fine copper, and in 1911, was 1,347 tons ore, yielding 14,275 lb. about 9.3 lb. copper per ton ore milled. The mine was shut do 1911. It is obvious that, owing to its comparatively small size and the Gratiot cannot work the Kearsarge bed profitably at the av copper, except on a very large scale, and can be operated much m ously in connection with the Seneca than alone.

GLOBE MINING CO.

Office: 15 William St., New York.

Officers: L. P. Yandall, pres., with R. D. Rickard, J. R. rit Smith of New York and W. H. Leggett, of Detroit, directors. sec.-treas.

Inc. May, 1911, in Michigan. **Cap.,** $78,250; $25 par; f issued.

Property: 3,200 acres, Secs. 1, 2, 3, 4 and 5, T. 53 N., R. 35 entirely across the Keweenawan trap formation, from the eastern sandstone, lies next south of the Champion, and immediately nor lenge, carrying about 6,000' of the strike of the Baltic and all paral was developed by the Copper Range Consolidated Co., under opt was relinquished, February 1, 1909, after expenditure of upwards o

Development: diamond-drill borings, to locate the Bal some cores with excellent values, but disclosed a heavy overburd boulders, rendering it necessary to reach the solid rock by a vertic was begun early 1905, but the first shaft was abandoned, owing to was replaced by a new vertical shaft, about 700' south of the Cham The shaft is telescopic, inside measurements of timbers at th 13' 3"x23' 3", with a second section below of 9x19' 6", and a t smaller size.

The shaft is 1,040' deep, with first level 356' below surface, cut thereafter at 100 intervals. The Baltic amygdaloidal bed was diamond-drill boring, and about 900' of drifting on the seventh about 1,000' from surface, and showed a little copper, in patches, bu was unpayable. Work was suspended January 31, 1909, and pre idle since. Notwithstanding the unfavorable results secured by so far, the property is by no means devoid of promise.

HANCOCK CONSOLIDATED MINING CO.

Hancock, Mich.

Officers: John D. Cuddihy, pres.; Capt. Thos. Hoatson, Hicok, sec.-treas., with Allen F. Rees, W. R. Thompson, and Cap directors; Clyde E. Weed, gen. mgr.; Richard Coombs, mg. capt. clerk; C. W. McDougall, engr.; Fred G. Schubert, master mecha

Inc. June 11, 1906, in Michigan. **Cap.,** $5,000,000; shares $ $2,500,000; fully pair with $3 assessment levied March, 1915, p in May and Sept., 1915, and Jan., 1916. Old Colony Trust Co., registrar; State Street Trust Co., Boston, transfer agent. Stock l Exchange. Annual meeting, third Wednesday in June.

Company began business with $1,000,000 and paid $552,623 f

Operations for years ended Dec. 31:

	Copper Sold	Ass'mt. Interest	Mining Exp. (a)	Int. and Taxes	Lake Ref.
1915	$917,092	.....	$776,919	$59,044	$3
1914	1,742,454	.....	1,056,541	54,421	
1913	735,946	$119,250	701,278	53,296	1

(a) Includes smelting, metals marketing, etc.

consists 725 acres of mineral territory, immediately west
ie old Quincy mine, in T. 55 N., R. 34 W., including the original
136 acres, set aside, 1859, by the Quincy Mining Co., which
ineral rights to the Pewabic bed. The Pewabic bed, on lands
original Hancock tract of 136 acres, is owned by the Hancock
Lands carry the Pewabic, Quincy, West and Hancock of Sumner
beds.

e best part of the Quincy mine is tributary to No. 7 shaft, which
north of the Hancock boundary.

916, approximately 75 acres were sold to the Quincy Mining Co.
In part payment thereof the Hancock was granted the right to
o. 7 shaft and one stamp of the Quincy mill. Operations were
ler this agreement during 1916, 1917, and part of 1918, but the
l from the shaft did not warrant the expense of its upkeep. In
mpany sold 125 acres, which includes the shaft, to the Quincy
r $235,000.

ancock mine, opened 1859, was closed June 1, 1885, on account of
of the metal, after producing 5,709,384 lb. fine copper. The Han-
er amygdaloidal bed averaged about 12′ in width below the fifth
h of 1,052′, where the mine was bottomed.

rty carries the upper half of the Michigan series of cupriferous
glomerates, and has 4 known copper-bearing beds, the Pewabic
important. The property also carries the underlay, but not the
3 copper-bearing beds of the Quincy, these being the Quincy to
apparently of little value, followed by the Pewabic, which is the
e Quincy and the so-called West lode of the Quincy. The known
beds outcropping on the Hancock property are the Hancock or
in the old Hancock mine, and now known as No. 1 lode, lying
st of the Pewabic; the old West bed, now known as No. 2 lode,
′ west of No. 1, and the New West bed, now known as No. 3 lode,
west of No. 2. Company also owns lots 6 and 7, Sec. 28, for a

ent: No. 1 shaft is the old main 3-compartment shaft of the
It has a remodeled wooden shaft rock house, with a hoist good
n.

nd main 5-compartment working shaft known as No. 2 is 2,200′
1. It is vertical, with dimensions 9′6″x29′6″, being the second
Lake Superior district, and is 4,360′ deep. This shaft intersects
depth of 2,038′, the bed here showing a pitch of 37°, compared
e upper workings, this flattening of 10°, at depth, corresponding
ttening shown to the northeast in the No. 7 shaft of the Quincy.
e is intersected by the shaft at a depth of 3,105′; it is 17′ thick
yable ore. In 1917, 74%, and in 1918, 62% of the ore from this
om this vein.

low the 53rd level, 4,000′ below the surface, is reached by 2
fts sunk from the 49th level, connecting with the No. 2 shaft
on the 53rd level and through drift connections on the 49th level.
amond-drilling disclosed some lodes to the south of the big fault
the property and crosscuts were driven to these lodes on the 53rd
. The 53rd level crosscut was advanced 611′ east in 1918, cutting
veins, the first one narrow, the second, called No. 3 east vein,
nineralization. The 49th level crosscut was advanced 428′ cutting
No. 1 and No. 2 east; both showed fair mineralization.

le drifting has been done on both No. 2 and No. 3 beds, No. 3
y a winze from the 10th to 18th levels, with drifts on the 9th to
sive, several of which are more than 1,000′ long. No. 2 shaft
on the 13th, 18th, 23rd, 27th, 34th, 39th, 44th, 49th and 53rd
broken will be sent by chutes from the levels above.
re-house that is the most modern in the Lake Superior
a total height of 128′, with working floor 60′ above
1,000 tons capacity each.

deep, ar
showing
Pr
north fr
Pro
lb. fine
about
1911
the
GLO

lying another conglomerate at a distance of about 150', these ding exactly with the Baltic formation. Maximum operating at 2,800'.

nt: by 620' shaft, sunk about 60' in the footwall, and a below the 620' level, disclosing rich copper rock in the Superior has been lined with a concrete collar for depth of 300'. Winze uperior vein at 1,133'; it is 40' wide and shows good rock on anging wall with about 10' of poor rock between.

a drift was extended 350' into the property from the 19th level nine. In 1918, 908' of drifting and crosscutting was accomplished , encountering copper in both the Superior and West lodes, thus 700' below the lowest previous development.

: includes a small power plant, and a 16-drill electric air- here are necessary buildings, including an office, change-house all of wood.

war the mine was closed down from September, 1914, to July, s were again suspended in September, 1917, but exploratory work gust, 1918.

:

	Tons Ore milled	Lb. Min. prod.	Lb. Min. p. t.	Lbs. Ref. Copper	Lbs. Cu. p. t. Rock
.....	15,628	291,500	18.6	179,012	11.45
.....	19,444	365,880	18.8	204,274	10.55
.....	14,656	258,900	19.5	156,766	10.69

or 1915 was 22.2c per lb.; for 1916, 29.21c; 1917, 28.14c.

ty, though small for the Lake Superior district, is considered management good. Before sinking the shaft to the 18th level, awaiting developments in the adjacent Superior mine (31st

IINING CO. **MICHIGAN**

Albert S. Bigelow, pres., 199 Washington St., Boston, Mass. es, sec.-treas.; Fred W. Nichols, agt., Houghton, Mich. 1865, in Michigan. **Cap.**, $1,000,000; shares $25 par; all is-

1,640 acres of mineral land, in Houghton and Keweenaw undeveloped; part of the surface rights have been sold, but min- ved. No mining done since organization.

COPPER CO. **MICHIGAN**

Copper Falls, Keweenaw county, Mich. Thos. Hoatson, ght, sec., Calumet, Mich.

in Michigan. **Cap.**, $1,000,000; shares $25 par. Amount paid nual report of December 31, 1918 shows $165 cash on hand. Is gh ownership of 5/6 of the outstanding stock by the Keweenaw nual meeting, fourth Tuesday in March. Listed on Boston

16 and 21, the former fractional, T. 58 N., R. 31 W., 31, about midway between the Arnold and Phoenix mines, nstone, with the Eagle River and Natick mines to the d 1853, though never a producer, has a single shaft about bbed, which shows the same characteristics as at the Ilanches of rich ground.

ill holes numbered 12, 13, and 15 were bored g wall and across the lode. Holes 12 and 13 t of the lode at 489 feet and 364 feet, respec- nt this same formation at 713' from surface, width with good values in both the upper and low in each of the holes.

e house, compressor building, smithy, 1915.

HUSSEY-HOWE MINING CO.

Address: care C. A. Senecal, Lake Linden, Mich.

Officers: Wm. H. Rea, pres., with Geo. W. Howe, C. B. Nimick and G. H. Childs, all of Pittsburgh, directors.

Inc. 1911, in Michigan. **Cap.,** 100,000 shares; $25 par issued, fully paid; 45,000 going to owners for property; 9,000 s ment.

Property: 320 acres, bounded by Indiana and Bohem cludes N. E. ¼ Sec. 22 and N. W. ¼ Sec. 23, T. 51, R. 37 W county. Property shows outcrop of the Eastern sandstone and an amygdaloid vein supposedly the Baltic lode of 2 veins. It sh bonates and oxides over a width of over 100' resembling the Champion, 25 miles N. E. As the dip is 60 to 65°, the property able area for workings.

Management planned to commence operations in the fall o

INDIANA MINING CO.

Office: 60 Congress St., Boston, Mass. **Mine office:** Dee ton, Mich.

Officers: R. M. Edwards, pres. and gen. mgr.; Sidney J. Henry Tolman, treas., with C. F. Moore and C. A. Hight, dire Wyman, sec.; Thomas Bennett, supt.

Inc. Aug. 11, 1909, in Michigan. **Cap.,** $2,500,000; $25 pa shares; paid in $12.50. Last assessment March 1, 1917. Listed Exchange. State Street Trust Co., Boston, transfer office; Fe Boston, registrar. Annual meeting, third Thursday in April. 60,000 shares to owners of land for property and offered 36,000 1909, for public subscription.

Receipts, 1918, were $2,779, from sale of equipment and in tures were $19,400; deficit, $12,209. Receipts, 1917, were $80,263, was from assessment No. 4. Expenditures, including 1916 d totaled $75,852, leaving balance of $4,411.

Property: 1,200 acres bought 1909 from the Indiana C tract lying N. E. of the Lake and N. of the North Lake, in Sec T. 50 N., R. 37 W. The property was worked on a small scale burning of the mill, 1864, but the old openings are inaccessible been done thereon by the present company. The lands are heav can supply all mining timber for a considerable time. Ample w from the Fire Steel river. Transportation is furnished by a spu Range railway, and the Mineral Range line is within a short di

Geology: the lands are traversed by the Evergreen belt ing amygdaloidal beds and by a number of unidentified cuprif between the Evergreen belt and the eastern sandstone. The of the tract is in the hypothetical horizon of the Lake amygda Indiana is covered with a heavy overburden of sand, hamperin tions. The ground has been tested by extensive diamond-drill

No. 2 drill hole disclosed phenomenally rich copper rock mediately under a 400' conglomerate. The nature of this ore is pute, it having been called sandstone, conglomerate and fel little question that it is an altered felsite; the rock consists es and light-colored mica, with secondary infiltrations of calcite a grains of disseminated native copper. The even size of the q their interlocking texture, indicates an igneous origin. There a the 40' of rock felsite rock and [illegible] ores of about 25' wid [illegible] the second zone of 2 [illegible] both cut fels [illegible] [illegible] [illegible]

1,150' level could not locate No. 2 hole, but found No. 9, 100' from
l position. The conclusion was that the deposit cut by No. 2 hole
great size or had no regular trend.
No. 2 shaft, an incline, was started in the S. W. quarter of Sec. 21
the South Lake amygdaloid lodes. In 1917, this shaft was down 310',
exploratory work had been done on the 300' level. This work was
e in the horizon of the main system of Ontonagon county lodes, but
merate was encountered the position of the crosscut had not been
Some copper was found, worthy of exploration, but not of com-
e when opened. Due to rising costs, work was suspended in 1917.

OPPER CO. **MICHIGAN**

120 Broadway, New York, N. Y. **Mine office:** Houghton, Mich.
: Thos. F. Coyle, pres.; Henry P. Paull, v. p.; Frederick W.
; F. R. Kennedy, treas., with Joseph B. Cotton, George G. Barnum,
linson and Julius H. Barnes, directors.
rch 8, 1909, in Michigan. **Cap.**, $1,000,000; $25 par; $7 paid
,750 shares. Last assessment of $1 per share called August 1, 1918.
ing, first Tuesday in June.
sheet of January 1, 1919, showed assets totaling $195,124; including
6,783; cash, $479; accounts receivable, $12,085; investment and mis-
35,777. Liabilities included $7,874 bills payable.
y: on Isle Royale, over 94,100 acres out of the 125,000 acres
he island, includes the former holdings of the Isle Royale Land
Ltd., and the Island Mining Co. Average cost of this property to
was $1.56 per acre. Present company has never done any explora-
r mineral. Property fully described in Vol. XI, Copper Handbook.

ALE COPPER CO. **MICHIGAN**

12 Ashburton Place, Boston, Mass. **Mine office:** Houghton,

: E. V. R. Thayer, pres.; Rodolphe L. Agassiz, v. p.; E. B.
O. Whitten, F. L. Whitcomb, E. C. Lewis, G. R. Whitten and G. H.
ctors; James MacNaughton, gen. mgr.; Clarence H. Bissell, sec.-
. Osgood, asst. sec.-treas.; Jas. E. Richards, mine supt.; A. G.
, mill supt.; Harry E. Lukey, clerk; Edward Colenso, chief mg. capt.
rch, 1899, in New Jersey, as a merger of the Isle Royale Cons.
and Miners' Copper Co. **Cap.**, $3,750,000; shares $25 par. Is
rough ownership of 33,187 shares of outstanding stock, by the
Hecla. Old Colony Trust Co., Boston, transfer agent; State Street
oston, registrar. Listed on Boston Stock Exchange. Company owns
of the Lake Superior Smelting Co. Annual meeting, first Wed-
pril, at 243 Washington St., Jersey City, N. J.

Sheet, years ended Dec. 31:

ets—

Property	Const. & Equip.	Invest.	Cash	Other Cur. Ass.	Total
$2,559,687	$3,982,311	$362,402	$180,326	$1,714,716	$7,265,514
4,750,000	713,941	$1,306,689	270,760	2,377,906	8,419,296
2,288,927	2,330,889	192,144	150,043	1,551,796	6,513,799

bilities—

Stock	Current	Depr. & Depl. Reserve	Mine Land Surp.	P. & L.	Total
$3,750,000	$760,710	.....	$270,760	$2,484,044	$7,265,514
3,750,000	713,941	$1,306,689	270,760	2,377,906	8,419,296
3,750,000	778,286	856,829	.....	1,128,683	6,513,799

ds: $1 per share was paid March 31, 1913; $5 in 1916; $4 in
nd $1 in 1919, a total of $13.50 a share or $2,025,000.
es and an 80-acre millsite. Mineral lands include
Portage and Huron mines, the Dodge and Frue pros-
Montezuma tract of about 200 acres purchased,

1913, for $100,000, and sundry undeveloped tracts. The Hussey-
280 acres, lying N. E. of the Superior, supposed to carry the e
Baltic bed, was bought, 1907, for $220,000. Lands include all of S
and parts of Secs. 3, 9, 10 and 15,, T. 54 N., R. 34 W.; also 160
T. 54 N., R. 33 W., 40 acres in Sec. 31, T. 55 N., R. 33 W., a
Sec. 36, T. 55 N., R. 34 W., giving a compact tract carrying abo
the strike of the system of copper-bearing bed.

Geology: the Isle Royale has 3 parallel amygdaloidal be
of N. 32° E. and average dip of 56°, of which 2, the Isle Roya
beds, have been extensively opened, the latter lying approximately
former. The shafts are on the Isle Royale, but the Portage he
many levels by crosscuts. East of the amygdaloids is the "Mal
near the Eastern sandstone, 4 to 7' wide and rich in mass and ba
deficient in stamp rock. It was opened to a depth of about 250' by
tin Mabbs, about 1875, and has been tested to some extent by the
There also are unidentified and unexplored copper-bearing am
W. of the Portage bed and occasional narrow fissure veins carryin
per ores.

The 3 old mines included in the present Isle Royale tract pro
lb. fine copper, under primitive conditions, at a net aggregate le
500,000. The old Isle Royale and Grand Portage mines were ope
the Huron in 1855. The history of these 3 mines is given in detail

Development: considerable diamond-drilling has been
ground openings were 19,106' in 1912; 13,626' in 1913; 9,694' in
1915; 17,455' in 1916; 19,271' in 1917 and 12,409' in 1918.

No. 1 shaft, near the northern boundary, was completely
December, 1903, and was abandoned. About 2 miles of drifts h
on this shaft. In May, 1914, work was started to retimber the sh
to sinking and exploring the Portage lode. In February, 1916,
been finished down to the 16th level and hoisting was being done
levels. No sinking was done in 1917 or 1918, the company confi
cipally to locating water pockets and draining the mine. The
that about 45% of the ground would be available for stoping.

No. 2 shaft, with 3 compartments, 2,280' S. W. of No. 1, is 3,
below the 33rd level. Drifting in 1917-1918 was in the West lo
that 55-60% of the ground may be available for stoping.

No. 2 shaft has a combination shaft ore-house, with Portage
The engine-house is equipped with a hoist capable of raising 6-t
depth of 6,000'.

No. 3 is merely a site for a shaft, to reopen the old Huron s

The new shafts, No. 4, 5, 6 and 7, are all on the Isle Ro
southern end of the property, and have several miles of workin
siderable heavy copper. These shafts are unconnected with the
in shafts No. 1 and 2, at the northern end of the property. No
connected by drifts on the upper levels.

No. 4 shaft, about 3,100' S. of No. 2, is 70' below the 19
deep, developing stamp rock of average grade. Equipment in
cylinder hoist, good for 1 mile depth, a 35-drill air-compressor,
No. 1 shaft, and a cylindrical steel shaft rock house having cyl
42" in diameter and 32' high. In 1917, electric pumps were mount
7 and 8, and in 1918, storage-battery locomotives were installed
and 14 levels.

All north drifts from the 1st to the 11th level, inclusive, o
workings. The Huron mine has been completely drained

s and was bottomed in the vein, 38' below the 19th level, or 2,304'
r, 1918. The levels are opened at 100' and 120' intervals. On
is a circular steel shaft ore-house, similar to that at No. 4. The
includes a brick engine house, with hoist and 45-drill air-com-
l boiler house, electric pumps on the 1st, 3rd and 9th levels and
locomotives on levels No. 10, 12, 13 and 14.
ft, 2,400' S. of No. 6, was started in 1913, but work was stopped
the strike and not resumed until late in 1915. It is bottomed in
below the 9th level, and is 1,201' deep. The north drifts down to
ave been holed to corresponding drifts from No. 6 shaft. The
ave been driven 1,200', or midway to the point selected for No. 8

started September, 1908, on the Hussey-Howe tract, is 972' deep,
plat cut at depth of 350'. A 205' crosscut, at depth of 474', dis-
e bed in which the shaft is sunk. On the 3rd level, at depth of
as run S. to within 50' of the Houghton Copper Co. boundary, dis-
amount of amygdaloidal rock, not carrying copper in promising
A" shaft is supposed to be sunk on the Baltic bed, but there is very
s to whether the shaft really is opened on the northern extension
and failure to locate the twin Baltic bed, within a distance of 205'
t on the 474' level, accentuates this doubt.
12 shaft, begun October, 1905, and discontinued January, 1908, at
also was sunk in search of the Baltic bed and drifts and crosscuts
in 4 directions, without securing satisfactory results. The shaft
badly disturbed amygdaloidal bed, practically barren of copper.
was started, 1904, on Sec. 10, but was discontinued because of the
rden, and a diamond-drill substituted, the drill-cores showing an
bed of which about 5' in width carried copper in fine grains.
equipment: the main plant at No. 2 shaft, includes No. 2 en-
compressor house having a 35-drill 2-stage air-compressor; a 44x72'
with a 16x72' coal-storage addition and a 3,000-ton coal trestle,
50 h. p. 84" horizontal boilers, taking water from a dam 300x500x6'.
shop is of steel, on stone foundations. The company has a private
tem. There are about 150 dwellings on the company's lands.
shaft a new collar was put in and a change-house erected in 1917.
ange-house was erected and 2 boilers installed, making six. At No.
ame ore-house, equipped with 24x48" crusher and operated by a
r, was put into commission.
Royale railway, owned by the company, connects the mine and
at 5 miles of main line, having easy grades. Equipment includes
and 60-ton locomotives, and forty 40-ton steel ore cars, equipped

ite, at the mouth of Pilgrim river, has nearly 1 mile of frontage
e. The old mill was burned, December 24, 1914. A new 2,000-ton
mp heads was in operation, August, 1915. The mill cost $220,000
300-ton orebins and 3 stamps, having circular mortars and 5⅝"
The stamps rest on concrete bases, 20' thick, and are fitted with
d steam cylinders. Each stamp has a maximum capacity of
daily. The dressing floor has 78 rough jigs, 6 finishing jigs and
s to treat slime. There are rolls with fixed bearings to regrind
om the mortars.
s a complete machine-shop on the second floor, power being
00 k. w. mixed pressure turbo-generator, taking steam from five
m a boiler house at the rear of the mill.
2x600' wharf, with deep water alongside, at the mill site, with
loading coal and general freight and for the dispatch of min-
The Boiler Bay shelter, 2 miles across Portage lake.
ed the mill by a 16,000,000-gal. pump, especially designed to
handling a triple discharge into a 30" riveted steel water
house to mill, the pump being located some dis-
sand clogging the intake. Three 100 h. p.

boilers furnish power for the pumps, fuel being taken from a la at the rear of the pump house boiler rooms. A dam near the mi water for the boilers.

Recent production: has been as follows—

Year	Tons Ore Treated	Lb. Min. Produced	Lbs. Cu. per Ton Ore Stpd.	Mine Cost per Ton (a)	Lb. Cu. Produced
1918.....	974,508	.....	15.9	$2.14	15,442,508
1917.....	922,160	.....	14.6	2.02	13,480,921
1916.....	925,419	.....	13.4	1.53	12,412,111
1915.....	680,270	13,727,832	13.7	1.45	9,342,106
1914.....	474,349	9,451,115	13.9	1.49	6,601,235
1913.....	314,679	5,887,000	13.2	2.12	4,158,548
1912.....	531,105	11,461,410	15.4	1.54	8,186,957
1911.....	457,440	10,339,171	16.4	1.47	7,490,120
1910.....	520,860	10,433,060	14.5	1.42	7,567,399

Production for 1919 was 13,007,647 lb.

(a) Includes mining, transportation, stamping and taxes.

(b) Includes nearly 2c per lb. extraordinary expense of re mill, re-opening No. 1 shaft, and No 7 shaft expense.

The Isle Royale is a low-grade mine, but shows itself capa substantial profits. Profitable operations for many years to come anticipated. Company started a campaign in 1917 to develop mo to equip the plant with modern facilities; this has cost in the ne $600,000, but company is now in position to produce 20,000,000 lb. nually and at a cost, low enough, in normal times, to make a goo small capitalization.

KEWEENAW COPPER CO.

Office: Calumet State Bank Bldg., Calumet, Mich. Mine Keweenaw county, Mich.

Office: Thos. F. Cole, pres.; Spencer R. Hill, v. p.; Capt son, 2nd v. p. and mining director, with A. L. Warner, C. A. Wr Hartley, directors. F. W. Taylor, sec.-treas.

Inc. March 11, 1905, in Michigan. **Cap.,** $10,000,000; sh issued 213,871 shares; $20 paid in. Last assessment of $1 per sha 1917. Stock listed on Boston and Duluth Stock Exchanges. Co stock ownership, the Phoenix Consolidated Copper Co., Meadow Humboldt Copper Co., Keweenaw Central Railroad Co. and Wash Mining Co. Has about 2,300 shareholders. American Trust Co., trar; Old Colony Trust Co., transfer agent. Annual meeting, sec March.

General Balance Sheet, December 31—

Assets—	1918	1917
Real Estate.....	$1,405,275	$1,405,227
Investments	1,702,611	1,791,021
[illegible]'s Rec.	415,214	260,67[illegible]
Exp., etc.....	725,364	710,365
.....	87,256	3,331
[illegible]	5,549	5,549
.....	$4,[illegible]	$4,[illegible]
[illegible] —		
[illegible]		$[illegible]
[illegible]		[illegible]
[illegible]		[illegible]
[illegible]		[illegible]

w Central Railroad Co. is a reconstruction of the old Lac La ailway. The entire capital stock issue, $400,000, reduced from s owned by the Keweenaw Copper Co. The railway company , not issued, and ended 1917 with accounts and bills payable of ainly to the Keweenaw Copper Co. The railway, with about line, spurs and branches, cost $692,346, and runs from Centen- uburb of Calumet, where connection is had with the Copper e Phoenix shaft. The road consisted of about 40 miles of , company sold the equipment and rails of the Mandan—Lac ecause this equipment was not suited for the heavy duty that whenever commercial rock was mined in considerable quan- ds of the sale, $225,000, was invested in Liberty bonds.

,195 acres, mainly mineral lands, heavily timbered, in 3 ying the strike of the Keweenawan mineral belt for about 14 actically all of the amygdaloidal and conglomerate cupriferous ct, as well as numerous copper-bearing cross fissures. Lands f Rs. 27, 28 and 29 W., and include the tracts formerly owned pper Harbor, Empire, Girard, Hanover, Keweenaw, Mandan, ania & Boston, Resolute and Vulcan companies, in addition to hrough stock ownership in subsidiary corporations.

s lands carry nearly 2 miles of water frontage on either side of r, including Fish cove, 1 mile east of the river's mouth, which fair harbor at comparatively small expense. The lands include irse of the river, on both banks, and with other holdings, give entire water-frontage of Mosquito lake, making possible the great water power, with a hydro-electric installation at the r. There is a mill site on Bete Gris bay, at the mouth of the ving about 5 miles of water frontage.

also owns the Lac La Belle, or Mendota, ship canal, 1 mile ac La Belle with Lake Superior. This canal has a 14' channel, endid haven that should be made a harbor of refuge.

mine, opened about 1860, had 3 old shafts, about 100' apart, Medora amygdaloidal bed, traversing lands of the company lies immediately under the Allouez conglomerate, and outcrops eet north of the Montreal river bed. The Medora, about 12' in a soft chocolate-colored amygdaloid, carrying considerable id quartz, in connection with fine stamp copper and occasional " paystreak along the footwall carrying some barrel work, the ng bunchy.

ract also carries other copper-bearing beds, among these being e vein, outcropping about 2 25' E. of No. 1 shaft, but making depth. About 100' S. of the Medora amygdaloid is another r in small quantities, and to the northward are the Wolverine out 15' width, and the Allouez conglomerate, lying about 280' bed, at surface.

nine was reopened on a considerable scale to a depth of 1,700' ', with about 2 miles of workings. All work in the mine was , 1909. The Medora workings are fully described in Vol. VIII. nine also carries the Medora bed, about 3 miles E. of No. 1 renching and test pitting, done 1906-07, on the Empire tract, bout 15' width, carrying some copper at surface. The Empire ontreal river amygdaloid, on which the Manitou did consid-

Mandan-Resolute tract of 2,440 acres carries the Kearsarge ally its entire territory. The shaft on the Kearsarge bed, about a mile S. of the old Medora workings, and was 1,355' ned, 1911.

owns a diamond-drill outfit and has made extensive borings, ection of the Medora, Mandan, Resolute and Empire tracts. 914, were confined to exploratory work in the horizon of the

Ashbed lode, and the first drill-hole located a copper deposit promise, early in 1913, at a depth of about 500'. Mine has been 28, 1914.

Development: in 1917, operations were conducted on the only. Fifty-three diamond-drill holes, aggregating 3,063', were exploratory purposes and the shaft sunk to depth of 1,616'. Th 10th levels showed fair copper. In 1917, 41,148 tons was stamped lb. refined copper per ton.

Due to scarcity of labor and increasing costs, operations were December 1, 1917. Company was reported considering the sale of or cutting the lumber itself. In either case, there would be a lar

KEWEENAW LAND ASSOCIATION, LTD.

Office: Room 33, No. 87 Milk St., Boston, Mass. **Op** Marquette, Mich.

Officers: A. B. Emmons, chairman; Nathaniel Wilson, S. Dean, treas.; John M. Longyear, gen. agt.

Is a land corporation, holding 400,000 acres, mainly timber some mineral lands, partly on the Keweenawan copper belt, in the of Michigan, taken over from the Lake Superior Ship Canal, Raily

LA SALLE COPPER CO.

Office: 12 Ashburton Place, Boston, Mass. **Mine** of Houghton county, Mich.

Officers: Rodolphe L. Agassiz, pres.; Jas. MacNaughton, mgr., with W. Hunnewell, T. N. Perkins, D. S. Dean and Lindsley tors; G. G. Endicott, sec.-treas.; H. L. Bennett, asst. sec.-treas.; supt.

Inc. Dec., 1906, in Michigan. **Cap.**, $10,000,000; $25 par; shares. Old Colony Trust Co., Boston, transfer agent; State St Boston, registrar. Listed on Boston Stock Exchange. Compan Caldwell Copper Co. and controlled the Tecumseh Copper Co., ship of practically the entire issue, giving 11-3 shares of La Tecumseh, and bought the entire property of the Tecumseh, Ma $1,648,000. Is controlled, through ownership of 152,977 shares, & Hecla Mining Co. The Calumet & Hecla contributed $1,000, company's treasury, taking pay in stock, and agreed to loan $75 cash, as needed. Annual meeting, second Tuesday in April.

Operations—Years ended December 31:

	Total Receipts	Oper. Exp.	Taxes, Reserve	Deprec. Reserve	Inc Cur.
1918.....	$485,013	$407,956	$8,800	$24,359	$92
1917.....	454,486	311,558	8,670	.....	135

Property: 2,360 acres. The Tecumseh and Caldwell c acres each and 540 acres were furnished by the Calumet & He Mineral Land Co., Sheldon & Douglas Estate, and other interes out into the company at a novel basis of valuation, figured on the dip of the Kearsarge lode, [illegible] and values on zones carrying the [illegible] on the Tecumseh and [illegible] lls, to give a [illegible] carries the [illegible]

many y
ing the
amygdaloid

vember, 1902. It is probable that the old Osceola shaft will even-ened, as the southern drifts of the No. 6 shaft of the Osceola, 0' level, near the Tecumseh boundary, are among the best in that

gement was made in 1916 with the Osceola Consolidated, whereby and 45 S. of No. 6 shaft, Osceola mine, were extended into La The ground was fair for the most part, but some sections were The work was discontinued in November, 1917, due to difficulties

No. 1 shaft, formerly known as No. 1 Tecumseh, sunk on the has 3 compartments, 2,146' deep, and shows the Kearsarge lode thick, but characterized by irregularly distributed values. The orkable ground is limited and the work done in 1918, was with ining that ground as soon as possible and abandoning the shaft. cludes 250 h. p. boiler and 18x24" hoist.

No. 2 shaft, 2,511' deep, formerly known as No. 2 Tecumseh, is 1,700' S. of No. 1 and of the same size, shows a bed of workable without much copper. A branch of the Mineral Range railroad e shaft in 1913. Development during 1918, showed fair ground in ts, becoming leaner near Osceola boundary, on the south drift, 600' from the shaft and after that point practically no copper. nt has a 125 h. p. boiler, an 18x24" hoist good for 2,500' depth, air-compressor. Buildings include a changing house.

t, 1 mile S. of No. 1, originally known as No. 1 Caldwell, and La Salle, is 1,450' deep, shows a poorly-defined bed, with unsatis- content. Work was discontinued November, 1910.

t, formerly known as No. 2 La Salle, sunk at a point 1,500' S. W. abandoned, June, 1909, at depth of 882'. The surface equipment No. 2 shaft.

arge bed is comparatively thin in the Tecumseh tract, ranging with an average thickness of about 9'.

lopment work amounted to 141' in 1913; 1,123' in 1914; 1,127' in 1916; 2,146' in 1917, and 1,532' in 1918.

:

Tons Ore Treated	Lb. Cu. Per Ton Ore Stpd.	Lbs. Cu. Produced	Mining Cost per Ton	Net Cost Per Lb. Cents	Rec'd Per Lb. Cents
176,423	10.388	1,832,665	$1.893	21.96	24.34
185,014	10.38	1,919,775	1.87	20.14	28.45
144,829	9.53	1,380,352	1.79	19.96	25.68
80,959	9.67	782,493	...	....	....
45,509	11.88	540,731	...	....	....
2,221	19.76	43,906	...	....	....
.....	.....	.....	...	....	....
18,970	14.77	280,598	...	....	....

mped at the No. 1 mill of the Lake Mlg. Smelt. and Ref. Co., at ring 1917-1918, with the exception of the last week in December, was done at the Ahmeek mill at Hubbell.
to 1919 was 340,719 lb.

CO. **MICHIGAN**

St., Boston, Mass. **Mine office:** Lake Mine,

pres.; John H. Rice, v. p.; Robt. H. Gross, sec.-ald C. Pryor, William S. Rooney, F. ; James McKie, supt.
p., $2,500,000; shares $25 par; $5 n Stock Exchange. Federal Co., Boston, transfer agent.

Reports for years ended April 30:

Receipts—	1919	1918
Copper sold	$168,861	$373,81
Misc.	9,457	16,35
Totals	$178,318	$390,1
Expenditures—		
Mine and prod. exp.	$265,693	$391,6
Equip. and dev.	619	6,7
Taxes	22,041	21,8
Dwelling acct.	652	8
Totals	$289,006	$420,9
Prev. Surplus	$331,525	$362,3

Cash on hand at end of 1919 was about $220,000.

Property: 2,010 acres, the S. E. ¼ of Sec. 29, S. E. ¼ W. ½ of Sec. 32, and E. ½ of Sec. 31, T. 51 N., R. 37 W., incl of mineral land, 680 acres of timber lands and 180 acres of cuto

The company's first work was done on the Knowlton and B cipally on the Knowlton amygdaloid, on which there were old sh 300', latter having been deepened to 600' by the present compan siderable copper was taken from the Knowlton bed, exploration ferred to virgin territory, at the southern end of the property, demonstrated by the outcome. There was also a 90' shaft on th 1,000' E. of the Knowlton, sunk in 1865, whose cost was paid fo per extracted. Considerable diamond-drilling has also been do ings of the Adventure, on adjoining lands, indicate that the L several other promising amygdaloid beds, in the same genera Lake bed now being opened.

Geology: the strike of the Lake amygdaloid in the inn of the shaft is about N. 6° E., with dip of about 35° W. It wa that the Lake bed was a fissure vein, but this was disproven of parallel strata, including a conglomerate lying about 400' Lake, a typical Lake Superior amygdaloidal trap flow, is exce a copper-bearing bed, ranging from 50 to 100'. The hanging fairly well defined, but the footwall is extremely irregular, marked line of separation between copper rock and trap. The to carry 3 well-defined shoots of enriched copper ground, rakin depth. An unsuccessful attempt was made to locate the north the Lake bed by diamond-drilling from surface and 3 holes wer now known that the lode turns W. and passes into South Lake diamond-drill holes, aggregating 1,628', have been bored. T bottom workings of the mine show a deflection to the westwa at the extreme north, of N. 15° W., which corroborates the L. L. Hubbard, that the Lake bed is the third and the East lod from the top in the series of 4 amygdaloid beds cut by the South Lake. There are two other lodes only 50' W. of the mercial ore. For order and description of the Knowlton, Butle of the Evergreen belt, see Mass Copper Co., in this book and

The mine is operated by a 1,500' incline shaft, ore being levels from the 2nd to the 11th. The lode is bunchy with ver some mass copper, but the general average is about 2%, equiv refined copper.

The Knowlton shaft was unwatered August, 1916, to m Knowlton lode, which, though narrow, shows good copper valu The Butler and Evergreen lodes are reached by a 900' cross-cu

eing cut late in 1918. Four test runs of ore averaged 26 lb. per
nt expects to resume operations here when mine is reopened.
nt: the mine has about 3,500′ of workings, a very large pro-
rifts being in neither the footwall nor the hanging-wall, giving a
a of the actual values in the bed. New work during fiscal year
1919, totaled 1,204′, compared with 2,813′ for 1918.
: includes a 32x72″ duplex-cylinder double-conical-drum hoist,
g 10-ton loads from depth of a mile; old 6-drill and 15-drill air-
ken from the equipment of the old Belt mine, and a new 50-drill
mpound air compressor, in a steel compressor house. Mine struc-
machine-shop, smithy, office, boarding house, and a change-house
ft. There are a number of dwellings and many old houses at the
The property is reached by the Copper Range railway, which
he old Belt location, with a 1½ mile spur to the shaft, and a sid-
lt to within 500′ of the shaft by the Mineral Range railway, giv-
e advantage of competitive railway rates.
: fiscal year ending April. Work resumed in May, 1915,
utdown.

ns Ore mpd.	Mineral Lb.	Lb. Cu. per Ton Ore	Lb. Cu. Produced	Cost per Lb.	Rec'd per Lb.
....	.....	23.13	717,403	....	.....
,191	2,246,970	23.13	1,461,893	25.63(c)	25.57
,440	2,346,970	21.14	1,489,247	20.00(c)	29.726
,848	2,511,216	26.42	1,581,071	15.622(b)	20.149
....	.....	14.95	275,647	....	15.074
,109	2,153,128	15.39	1,300,562	19.5(c)	.....

produce during first 3 months. (b) Includes 1.036c. charge due
rations. (c) Approximately. (d) Did not produce during last

y 1, 1919, all operations were suspended due to labor conditions,
w copper prices.
ement is both experienced and capable, and the mine, though
romising.

NG, SMELTING & REFINING CO. **MICHIGAN**

Ashburton Place, Boston, Mass. **Operating office:** Calumet,
fice: Point Mills, Houghton county, Mich.
L. Agassiz, pres.; Jas. MacNaughton, v. p. and gen. mgr.;
, sec.-treas., with H. F. Fay and D. L. Dean, directors.
n Michigan. **Cap.,** $2,500,000; shares $25 par; fully issued;
Stock distribution is as follows: Allouez Mining Co., 36,164
ial Copper Mining Co., 16,164 shares; Hancock Cons. Mng.
s; Isle Royale Copper Co., 18,836 shares; Superior Copper Co.,

npany owns 2 mills; one, called the Centennial-Allouez mill,
, on the shore of Portage lake, on land adjoining the Franklin
ill was built by the Arcadian Copper Co., and was bought, 1904,
al Copper Mining Co., and later transferred to the present
e mill of 4,000 tons daily capacity is equipped with 6 Nordberg
shing rolls to treat oversize material. Two additional stamp
planned. Power is furnished by a 600 h. p. cross-compound en-
s supplied by a 15,000,000-gal. pump. A 30,000,000-gal. pump has
In 1918, company installed a mixed flow pressure turbine to
. w. electric generator. A boiler-house containing 8 boilers was
5; a new addition was completed in 1917 to house the 4 boilers
the two new stamps. The other mill, known as Lake No. 2, at
amps in operation, treating all the ore from the Allouez Mining
Copper Mining companies' workings. A tailing pumping plant
erating early in 1919, pumps tailings far out into Torch lake.
d jointly by the Osceola, Lake and Calumet & Hecla.

LAKE SHORE MINING CO.

Idle several years. **Office:** 990 West Kensington Roa Calif. Mine near Green, Ontonagon county, Mich. W. H. Ga **Inc.** in Michigan. **Cap.**, $500,000; $25 par.

Property: 821 acres, patented, on the shore of Lake to carry slatey rocks enclosing bedded deposits of 5' and 12' wi per oxides and chalcocite giving average assays of 2% copper, 40 to 80c gold per ton. Apparently, the orebody is of the sec pine series of the Keweenawan formation, and ores may chang at depth. A little prospecting has been done.

LAKE SUPERIOR DEVELOPMENT CO.

Office: care Clyde Mackenzie, sec., Houghton, Mich. J Jos. W. Selden, treas.

Property: 400 acres, held under option, the N. ½ of S of S. W. ¼ of Sec. 24, T. 57 N., R. 32 W., about ½ mile E. o about 1½ miles of the Ojibway. Lands are on the Kewee Drilling done in 1910-'11 gave encouraging results and company resume operations at some future time.

LAKE SUPERIOR SMELTING CO.

Office: 12 Ashburton Place, Boston, Mass. **Works offi** Houghton county, Mich.

Officers: R. L. Agassiz, pres.; C. H. Bissell, sec.-treas Flagg, F. W. Hunnewell and Jas. MacNaughton, directors. Ja gen. mgr.; Henry D. Conant, supt.

Inc. July, 1891, in Michigan. **Cap.**, $1,200,000; shares and issued. Is controlled through ownership of 25,000 shares, b Hecla Mining Co., and by the Osceola Cons. Mining Co., which h and the Isle Royale Copper Co., which has 8,000 shares.

Balance Sheet—Years ended December 31:

Assets—	Real Estate	Mchy. & Equipt.	Mdse., Mat. In Process	Cash & Accts. R
1918.....	$1,044,446	$535,515	$137,113	$193,45
1917.....	1,044,446	416,000	163,546	157,86

Liabilities—	Cap. Stock	Accts. & Notes Payable	Reserves	P. & L
1918.....	$1,200,000	$370,890	$132,010	$207,62
1917.....	1,200,000	391,839	103,437	86,58

The smelter has 11 reverberatory furnaces and 3 refining f is a mechanical ladling and casting device having a 1,100-lb. lad machine with molds linked into an endless belt, dumping over spr ing tanks, whence the ingots are delivered mechanically by cleat spection and loading platforms.

The smelter treats ore from the Osceola, Isle Royale, Ahm nial mines. The company also owns the dismantled smelting pl Michigan.

LAURIUM MINING CO.

Completely absorbed by the Calumet and Hecla Mining Described Vol. XIII.

LONGYEAR-MICHIGAN EXPLORATION CO.

Address: J. M. Longyear, Jr., Marquette, Mich.

Property: had options on 1,240 acres of land in Section 35 T. 56 R. 34, near Calumet, Houghton county. Several diam made in 1916, failed to show ore. Options reported taken over dicate Copper Co., which see.

SOLIDATED MINING CO. **MICHIGAN**
9 Milk St., Boston, Mass. **Mine office:** Mass, Ontonagon

John W. Linnell, pres.; Theo. O. Nicholson, v. p.; Wilfred A. treas.; Elton W. Walker, supt., with Francis L. Maguire, John B. Hill, D. Allison Carrick and Fred J. Schultheis, directors. E. ass, mill supt.; A. P. Bennetts, mg. capt.; Jos. Bice, master me-

in Michigan. **Cap.,** $2,500,000; shares $25 par; issued, 97,317 , $24: $8 paid on organization, balance in installments. Listed on Exchange. Old Colony Trust Co., Boston, transfer agent. An- second Thursday in March.

Sheet, December 31, shares:

Receipts	Net Profit	Prev. Assets	Divs., Inc. Tax, Etc.	Bal. of Cash Assets
$429,845	$146,106(a)	$295,773	.....	$149,667
796,638	25,599(a)	321,372	.....	295,773
1,062,319	181,631	449,255	$309,514	321,372
1,255,896	430,528	213,361	194,634	449,255

on, 1918, cost $11,269; 1917, $83,782; 1916, $94,556.

: initial dividend paid, Aug., 1916, with total for 1916 of 917, $3 per share paid, amounting to $291,951.

about 5,500 acres, lying in a very irregular but fairly com- ecs. 33, 34 and 35, T. 51 N., R. 38 W., in Secs. 4, 5, 6, 7, 8, 9 and . 38 W., and in Sec. 1, T. 50 N., R. 39 W., holding being bounded he Union, Adventure and farm lands, on the E. by the Adventure l on the S. by various lands, and on the W. by the Flint Steel, Ad- t. Mary's Mineral Land Co. Holdings include 4 old mines, the een, Mass and Ogima, also 2 old prospects, the Merrimac and roduction of which, under previous managements, was 11,131,023 These 5 properties are described, in detail, in Vol. II, Copper

tract carries the outcrop of six of the copper bearing amygdaloid ergreen belt, for about 1½ miles. The outcrops vary greatly in age about 10′, showing a sharp bend in the strike, which varies , on the north, to N. 37° E. at the southern boundary. The dip ies from 38° at the Ridge to 47° at the old Mass mine. The cop- s are as follows, from north to south:

on. Carries heavy copper and stamp rock.

Lies 140′ south of the Knowlton, and carries a little heavy copper (milling ore).

Butler. Lies about 75′ south of the Mass bed, is wide and fairly places.

Lies about 200′ south of the North Butler, is 12′ to 35′ wide, stamp copper with occasional heavy copper.

Lies about 100′ south of the Butler. Carries mainly stamp cop- barrel-work, being 5′ to 10′ wide and showing some good ground. een or Ridge. Lies about 250′ south of the Ogima and is one of the property, ranging 4 to 40′ in width and usually being richest Is very bunchy, but shows some excellent stopes, yielding mass np-rock of good grade.

ass. This bed, which is the lowest of the series of the Evergreen the number of cupriferous beds to 7, corresponding with the num- ining Adventure property, lies about 120′ under the Evergreen pened by crosscuts from "A" shaft on the 15th and 18th levels. es about 12′ in width, carrying considerable epidote and is very copper is exceedingly fine, most of it being of a flaky nature, very eye. A mill test of ore from this bed in 1909 gave a recovery f mineral per ton.

Development: the Mass has openings on all its copp
and is hoisted through the nearest shaft, workings on each lev
by crosscuts. The Mass carries the outcrop of the copper-be
Evergreen belt for about 1½ miles. Shafts "A" and "B" are
Butler lode down to and including the 10th level. The mi
notably rich in mass copper and carries silver values, but the
ingly bunchy, ranging from very rich to absolutely barren.
derground, bringing the average content of stamp rock to 16.51
50% of the rock broken is hoisted, and about 25% of the re
copper.

"A" shaft, 1,757' deep, with two compartments, sunk on t
has been abandoned.

"B" shaft, 875' S. W. of "A" has 3 compartments, and is b
Levels are at variable intervals: those at considerable interval
saving in drifting through poor ground and sub-levels can be
"C" shaft, 2,148' S. W. of "B" and 1,554' deep with a pla
level, is the old Ogima shaft, sunk on the Butler bed, but the
opened by a 400' crosscut on the 3rd, 5th and 7th levels. Some
was opened on these and on the 9th levels west on the Butle
pany has concentrated work upon the Butler, though work wa
Ogima and Knowlton beds.

"D" shaft, 150' deep, is idle.

Company will sink a new shaft 1,800' west of "C" as soon a
permit.

Considerable diamond-drilling has been done south from t
into the horizon traversed by the so-called Adventure lodes.
drills on the Adventure property, and also north of the Kn
mond-drilling was done in 1910 in the N. E. ¼ of Sec. 5, to
and conglomerate strata outcropping at that point, which is quit
the hypothetical horizon of the so-called Adventure lodes, wi
eastern sandstone undetermined.

Development during 1918 totaled 2,280', compared with 4,
sults underground were satisfactory in both years, but develop
tion were restricted due to labor shortage. Grade of copper pr
16.51 lb.; 1917, 16.29 lb.; 1918, 17.33 lb. Work done on No.
Evergreen lode to be well mineralized as far west as "C" shaft
Drifting and crosscutting in 1917 revealed good ore from thi
and there seems little doubt that a new mine has been opened
property, and that it can be operated through "C" shaft.

In 1918, the Butler lode produced 127,491 tons, and the
tons, compared with 163,310, and 74,733, respectively, in 1917.

The shaft ore-house at "B" is equipped with a steam ham
crusher, and a 50x24" engine; "C" shaft has a steel ore-hous
equipped with devices permitting automatic handling of ore.

The central power-house has a 24x48" duplex hoist, good
depth. The power plant includes a 50-drill 2-stage cross-co
pressor, a 20 k. w. dynamo for electric light, and three 335
boilers. During 1918 an air-compressor, with capacity of 2,5
per minute, was installed.

In addition to the usual mine buildings, there are about 9
The company also has a town site, Mass City, a village with a
and business houses, which is the terminus of the Mineral Ran
ation on the C., M. & St. P. railway.

The Mass mill is at Keweenaw bay, on an arm of Lak
tion of the Mineral Range and Duluth, South Shore & A
of Houghton
a new mill

ouse has a 16,000,000-gal. Nordberg vertical pump, connected ning 300' under the bed of the bay to the intake.

begun 1899, with an output of 42,800 lb. fine copper, gradu- 2,576,447 lb. in 1903, decreasing thereafter, through loss of d. Recent production has been as follows: 2,007,950 lb. copper lb. in 1906; 2,078,677 lb. in 1907; 1,766,930 lb. in 1908; 1,723,436 1,885 lb. in 1910; 1,326,898 lb. in 1911; 2,045,006 lb. in 1912; 913; 2,955,952 lb. in 1914; 4,638,452 lb. in 1915; 4,752,588 lb. in . in 1917; 3,403,827 lb. in 1918; 1,797,000 lb. in 1919.

d in 1919 totaled 123,780 tons; in 1918, 196,456 tons; in 1917, l in 1916, 287,900 tons.

ed copper in 1918 was 23.82c and price received 24.34c per lb., 9.81c. and 26.23c. in 1917. The 1919 cost was 27.83c..

onsolidated has conquered every sort of misfortune that befalls gh the acquisition of the Evergreen Bluff property, was placed g position than ever before. The experience of 17 years has knowledge of the vagaries and possibilities of the 7 cupriferous green belt; though bunchy, two of the number are of real prom- n and Butler. It is probable that other beds can be worked the future of the mine appears to depend on these beds. There bility of locating and developing other and richer beds to the main workings, in the horizon of the Lake and Adventure beds. is both progressive and experienced, but labor is short.

MINING CO. **MICHIGAN**

1917, company was consolidated with the Old Colony Copper of Mayflower-Old Colony Copper Co. (which see), on a share Described, Vol. XIII.

-OLD COLONY COPPER CO. **MICHIGAN**

State St., Boston, Mass. **Mine office:** Houghton, Mich. F. Fay, pres., with R. L. Barstow, G. E. Clarkson, G. P. Mosman, C. J. Paine, and F. W. Nichols, directors; C. J. Mor- G. S. Goodale, supt.

5, 1917, in Michigan, as a consolidation of the Mayflower Old Colony Copper Co. Stock was exchanged on a share **Cap.**, $5,000,000; shares $25 par; $14 paid in. Last as- paid February 9, 1920. American Trust Co., Boston, transfer ny Trust Co., Boston, registrar. Annual meeting, third Wed- . Shares listed on Boston Stock Exchange.

et for December 31, 1918, shows: receipts from assessments, $1,102, and machinery sale, $360; total, $86,663. Expenses were: construction, $2,300; equipment, $2,390; and general, $8,619, a The deficit was $8,536. Balance on hand, December 31, 1917, on January 1, 1919, $23,766.

bout 2,040 acres on Mineral Ridge, near Calumet, Hough- prises Secs. 7, 8, 17 and 18, T. 56 N., R. 32 W. Lands are rsarge mine and east of Wolverine, South Kearsarge, and Calu- es. Prospecting was begun on the Mayflower in 1899 and con- s.

t: on Mayflower property, by 4 shafts, No. 1, or Faull has considerable drifting on the 1st and 2nd levels and a cross- allel cupriferous amygdaloids, showing occasional patches of ing of promise. No. 2, or Isle Royale shaft, 160' deep, has feet of drifting and shows a bunchy amygdaloid, 10 to 12' ore or less copper in a 2' streak next to the hanging wall; No. badly broken amygdaloid. No. 4 shaft, 580' deep, starts from unnamed amygdaloid, lying approximately 2,000' east of the nd at a depth of 425' runs into a parallel amygdaloid lying 90' of the first bed. The copper showing is poor. On the Old there are 5 shafts, aggregating about 2,200' in depth, and over

6,000′ of drifts and crosscuts, all of which have so far show results.

The new shaft, known as Mayflower-Old Colony No. 1, dow ary 20, 1920, reached the Mayflower lode at 1,665′, where it show commercial amount. The shaft lies about 300′ W. and 250′ post between Sections 8 and 17, on the line which formerly divid The formation is a mixture of trap and amygdaloid, and at passed into the latter rock. At a depth of 1,452′ five feet resembling that of the Mayflower lode. The trap at the botto and the geologic features are said to be new to the district.

In the Old Colony mine a cross-section was secured, 1899- driven about 3,000′ and by diamond-drill borings eastward to th the tunnel; this cross-section showed upwards of 75 amygdaloi erate beds, a number of which carried a little copper in the where cut in the tunnel.

Drilling and exploratory work was resumed in the Mayflow after 3 years idleness, and in the Old Colony, in 1911, after Hole No. 16, on the Mayflower property, is known as the discov the so-called Mayflower lode was first cut by it. The holes o close this to be a big, well-mineralized amygdaloid bed, extendi of 6,000′, and for a depth of 1,500′. This lode lies on the ext of the copper range, near the eastern sandstone. Hole No. 41 was abandoned in 1916 at a depth of 2,635′, having run into a sandy material. Hole No. 42, started in February, 1916, at a of No. 41, was abandoned October, 1916, at a depth of 2,763′, w decomposed ground was encountered.

Diamond-drilling in 1917, amounted to 42 holes in the Mayfl in the Old Colony.

Thirteen holes on the Mayflower and 10 on the Old Colon commercial ore; hole No. 20 showed 101′ of 1.65% ore; hole showed 100′ of 1.2% copper ore, 60′ of which carried 1.9%; h 17 in this locality, showed 87′ and 95′ widths.

These earlier drill-holes were sufficiently promising to wa ing, provided both companies shared the expense, and as the way of dividing the expense was a consolidation of both com accomplished in 1917.

Equipment: includes 15 dwellings, boiler house, chang engine-house, containing hoist and compressor.

MEADOW MINING CO.

Is controlled by the Keweenaw Copper Co. **Office:** sec., Calumet, Mich. Mine near Copper Falls, Keweenaw cou

Inc. 1898, in Michigan. **Cap.**, $1,500,000; $25 par; 81. Dec. 31, 1918; 37,500 shares were given in payment of property. tion of the Meadow Mng. Co., inc. 1863, under special Michiga

Property: 364 acres, adjoins the Humboldt and Phoe carries the Ashbed lode, which was first opened 1851, with a little to 1860. Where the Ashbed is crossed by transverse fissures, occur and such places usually show pits made by prehistori described Vol. II, Copper Handbook.

Idle for years.

MICHIGAN COPPER MINING CO.

Office: 15 William St., New York. **Mine office:** Rockl county, Mich.

Officers: L. P. Yandell, pres.; F. G. Heuman, sec.; R. E directors: L. P. Yandell, J. R. Stanton, J. S. Dunstan, W. A. Low. Jesse Butler, supt.

Inc. Jan. 5, 1899, in Michigan. **Cap.**, $2,500,000; $25 pa $24 paid in. Last assessment levied July 1, 1918, was $2 per $200,000. Old Colony Trust Co., Boston, registrar; American T

Annual meeting, first Tuesday in May. Listed on Boston Stock

eet for 1918, indicates receipts, $445,782; including $290,923 from 154,859 from assessment and $975 from interest. Surplus for year The accumulated deficit was reduced to $52,068, and $247,473 ng and development. These figures compare with 1917 receipts, 8 from copper, and $96,986 from assessments. The deficit for 34; mining and development cost $117,144.

the Minnesota, Rockland and Superior mines, 4,870 acres of ry, 1,466 acres of timber and miscellaneous lands and a 150-acre ; total holdings of 6,686 acres.

tract is 3 miles east and west by 4½ miles north and south, in ich there are 4 scattering tracts to the westward, one of 40 acres, s each and one of 160 acres, all carrying the outcrop of the Calico The Superior mine produced 567,331 lb. fine copper, 1856-69 and Rockland, lying next east of the Minnesota, was operated 1853-70, 09 lb. fine copper from the Minnesota contact vein which averaged and carried considerable silver in that mine. The old Minnesota 847, closed 1870, made 34,704,668 lb. fine copper and paid dividends The Minnesota mine is fully described in Vol. II, Copper Handbook. the Michigan company's tracts carry the following known the Evergreen belt: Calico, Contact, Minnesota, Branch, North lton, Mass, Butler, Ogima, North Amygdaloid and South Amygda- mably the other parallel beds, in addition to various other uniden- aring beds of the Keweenawan series. The Knowlton, or north- Evergreen belt of parallel beds, lies about 1,000′ south of the shafts and the 7′ amygdaloidal bed supposed to be the Butler, extent in Peninsula bluff 2,000′ south of "B" shaft, shows some nd stamp rock. There are 3 old shafts on the Butler bed and several parallel copper-bearing strata. There also are cupriferous utcrops north of the Calico bed on which no work has been done. **ent:** mine has 3 shafts on the Calico bed and about 10 miles "A" shaft is 2,133′ deep; "B" is bottomed at the 14th level and level. The lode grew steadily poorer with depth and showed a nch, being only about 5′ wide on the 16th level of "A" shaft, arged with copper. The mine was closed down in 1910, when the urned over to tributors, who continued to scram the mine with themselves and the company until May, 1913, when all work was

15, work was resumed at the old "E" shaft, and continued to date. his was enlarged from 2 to 3 compartments and sunk to a depth ing south of the shaft encountered the Evergreen, Butler and ll showing commercial values. Results from other development orted as most encouraging.

l in 1919, that a new shaft was to be sunk east of "E" shaft.

t: buildings include a machine-shop, smithy, carpenter shop, ce and changing house.

construction of which was begun April, 1906, is about 1 mile lass mill, on Keweenaw bay, with ample water frontage. Con- uspended in 1907, after about $175,000 had been expended. In nent was overhauled; necessary additions and improvements were mill is expected to be in operation at an early date.

lb. copper: 1900-1905, 6,113,500; 2,875,341 in 1906; 2,665,404 06 in 1908; 1,979,305 in 1909; 36,682 in 1910; 327,773 in 1911; 90,000 in 1916; 35,400 in 1917; and 1,177,176 in 1918.

as thus far proved a disappointment, largely because limited cted the necessary exploratory and development work. Recent e been rather promising. The property is very fully described Copper Handbook.

MICHIGAN SMELTER CO.

Office: 82 Devonshire St., Boston, Mass. **Works office** Houghton county, Mich.

Officers: Wm. A. Paine, pres.; John R. Stanton, v. p.; sec.-treas.; Frederick I. Cairns, supt., and Chas. A. Snow, director ford, asst. supt.

Inc. 1903, in Michigan. **Cap.**, $500,000; $25 par. The entir is owned by 6 mining companies, the Copper Range group holding and the Stanton companies 8,000 shares, holdings in shares bein Champion, 4,400 shares; Trimountain, 4,400; Baltic, 3,200; Mohaw verine, 3,200; Atlantic, 1,600. No dividends have been paid, profi turned back into improvements. Annual meeting, second Monday

Works: company owns and operates the Michigan smel west of Houghton, near the old Atlantic stamp mill, with frontag lake. It was designed by Frank Klepetko, and is the largest and smelter in the Lake Superior district, with a capacity of 90,0 copper yearly.

The plant is terraced throughout, permitting automatic handlin The copper ore (locally rock), is delivered in 40-ton bottom-dum by the Copper Range railroad, which also hauls away the refin shipment from the Copper Range wharves in Houghton.

The 3,000-ton storage bins hold 10 days' supply for the works, or in Lake Superior terms, mineral, is dehydrated in rotary dr gases from the furnaces, taken to the furnaces in tram cars and hoppers on the charging floor. Coal trestles, on an upper level, h of hard and soft coal, with tunnels underneath through which fu tram cars, descending by gravity to the furnaces and boiler room are separate storage bins for charcoal, sand and limestone.

The reverberatory furnace buildings has three 5-ton traveling furnaces. Alternating with the larger reverberatories are one two 200-h. p. Stirling water-tube boilers, heated by waste gases fro After leaving the boilers the gases are drawn through a 6x8' sub with arched roof, up the hill to a 150' smokestack, with base furnace building.

The blast-furnace building has 2 cupola furnaces. Blister mechanically, in molds upon a circular casting table, cooled in wat by a link elevator to the loading platform. Slags are carried m the sampling mill and reduced in a 30-ton crusher of 1,000 tons for re-smelting. The slag from the final fusion is granulated discharged through launders to low ground northward.

The combination machine-shop and power house has a comp driven by an independent engine, and a 300-h. p. Nordberg hori compound engine, driving a 200-k. w. generator, actuates the for the blast furnaces. Electric power is used for operating the cranes, casting machinery and lighting. There are 3 specially de electric locomotives.

Miscellaneous buildings include office, laboratory, warehou Water is obtained from the old Atlantic dam, on Cole's creek, th flume with capacity of 5,000 gals. per minute, leading to a 50,0 tank, 100' above the works, giving good pressure at all points. well planned and well handled.

MINONG COPPER CO.

Office: 122 Winder St., Detroit, Mich. Louis O. Bro Hugh A. McPherson, sec.

Inc. Dec. 16, 1874. **Cap.**, $1,000,000; shares $25 par.

Property: 1,435 acres in Secs. 22, 23, 26, 27, 34 and 35, T W., lying at the head of Minong [illegible] Cove on the Isle Royale, [illegible] ancient mine [illegible] 40' and about [illegible] miles long. Idle since a

MINING CO. **MICHIGAN**

5 William St., New York. **Mine office:** Mohawk, Keweenaw Mill office: Gay, Mich.

L. P. Yandell, pres.; R. E. Graver, treas.; F. G. Heumann, s: L. P. Yandell, J. S. Dunstan, C. D. Lanier, W. A. Paine and .

., 1898, in Michigan. **Cap.**, $2,500,000; **shares** $25 par; all able; paid in $18. Stock listed on Boston Exchange. Boston Safe ust Co., registrar; American Trust Co., Boston, transfer agent. g last Tuesday in March. Company owns $80,000 worth of Michi- Co. stock.

1918, was $1,033,690 before deducting dividends and before pro- come, War and Excess Profit taxes. Dividends for year absorbed rplus, Dec. 31, 1918, $5,998,592.

s: formerly paid semi-annually, but are paid quarterly since 8. Payable Feb., May, August and Nov.; $5 in 1906; $9 in 1907; $3 in 1909; $2 in 1910; $1.75 in 1911; $3.50 in 1912; $5 in 1913; 6 in 1915; $17 in 1916; $20.50 in 1917; $10 in 1918; $5 in 1919; on Feb. 2. The grand total is $9,257,000.

: 800 acres, in an irregular tract, having its axis on the strike rge amygdaloid bed, in Secs. 27, 28, 33 and 34, T. 57 N., R. 32 W., N. E. of Calumet, with the Ahmeek and Seneca mines on the meek to the west. In May, 1916, purchased 900 acres near Dollar ween Torch and Portage lakes, with a long strip of shore on each uiring an excellent millsite on Torch lake.

property carries the Kearsarge amygdaloid bed, which is 8' in average width, as at the Wolverine, and the upper workings he same percentage of copper as in the Wolverine mine, but the gs are by no means so rich. The Kearsarge bed is crossed at ap- ght angles by a number of narrow fissure veins, with nearly vertical a considerable amount of mass copper and in addition there are es carrying copper arsenides, including mohawkite, keweenawite, ieyite, and stibio-domeykite, the first two being peculiar to this irst found in this mine. The fissures carrying mohawkite range dth, are well mineralized where crossing the amygdaloidal bed and ite but usually short distance on either side, the mohawkite and s occasionally occurring massive, but commonly being disseminated us gangue. The copper arsenides decrease with depth, and recent s been small. There also are other cupriferous amygdaloidal tratified series that may be prospected later.

nent: 6 shafts, numbered from north to south, of uniform size, f timbering, with solid cribbing through the overburden and with ment. All operating shafts, i. e. No. 1, 4, 5 and 6 are equipped collars. The skipways in the shafts, are laid with concrete stringers very satisfactory. The mine is equipped with electric signals and t 65 power drills. New work in 1918, totaled 9,253' which com- 134' in 1917.

ft, about 1,500' south of the northern boundary, is bottomed at and is 2,693' deep. No. 1 hoist, in the central power-plant at No. es two 4-ton skips in counterbalance. No. 1 shaft has a combina- house, equipped with a 12x24" engine and crushers. The new nue to show the necessity of selective underground working.

ft is 2,364' deep. Like No. 1, it had good ore near surface with t at depth, followed by improvement below the 12th level. The No. 2 shaft, serving both No. 1 and 2, includes an engine house se. Hoists are double-conical-drum duplex-cylinder engines, good th, each handling two 4-ton skips in counterbalance. The boiler motive firebox boilers with foundations for 3 additional boilers, e house has 2 air compressors, of 40 drills aggregate capacity. operated during 1918.

ft, 1,600' deep, was abandoned, as the ground can be reached

through shafts No. 2 and 4. No. 4 shaft is 2,489′ deep, developin copper content from surface. Equipment includes a steel shaft r 3 crushers and a steam hammer. The engine house has a doub hoist, good for 6,000′ depth. A compressor plant, at No. 4 shaft pressors and two 4-ton trolley locomotives.

No. 5 shaft is 1,787′ deep. Equipment includes a new all-s house and a Bullock hoist good for 2,000′ depth.

No. 6 shaft, the southernmost and newest, is about 2,600′ and 2,600′ from the Ahmeek boundary, commanding about thr mile of the strike of the Kearsarge bed under about 160 acres, o as much ground as the entire Wolverine mine. This shaft, lo in the footwall rock, is 1,451′ deep, and can be sunk to a maxi Mechanical haulage was installed on No. 8 level in 1916, and tw locomotives were put in operation in 1918.

New openings at No. 4, 5 and 6 shafts in 1918 continued to cellent mineralization as in previous years.

The mill, near the mouth of the Tobacco river, on Trav Superior, opposite the mill of the Wolverine, is 178x206′ in size, sheathed with iron, on foundations of sandstone. A steel trestle 50′ high, leads into the mill, loaded cars being pulled up the inclin engine. The mill has 4 stamps, all compounded, giving a daily c to 3,000 tons. The mill has a Chilean mill and 3 sets of auxiliary with fixed bearings, to reduce oversize material from the morta heads, this averaging 20 to 25% of rock stamped. Mineral from charges automatically and is sluiced into the basement, where 1½-ton mineral cars, having 14-mesh perforated steel bottoms drainage out of water, after which the cars are weighed, then l elevator and dumped into bins. The bin house has 4 compartm cement floor and steam-pipes underneath, for drying the rema from the wash. The mineral is taken from the bin house, i steel mineral cars to the Michigan smelter at Houghton for redu from the mill are dewatered, then raised by bucket elevator, and conveyor, some distance from the mill. To utilize exhaust stea a 1,250-k. w. turbo-generator has been installed.

In 1918 a concrete building 42′x42′x18′ on a concrete foun was built to accommodate this turbine which will furnish pow the mill machinery in addition to three 7,000 gallon electrically-dri pumps which are to be installed at the old pump-house, thereby present pumping boiler plant.

Water for both the Mohawk and Wolverine mills is furnish pump house, standing near the Tobacco river, from which water pump house has at present a 20,000,000-gal. triple expansion pump by a 9,000,000-gal. pump, giving an ample water supply for both

A 30x300′ wharf, on Traverse bay, a short distance from th of clear water alongside, is fitted with coal hoists and storage s the needs of both mills. Employs about 700 men.

Yield of fine copper, per ton of rock stamped, averaged 1 decade ended 1912.

Production:

	Tons Ore Hoisted	Cost per Ton Hoisted	Tons Ore Stmpd.	Cost per Ton Stmpd.	Lb. Cu. per Ton	Mineral Lb.	Ref. Cu. Lb.	Co Cts.
1918....	465,608	$2.204	454,293	$2.259	28.78	15,011,000	10,781,041	9.52
1917....	.....	.....	605,202	.....	20.35	17,775,200	12,313,887	9.25
1916....	700,412	1.47	664,547	1.54	20.82	18,468,100	13,834,034	8.52
1915....	865,029	1.16	829,789	1.20	19.15	20,705,600	15,882,914	7.21
1914....	665,852	1.21	649,649	1.24	17.08	14,591,000	11,094,859	8.23
1913....	895,100	1.53	369,458	1.64	15.76	8,018,000	5,778,235	10.42
1912....	868,841	1.34	787,941	1.47	15.22	15,901,500	11,995,598	9.67
1911....	902,859	1.294	802,548	1.406	15.07	15,760,700	12,091,056	9.33
1910....	906,248	1.267	802,537	1.433	14.22	15,013,500	11,412,066	10.07

(a) Includes construction. (b) Includes strike expense. c) Includes cost depletion, smelting, freight, taxes, etc. The actual cost of operating was 11.2

n for 1919 was 12,800,000 lb.
was closed from July, 1913, to April, 1914, due to the Miners'

1911,. estimated 176,000,000 lbs. extractable copper, and a further
rs. Our estimate made in 1915 was 260,000,000 lb. and a life of
1918, the company engineers estimated 260,738,612 lb., or a yield
lb. annually for 20 years. Production to Dec. 31, 1918 has been

awk, while a much lower grade mine than was anticipated at the
a fine property, having an assured future with the benefit of a
competent and thoroughly economical management.

INE **MICHIGAN**

re R. P. Mulock, owner, Colfax, Iowa. Mine near Match-
gon county, Mich.
240 acres, the N. W. ¼ of Sec. 9 and the N. W. ¼ of N. W.
¼ of Sec. 15, T. 49 N., R. 41 W., one-half mile N. W. of the
Exploratory work, 1903-05, showed 4 cupriferous amygdaloidal
two, about 400' apart, averaging 6' and 15' in width, were opened
s. showing copper.

PPER CO. **MICHIGAN**

eopold Bldg., Houghton, Mich. Mine near Copper Falls,
nty, Mich. F. W. Nichols, resident mgr.
200 acres, the N. E. ¼ and E. diagonal ½ of E. ½ of N. W.
T. 58 N., R. 31 W., surrounded by holdings of the Frontenac
roperty slightly explored in early days, has been idle many years.

MINING CO. **MICHIGAN**

ie address: Rockland, Ontonagon county, Mich.
B. T. Morrison, pres.; Harry Highley, sec.-treas.; Chas. M.
M. Howard and W. S. Warn, directors.
in Michigan; rechartered 1878, cap. increased later to $2,500,-
5 par; issued, $1,875,000, and rechartered 1908. Listed on Boston
e. Paid dividends, 1861-72, of $320,000, and levied a 40c. assess-
ie company has no debts.
1,852 acres, having the Michigan on the north and east and
n the south and west, carries the western continuation of the
the old Minnesota mine, now owned by the Michigan Copper
When the work was begun, the property showed the relics of
operations, including a shaft of 50' depth, timbered and scaffolded,
continuous sheet of copper extending down one side. The com-
derable litigation with the old Minnesota company over the title
land, the National finally winning. Stopped work in 1893.

PPER CO. **MICHIGAN**

1855. **Office:** Delaware mine, Keweenaw county, Mich.
t last accounts, Ashley Watson, pres.; Chas. E. Adams, sec.-
Watson, Frederick Hoitt and Frank L. Van Orden, directors.
and reincorporated March 29, 1880, in Michigan. **Cap.,**
par; assessable; fully issued. Annual meeting, first Wednesday

480 acres, being the S. ½ of Sec. 3 and N. W. ¼ of Sec.
. 30 W., all on the Keweenawan trap belt. A little work was
on a fissure vein crossing the Ashbed. Assessments levied total

COPPER CO. **MICHIGAN**

Broadway, New York. **Mine office:** Houghton, Mich.
. Parke Channing, pres.; Sam A. Lewisohn, v. p.; E. H.
treas. Directors: J. Parke Channing, Adolph Lewisohn, I. J.
Van Orden, Theo. L. Herrmann, J. H. Susmann and Chas. J.
Harry Reeder, supt.
n 21, 1912, in Michigan. **Cap.,** $5,000,000; $25 par; $10 paid

in, issued 102,000 shares. U. S. Mortgage & Trust Co., registrar ing, third Wednesday in March. Listed on Boston Curb.

Company ended 1918 with a cash balance of $28,426. Develo $213,434, or $523,836 since 1912. This compares with a cash ba and development expenses of $159,870 in 1917.

Property: 1,200 acres, in Secs. 34 and 35, T. 55, N., R. 3 3, T. 54 N., R. 34 W., just west of Houghton, on the south sh lake, carries practically all of the Ashbed amygdaloidal beds Atlantic and the Quincy-Pewabic lodes.

Development: property but slightly explored under f whose efforts were sporadic and unimportant. Operations by p were begun July 10, 1912, in the horizon of the Hancock lodes yielded good showings of copper at depth of 513' in what is pre extension of Hancock No. 3 lode, and again at a depth of 1,3 streak of coarse copper was encountered.

In 1914, the main, or Dakota Heights adit on the old Pe extended 126', encountered the lode at 100', and drifts No. 2-A were continued for 70' and 63'.

This work showed a lode, 6-8' wide, opened for 700' and ore, but not of commercial value. During 1915 exploratory work lode showed considerable copper on the No. 2 North drift. A sunk from this drift and 1,602' of drifts and crosscuts driven level. No beds of value were found in the southern part of th

In 1916, all exploration was confined to workings from N end of property. No. 2 drift was put out 352' on the old Pewabi no copper. Work from No. 4 E. crosscut disclosed nothing exploration, save the bed in which the breast of crosscut is in.

In 1917, main shaft was sunk 47' to the 400' level. "A" sha adit level for ventilation, but the shaft and 250' of drifting along less mineralization than was indicated by diamond-drill cores work at the main shaft was pushed on the 400' North drift, cro was driven 450', excellent copper showing in spots. An incline 1,027' from adit level. The showing at 1,000' was so inferior to or the 400' levels that work was abandoned in that section. I couraging work in north end of property, company will explor

Equipment: includes hoist, compressor, pump and electr a legitimate mining speculation, backed by the Lewisohn interest

NEW ARCADIAN COPPER CO.

Fully described in Vol. XIII. Merged November, 1919, wi Copper Co., to form the Arcadian Consolidated Mining Co., whi

NEW BALTIC COPPER CO.

Fully described in Vol. XIII. Merged November, 1919, with Copper Co., to form the Arcadian Consolidated Mining Co., whi

NEW YORK CONSOLIDATED MINING CO

Charter expired and corporate existence of company wound Nichols, Receiver, Houghton, Mich.

Property sold to J. H. Rickard, trustee, 1917.

NORTH LAKE MINING CO.

Office: 60 Congress St., Boston, Mass. **Operating o** Bldg., Houghton, Mich.

Officers: R. M. Edwards, pres and gen. mgr.; Arthur C. Henry Tolman, treas., with H. D. Forbes and S. L. Powers, J Wyman, sec.

Inc. Aug. 26, 1908, in Michigan. **Cap.,** $2,500,000, $25 par $10.50 paid in. Assessment, No. 3 of 50c. levied March 9, 1917 [illegible] paid $144,000 for 360 acres of land, [illegible] Lake [illegible] in cash and one-half in 6,000 [illegible] [illegible] cash in the treasury. [illegible] the [illegible] Lowe & Co., Sept. 191 [illegible] [illegible] by the formation of

000 in debt. This indebtedness was wiped out by an assessment of
, levied April 18, 1913. Federal Trust Co., Boston, registrar;
ust Co., Boston, transfer agent. Shares are listed on the Boston
ge. Annual meeting, third Thursday in April.

reports show:

sessments	Other Inc.	Exp.	Prev. Bal.	Curr. Bal.
$50,000	$184	$35,098	$26,310	$11,224
.....	387	55,264	28,567	26,310
100,000	333	56,188	15,556	28,567

hand, Dec. 31, 1918, was $650, compared with $1,271 in 1917, and
16. Accounts payable, 1918, $6,372; 1917, $8,999, and 1916, $6,520.
: 1,120 acres, in Secs. 28, 29, 32 and 33, T. 51 N., R. 37 W.,
ately north and east of the Lake Copper Co. Property was sup-
y about 7,000′ of the strike of the Lake amygdaloidal bed, but
e Lake bed curves to the westward, rather than to the east. Prop-
ies the copper-bearing series of the Evergreen belt of amygdaloidal
rious other unidentified cupriferous strata. The company's lands
y the Fire Steel river, and are traversed by both the Mineral Range
Range railways.

ment: exploratory work has been thoroughly and systematic-
and carried out the preliminary work consisting of diamond drilling
mplete cross-sections, of about 8,500′ and 9,500′, respectively, to
strike and dip of all the strata on the property. These sections
0′ apart, and the contact of the Keweenawan series with the eastern
s been definitely located by drilling.

liamond-drill holes were put down between 1909 and 1911, with
′ to 2,000′. Several cupriferous amygdaloidal beds were disclosed,
d 8 conglomerates, have been correlated as extensions of No. 1 and
enture series of lodes. No. 1 bed, of about 33′ width, showed 10′
copper, but No. 2 bed was lean. Formations above No. 8 con-
d are practically unexplored, and excepting the work done in holes
remain entirely untouched. Results obtained from holes 3, 7 and
s conglomerate bed, were very promising and a vertical shaft was
1913, near No. 3. At 300′ depth a crosscut to the N. W. cut No. 8
. A 200′ winze, 30° incline, was sunk and 100′ gained in depth.
evel exploratory work to develop lodes cut on South Lake property
l, but no commercial rock was found. At a distance of 1,050′ N. W.
the crosscut broke through into the overburden. In the summer
sinking was resumed, and by June, 1916, had been bottomed on the

s at right angles to the general trend of the formation were driven
tions from the shaft on the 800′ level. In Dec., 1918, the S. E.
1,576′ long and the N. W. crosscut was 1,969′ long. The S. E.
etrated a lode which showed 2 to 8″ of rich brick copper, and
fine copper. In September, the Butler lode was cut by the N. W.
a 30′ drift on the lode shows considerable copper; but operations
ed at end of 1918 until more favorable cost conditions prevail.

ent: includes a hoist good for 1,200′ depth, small air-com-
ding house, and all mine buildings.

th Lake is an exploration company, but in view of the encouraging
ed by diamond-drill borings on this and adjoining properties, is
romising; the management is very capable.

MINING CO. **MICHIGAN**

Suite 3300, 120 Broadway, New York City. **Mine office:** Calu-

Thos. F. Cole, pres.; Thos. Hoatson, v. p.; Jos. B. Cotton,
R. Kennedy, sec.-treas.; Henry Paull, auditor, above with G. A.
and Saml. Brenner, directors.

Inc. June 1, 1907, in Michigan. **Cap.**, $2,500,000; $25 p
issued 84,000 shares, $15.50 paid. Last assessment, 50c., paid
Previous assessment of $1 paid Dec., 1912. Boston Safe Depo
registrar, American Trust Co., Boston, transfer agent. Listed
Stock Exchange and New York Curb. Annual meeting, first T
Balance sheet, Dec. 31, 1918, showed assets: mining pro
investments, $48,037; due on calls, $13,766; cash, $8,424; acc
$348; supplies at mine, $6,856; loss and gain, $726,879; total,
bilities: capital stock, $1,302,000; bills payable, $30.

Property: 2,520 acres, in T. 57 N., R. 32 W., Kew
bounded on the north by the Cliff and on the south by the S
fee, 980 acres, mineral rights to 580 acres and recently purchas
$37,800 cash.

The Kearsarge bed, located 1904, on the Miskwabik tract, abo
of Mohawk No. 1 shaft, was proven by 5 bore holes drilled acro
at intervals of 1,200'. Four of these holes gave good cores,
rich toward the northern limits of the tract. The holes showe
amygdaloidal bed to be divided into 7 alterations of amygdaloid
diately above the geological horizon of the Wolverine sandsto
cores each showing copper from either one or more of four ho
indicates that copper values alternate from bed to bed, or layer
cupriferous zone of the Ojibway be considered a single strata;
amygdaloidal layers being well mineralized in a given cross-se

Development: by two 3-compartment shafts. No. 1,
1,500' from the northern boundary of the property, is 2,051'
copper from grass roots. Developments in this shaft show tha
stratum is split in two, having distinct beds of 20' and 13' respec
by 13 to 15' of trap. The 1,600' and 1,700' levels show good ore.

No. 2 shaft, 1,116' S. W. of No. 1, is sunk about 90' in the
1,954' deep, disclosing very little copper ground above 800', th
betterment is noted below that depth, and a very marked impro
below 1,500' depth. This shaft is sunk in unusually firm ground
little timbering. Work was suspended June 30, 1913, for lack of

The mine is equipped for development to a depth of 2,000
has been systematic, but the former management planned maki
5 drill cores, which, as has been proven, gave rather too favorab
of the richness of the lode.

No work was done in 1919, and date of resumption of operati

OLD COLONY COPPER CO.

By vote of stockholders, Feb. 26, 1917, company was consol
Mayflower Mining Co., on a share for share basis, under the tit
Old Colony Copper Co., which see.

ONECO COPPER MINING CO.

Office: 78 Devonshire St., Boston, Mass. **Mine office:** H

Officers: John D. Cuddihy, pres.; John Brooks, sec.-tre
with F. L. Maguire, J. E. Fitz Gerald, Jr., directors; John L. H

Inc. Dec., 1898, in Michigan. **Cap.**, $2,500,000; $25 par;
issued 70,000 shares June 9, 1913. Levied a 50c. assessment, Ja
assessment, Feb. 21, 1910, and a $1 assessment, Oct. 10, 1912.
third Thursday in March. Stock listed on Boston Curb. Co
transfer agent; Federal Trust Co., Boston, registrar.

Property: 800 acres in Houghton county, all on the Ke
per formation, in Secs. 2, 10 and 11, T. 56 N., R. 33 W., forming
640 acres, and a smaller tract of 160 acres, adjoining diagonall
corner. The property lies east of the Franklin Junior and Rho
but is separated therefrom by a quarter mile of intervening lan

Development: the mine was opened in 1862, and explor
1890 and 1898. Present company began sinking June 30, 1899,
500' shaft. Drifting on the upper levels showed a belt of fair
a little copper, and the shaft [illegible] rock [illegible] rich in copp

se it is one of the few productive crossveins found in the Portage
The bed on which the shaft was sunk has been variously identified
yale, Grand Portage and Kearsarge amygdaloids, but is now termed
ygdaloid.

s suspended 1900 until Aug., 1909, when a diamond drill campaign
drill-holes being bored, cutting the Oneco bed and an unidentified
bed, called the Torch Lake or Tomahawk lode, about 1,200′ west
cores from both beds showing more or less copper. Drill holes
depth of 1,000′, to 1,700′, locating the eastern sandstone and giving
oss-sections, 2,700′ apart.

was reopened Nov., 1910, drifting resumed on the 4th level, the
a depth of 1,250′ and extensive drifting done on the 9th, 10th, 11th
s, both north and south, which showed the vein to be 10 to 20′ wide
ralized. Mine has been idle since 1914, due to lack of funds.

A COPPER CO. **MICHIGAN**

Houghton, Mich.

Reginald C. Pryor, pres., treas and gen. mgr.; C. H. Lang,
iffney, sec., with Ward B. Smith and D. L. Robinson, directors.
1 22, 1912, in Michigan. **Cap.**, $3,750,000; $25 par; $4 paid;
Stock listed on the Boston Curb Exchange. State Street Trust
ansfer agent; Commonwealth Trust Co., registrar. Balance, Dec.
30.

10,230 acres in Ontonagon county, Mich., near the White
he Calumet & Hecla Co. The formation, a fine-grained sand-stone,
osed by surface trenching at several points and found to carry
considerable quantity. The metal appears to be patchy, but as
ntly averages 10% where cross-faults occur, a commercial average
y be expected.

ent: has been confined to diamond-drilling. The first hole
an., 1913, has a depth of 1,912′ and is apparently in the horizon
ale-Arcadian lode. Hole No. 2 is 1,500′ deep. Hole No. 5 driven
0′ depth, failed to reach the contact. In 1914 holes Nos. 6, 7, 8
illed, making a complete cross-section from the S. E. corner of
N. W. corner of Sec. 4. None of the lodes cut in the holes gave
copper in commercial quantities. Owing to financial conditions
continued Sept. 21, 1914. Drilling near the northern boundary
ted July, 1915, each hole exploring the territory farther south.
e S. E. corner the lode was located at 1,100′ depth, but had no
6, drilling gave cores from the lode in several places, but revealed
values, so operations were stopped, and management awaits results
on neighboring properties.

ONSOLIDATED MINING CO. **MICHIGAN**

Ashburton Place, Boston, Mass. **Mine office:** Osceola,
ty, Mich.

Wm. H. Dwelly, E. V. R. Thayer, J. M. Longyear, Wm. D.
Dean, E. B. Dane and J. T. Burnett.
. V. R. Thayer, pres.; R. L. Agassiz, v. p.; C. H. Bissell,
. Osgood, asst. sec.-treas.; James MacNaughton, gen. mgr.;
r, supt.; A. Lincoln Burgan, mill supt.; Chas. D. Hohl, chief
, mng. capt.
ch; Jos. Discombe, mng. capt., North Kearsarge branch; Frank
. South Kearsarge branch; John T. Reeder, purch. agt.; Wm.
.

Michigan, and reincorporated 1903 for a term of 30
00,000; $25 par; issued, $2,403,850. State Street Trust Co.,
American Trust Co., Boston, transfer agent. Listed on
change. Annual meeting, second Thursday in March. Con-
met & Hecla Mining Co., through ownership of 33,560 shares.
dividends paid from 1878 to Dec. 31, 1919, aggregate
t dividends were: $2 in 1904; $4 in 1905; $16 in 1906; $7 in

1907; $2 in 1908; $14 in 1909; $8 in 1910; $7 in 1911; $12 in 1912; $3 in 1914; $11 in 1915; $19 in 1916; $14 in 1917; $10 in 1918, and

Net Earnings:

1908.....	$667,105	1912.....	$1,163,288	1916.....	
1909.....	1,070,645	1913.....	381,967	1917.....	
1910.....	758,586	1914.....	353,677	1918.....	
1911.....	664,628	1915.....	1,610,860		

Income Account, years ended December 31:

	Total Income	Expenses	Taxes and Construct.	Dividends	Surplus for year
1918.....	$4,082,236	$2,878,282	$716,038	$961,500	$19,136
1917.....	3,494,468	1,716,843	698,882	1,346,100	*267,357
1916.....	5,065,134	2,222,916	66,058	1,826,850	949,309

* Deficit.

Current Assets and Liabilities.

Assets.

	Cash	Accts. Rec.	Liberty L. Bonds	U. S. Certif.	Copper on hand	Suppl
1918....	$721,596	$1,007,861	$412,950	$500,000	$546,924	$285,
1917....	1,505,475	534,238	317,500	.....	499,441	335,

Liabilities.

	Accounts Payable	Reserve for Taxes	Surplus
1918.....	$160,844	$660,882	$2,652,970
1917.....	229,779	552,404	2,410,190

Property: 2,120 acres, in 4 separate tracts, also an extensi Houghton county, and miscellaneous lands in Houghton and Kewe includes the Osceola, North Kearsarge, South Kearsarge and Ta mines.

The **Osceola** mine proper, 720 acres, lying next south of & Hecla, was opened 1873, on the Calumet conglomerate; thi unremunerative, work was begun on the Osceola amygdaloidal and 730' east of the Calumet conglomerate. The Osceola amy strike of approximately N. 39° E., and is opened by six shafts n north to south. Crosscuts have been sent from the Osceola we Calumet conglomerate, at various depth, without encouragement, drilling was done, 1904, to locate and test the Kearsarge amygdal Osceola tract, but the results were not encouraging. It is said tha ceded the right to mine the Kearsarge bed on its property to the La Co., in exchange for certain surface rights.

The 4 northernmost shafts of the Osceola mine proper a No. 5 Osceola shaft, 700' S. E. of No. 3 is 4,667' deep. No. 6 formerly known as the Opechee, 1,300' S. W. of No. 5, is 4,73 shaft shows some good stopes, especially on the lower levels in drifts, toward the Tecumseh mine.

Some work was done at No. 3 shaft in 1916, but stopped 191 improvement in labor and mill conditions. Mining was limited t where the 46' level was the most active and most productive. A opened above the 38th in very good ground for 500'. No. 4 driven into La Salle ground. The Ancient shaft 1,800' S. operating between No. 47 and 46 levels. Rope haulage was int from the new shaft.

Osceola contributed 246,[illegible] tons to 1[illegible] Its output was in 191 pared with 203,281 tons in 1[illegible] in 1917 and 270,[illegible] tons in 1918.

The [illegible]

r. Two trolley-type locomotives were ordered in 1918 for this
e mine.
secured from Lake Superior through a 1½-mile line of 6" pipe,
ith a stand pipe at the Tamarack mine, leading to a 130,000-gal.
rvoir between Osceola shafts Nos. 5 and 6.
rsarge or **North Kearsarge** mine, 1,120 acres, lies north of the
ith which its has underground connections. Extensive diamond
1907, showed considerable good stamp rock in the foot and hanging
ts where the main bed was impoverished. The Kearsarge amygda-
nges 16 to 20' in width, in this mine, and has proven very bunchy,
very good average values. The southern workings, approaching the
ave shown improvement, but the mine is richest near the Ahmeek,

rth Kearsarge shaft is 4,229' deep and has a hoist good for 6,500'
ng two 6-ton skips in balance. No. 2 North Kearsarge shaft was
depth of 2,400', some years ago.
orth Kearsarge shaft, 1,825' N. E. of No. 1, is 3,403' deep and
rge area of good ground, especially in the northern drifts. No. 4
rge shaft, begun 1907, sunk 75' in the footwall, is 1,622' deep. The
with concrete for 185' from surface, and has large loading bins
e 10th and 13th levels, to which rock is milled through chutes, from
ve. Equipment of the rock house includes two 24 by 36" crushers
electric motor. The steel-frame boiler-house at No. 4 has three
ith room for 2 additional. During 1917 and 1918, four storage-
notives with 5-ton cars, were installed on No. 15, 16 and 18 levels.
th Kearsarge surface plant includes a stone compressor house and
mpressor at No. 1 shaft, combination machine and carpenter shops,
d office, all of wood.
haulage was installed early in 1919 on levels No. 31 and 32, shaft
vels No. 34 and 35, shaft No. 3.
earsarge contributed in 1918, 745,722 tons of 12.60 lb. copper ore,
es with 691,263 tons of 12.54 lb. ore in 1917, and 651,079 tons of
n 1916.
th Kearsarge mine, 160 acres, lying south of the Wolverine
e Centennial, was known formerly as the Iroquois. Development
eptember, 1899, and the best stopes are toward the Centennial line,
e bed averaging about the same width as in the North Kearsarge
e mines, and being remarkably uniform in copper values. This
letely developed, both shafts and all but a few of the drifts having
oundaries of the property, and the mine is officially stated to have
life. There are about 600,000 tons in the pillars and arches yet to
ich will be a slow operation, with comparatively high costs.
mine yielded 218,728 tons of 14.96 lb. copper ore, which compares
ons of 14.28 lb. ore in 1917, and 408,572 tons of 17.06 lb. ore in
180,000 tons came from the shaft pillars in 1917 and 1918.
uth Kearsarge shaft, the northernmost, is 2,820' deep, and prac-
boundary. The shaft rock house cares also for rock from No. 2
ich it is connected by an 1,100' trestle. Two skips are operated in
2 S. Kearsarge shaft is 1,992' deep. This shaft was closed in
18, due to lack of labor.
per min. motor-driven pump handles the water coming through
gs.
arack Junior mine, 120 acres, lying between the Centennial
Hecla, has 2 vertical shafts, on the Calumet conglomerate, No. 2
ep, with 12 levels opened. The Tamarack Junior has been idle
apparently is dead, so far as the conglomerate is concerned, with
spects of finding other workable cupriferous beds on the tract.
ransported from the various mines to the mills by the Hancock &
ay, a branch of the Duluth, South Shore & Atlantic system.
built in 2 sections, the main section being 176x213', of steel

frame, with 4 steeple-compound stamps. These stamps, which are general use in the Lake Superior district, were invented by B. Ne result of some years of experimentation. The stamps have circ with ⅝" screens, and hydraulic separators, about 20% of the copper coming from the mortar discharges and separators. The older stamps with circular screens having ⅜" openings, and is otherwise No. 2 mill.

The wash department of the 2 mills are equipped with classi with 6 round tables and 1 Wilfley table for each stamp, the Wilfleys ings from the round tables. Chilean mill reduces over-size mate stamp mortars and there are crushing rolls and Hardinge mills.

A complete automatic sprinkler system for fire protection wa 1917 and a plant to pump the tailings further into Torch lake was p tion in 1919. This plant was built jointly by the Osceola Consoli Co., the Lake Milling, Smelting & Ref. Co. and the Calumet & H

The steel boiler-house, adjoining the mills and furnishing po has three 250 h. p. 72" boilers, delivering steam at 150 lbs. pressure h. p. 84" boilers operated under 105 lbs. pressure, all of the locor type.

The power plant has an Allis-Chalmers Corliss engine, operati Morgan-Gardner d. c. generator, furnishing current for 220-volt enclosed arc lamps.

The joint pump-house of the Osceola and Tamarack mines ha 000-gal. triple-expansion pumps having 22", 40" and 60" cylinder 30" horizontal plungers of 52" stroke and 42" discharge. Water is an 8' tunnel, running 1,275' under Torch lake, with 3" intake he against clogging by ice.

Production:

	Tons Ore Treated	Lb. Conc. Produced	Lbs. Cu. per Ton Ore Stpd.	Cost per Ton (a)	Lb. Cu. Produced	p
1918.....	1,194,967	.....	13.3	$1.78	15,919,647	
1917.....	1,237,805	.....	13.0	1.63	16,084,958	
1916.....	1,284,681	26,901,015	15.2	1.36	19,586,501	
1915.....	1,361,089	26,777,790	14.5	1.18	19,731,472	
1914.....	1,108,447	20,997,900	13.5	1.29	14,970,737	
1913.....	735,044	14,945,645	15.4	1.60	11,325,010	
1912.....	1,246,557	24,282,312	14.8	1.23	18,413,387	
1911.....	1,246,596	24,452,912	14.8	1.14	18,388,193	
1910.....	1,217,720	25,669,913	15.9	1.28	19,346,566	

(a) Includes mining, transportation, stamping and taxes (per

The total cost per pound in 1918 includes depreciation and depl ing to 3.07c per lb., but not taxes, about 4c per pound.

Production for 1919 was 10,825,841 lb.

Mine costs per ton at each mine vary, as shown below:

	Osceola	North Kearsarge So
	$2.10	$1.69
	2.14	1.55
	1.88	1.30

...able operation is ex...

...Main office: La...

, Walter Hunnewell and R. R. Goodell, directors; F. W.

1890, in Michigan. Cap., $1,250,000; $25 par; issued, 20,000
d, and 20,000 shares, $2 paid. Is controlled, through owner-
shares, $10 paid, by St. Mary's Mineral Land Co. Paid a
November 18, 1910. Ended 1918 with $9,585 cash on hand
Liberty Bonds.

820 acres, the N. W. ¼ and the S. W. diagonal half of the
N. E. ¼ of Sec. 4, and Sec. 5, T. 54 N., R. 34 W. Land lies
he Atlantic mine, and supposedly carries the northern exten-
lantic ashbed, on which a little exploratory work was done
ganization.

,000 originally raised by sale of 20,000 shares, one-half was
pecting work. The timber on the lands has been sold at
nd 140 acres sold to the Naumkeag Copper Co. From these
est on funds, company has distributed $40,000 cash and 4,000
mkeag Copper Co. stock to its stockholders.
done since 1900.

ONSOLIDATED COPPER CO. MICHIGAN

by Keweenaw Copper Co.
lumet, Mich. Mine near Phoenix, Keweenaw county, Mich.
Thos. F. Cole, pres.; Spencer R. Hill, v. p.; F. W. Taylor,
h G. G. Hartley, A. L. Warner and Thos. Hoatson, directors.
, 1889, in Michigan. Cap., $2,500,000; $25 par; all issued;
Last assessment $1, October 1, 1917. Is controlled by the
pper Co., through ownership of about 98% of the share
ed by an exchange of shares on the basis of 10 shares of
share of Keweenaw.

year ended December 31, 1918, showed assets of $1,873,016
real estate $505,246, development and exploration $1,265,763,
Liabilities consist of capital stock $1,850,000 and $23,016 lia-
e fund.

ssets totalled $2,134,393, which included real estate $505,222,
nd exploration $1,418,368; cash $2,192. Liabilities included
eweenaw Copper Co., $38,461 accounts payable, $23,538 con-
.

2,505 acres, carrying 5 different fissure veins, on which more
has been done, at various times. The old Phoenix mine,
e consolidation, is famous for having produced the largest
copper ever found, weighing upwards of 500 tons. The
e, on which work was begun 1846, was opened to a depth
0', yielding considerable mass copper and silver. There also
s on the Ashbed lode, which has been slightly developed by
tunnel. The mine has extensive openings and a modern
was worked for 6 years without success, until closed down

drilling on the Ashbed lode, 1910, gave encouraging results
on of this work late in 1913, after several years of idleness,
pper ore.

mond-drill holes, aggregating 3,063', were put down, besides
ground work. The shaft is 1,616' deep. In 1916, the "Old
e was explored by a crosscut northwards to the hanging
shbed lode; it is not mineralized, excepting where it cuts

at power plant at No. 1 shaft includes 3 boilers, 2 air-
oist and pumps. The mill contains 7 Wilfley tables.
suspended December 1, 1917, due to high operating costs

QUINCY MINING CO.

Office: 32 Broadway, New York. **Mine and works offic** Houghton county, Mich.

Officers: Wm. Rogers Todd, pres.; W. Parsons Todd, v Bishop, Chas. J. Devereaux, Isaac H. Meserve, Wm. M. Belch Longyear, Walter P. Bliss and Otto Kirchner, directors; W. sec.-treas.; F. J. McLain, asst. sec.-treas.; Chas. L. Lawton, gen Laist, smelter supt.; Ralph Hayden, mill supt.

Inc. March 30, 1848, under special charter from the state **Cap.**, $3,750,000; shares $25 par; issued, $2,750,000. Original c reincorporated March 6, 1878, for 30 years more with cap. $ creased, 1889, to $1,250,000, again increased, 1896, to $2,500,0 more increased, 1906, to $3,750,000. Re-incorporated 1908 for a 30 years. Old Colony Trust Co., Boston, transfer agent. Shar on the Boston Stock Exchange. Annual meeting, first Wednes

Comparative Statement: assets and liabilities exclusive o mine plant and supplies in use.

	Cash, Cs., Invest's	Accounts Rec.	Total	Accounts Pay.	Mat. Supplies At Mine	At Sm
1918.....	$2,380,849	$263,330	$2,644,179	$467,440	$554,646	$71,7
1917.....	2,512,670	530,377	3,043,053	403,655	485,695	67,2
1916.....	1,824,784	624,799	2,449,584	246,417	494,283	56,3
1915.....	1,018,381	626,283	1,644,664	282,861	271,035	32,1
1914.....	736,617	152,795	889,412	255,620	229,912	33,6
1913.....	406,633	53,110	459,733	110,179	352,988	44,2

Operations:

	Metal Sales	Total Income	Expenses	Net Income	Dividends
1918.....	$4,857,085	$4,938,560	$4,075,515	$863,044	$625,0
1917.....	6,350,500	6,402,836	3,893,569	2,509,267	1,680,0
1916.....	5,409,874	5,421,835	2,663,176	2,758,659	1,750,0
1915.....	3,883,958	3,999,745	2,126,071	1,873,674	880,0
1914.....	2,054,622	2,063,650	1,858,857	205,868	80,0
1913.....	1,921,798	1,940,128	1,863,968	76,160	412,5

(a) Balance Jan. 1, 1913, $1,233,278, also deduct $150,000 paid on note Canal Mineral Land Co.

(b) After deducting $226,250 paid Hancock Cons. Mining Co. for mineral land

(c) After deducting income and excess profits tax for 1917, amounting to $ rection for 1916 income $3,342, total $317,863.

Dividends: Quincy paid its first dividend in 1862, and prof disbursed to shareholders in every succeeding year except 1 giving the company a continuous dividend record of 49 years, date, rendering it the oldest dividend-paying American copp second only to the Tharsis Sulphur & Copper Co., Ltd., which of continuous dividends since 1867, or 1 year longer than record. Recent dividends, by years, have been as follows: 1902, 28%; 1903, 22%; 1904, 20%; 1905, 24%; 1906, 30%; 190 18%; 1909, 16%; 1910, 20%; 1911, 16%; 1912, 21%; 1913, 15 1915, 32%; 1916, 64%; 1917, 72% 1918, 34%; 1919, 10% to dece dividends, $26,892,500.

A table of statistics, production, costs, etc. 1864-19[illegible], is X., of The Copper Handbook.

The p[illegible] marked Quincy's 70th anniversary. The c paid its st[illegible] $9,452,500 in dividends and $[illegible] surplus; this [illegible] to a profit of 46c on each [illegible] per produced [illegible] average price for the [illegible] equal to $9,97[illegible]

Property [illegible] many years ago, [illegible] tions include a [illegible] $750,000; the old [illegible] tion, 1910, of Sec. [illegible]

ıd Co. bought for $600,000; 80 acres under and to the S. of shaft
bought from Hancock Mining Co., July, 1915, for $226,250. In
company purchased 125 acres from the Hancock Mining Co.,
This parcel adjoins the original 80 acres.
ldings of the Quincy now include lands formerly held by the
ranklin, Mesnard, Pontiac, Arcadian and St. Mary's, in order
ı south to north.
ment: property carries the Pewabic bed and a number of
per-bearing amygdaloids, from the Hancock mine, on the north-
f Portage lake, to the boundary of the Franklin Junior mine,
lf way from Hancock to Calumet. Through the territory lately
afts No. 2, 6 and 8 can be sunk to practically unlimited depth.
ıe was opened 1848, on the Quincy amygdaloid, a bed lying some
st of the Pewabic, but the Quincy bed was abandoned 1856,
ewabic amygdaloid was opened. There is a footwall branch,
e Pewabic East lode, underlying and parallel with the main bed,
ionally yields good returns. The so-called West branch, about
f the Pewabic bed, has been opened by shafts No. 2, 4 and 7
osscuts on different levels and considerable stamp rock has
therefrom. About 1,000′ west of the Pewabic bed is the Han-
aloid, which is narrow but fairly mineralized, and which yielded
of 21 lb. fine copper per ton, after reasonable selection, when
the old Hancock mine, this figure being materially above the
rage return from the Pewabic bed.
wabic amygdaloidal bed, on which all shafts are sunk, has a
out N. 30° E., with an average dip of 52 to 54° at surface, flat-
ıe lowest workings at depth of more than a mile to approxi-
30′, the shafts following the dip of the bed on catenary curves.
ic averages about 20′ in width in the upper workings, but is
arrower at the bottom. The lower workings show decreased
es with much less heavy copper than above, but the ore is more
value. Part of the decrease in copper returns is due to mining
ormerly would have been left as worthless and practically the
bic bed is now mined. There are copper courses, or shoots,
the north with depth.
wabic bed has good walls and the mine requires comparatively
ing. Dry-walls are built of waste rock, in wide stopes, saving
of hoisting waste and also the cost of timber. Shafts are
in the footwall. The Pewabic rock now runs 19 lb fine cop-
with some silver. Previous to about 1890, about 40% of the
secured in masses. In 1912 the proportion of mass copper was
company reports approximately the same percentage to date.
ınmost drifts of the Quincy are about 3,000′ below mean water
rtage lake, while the northernmost workings at No. 8 shaft
iles from the southern breasts.
rs have been installed and every precaution is taken against
are carried to and from work in man cars holding 30 men
sting cables are inspected frequently, with every care taken to
ents.
e has a complete electric underground traction plant, tram
g about 1,800′ each in length with gradients of 1.5% towards
The equipment includes 20 electric trolley locomotives, each
5 three-ton rock cars at a speed of 6 to 8 miles per hour, 1
or each tram. In 1918 4 storage-battery locomotives were

ıe ıı ıı ıı

capacity for production of over 4,000 tons daily. About 200 r
used in sinking, drifting and stoping, and extensive use is mad
mond drill for exploratory and preliminary development work

The Quincy has been much troubled by air-blasts, violent
brought about by the settling of super-incumbent rock in the so
of worked-out openings, causing violent compression of the
throughout the mine. The most serious disturbances from air
are practically artificial earthquakes, felt for only a few miles
surface, were experienced in February, 1906, and March, 191
seems reason to fear that these troubles will prove interm
tinuous for the balance of the mine's life. The air-blasts, whil
have caused more alarm than damage.

Development:

	1918	1917
New openings	24,580'	26,900
Shaft-sinking	428'	499

New work averages slightly over 5 miles yearly, the min
proximately 120 miles of workings.

Owing to the acquisition of adjoining mines, the Quinc
numbered irregularly and are described herein in order of occ
south to north, rather than in order by number.

No. 7 shaft: the southernmost, planned and sunk by Joh
leaves surface at an angle of 53° and is bottomed at an ang
The shaft was sunk 4,000', in 18 months, through refracto
phenomenal speed being rendered possible by sinking and rais
tions simultaneously. The shaft is bottomed at the 71st leve
of about 6,500'.

No. 7 shaft has a steel shaft rock-house, with 750-ton bins,
mer, two 24x36" crushers and an 8,000 h. p. hoist, with 52x84"
winding drums 28' in diameter by 11' 9" face, carrying 8,000'
cable, the main shaft weighing 120,000 lb. This hoist can
skips from a depth of 1½ miles at a speed of 3,000' per min
being limited to this rate by an automatic cutoff which also p
winding. Starting a load of 6 tons from a depth of more
the hoist, if untouched, will check without damage after rais
only a few feet higher than the appointed place in the shaft h
is a 1,300-gal. bailer in addition to skips. Operations were susp
shaft on June 1, 1918.

No. 4 shaft is closed down.

No. 2 shaft is 8,000' deep (1919). It lies 585' north of No.
has about 38,800' of active levels extending from the 51st
Equipment includes a 1,300-gal. bailer for raising water and 30
drills are operated normally.

Stamp ore from the shaft is dumped onto grizzlies, wit
smaller material falling into circular bins, whence it passes
the crushers and thence into the main ore house bin. The
copper passes through the grizzly bars, is picked out by
dropped into a chute carrying it to a steam hammer, there
chute for waste rock. The grizzlies allow large pieces of ore
a bin of reinforced concrete in front of the steam hammer,
and sent to the main ore-house bin through a chute, while
is dropped into a steel tube leading to a circular steel bin, wh
rail-road cars through

ng, road building and concrete work. There are similar
ts at the other main shafts, except No. 7.
ace equipment of No. 2 shaft is very heavy, being practically
that at No. 7, including two 60-drill cross-compound 2-stage
rs. A handsome concrete building was erected to house a
engine, being installed December, 1919. The new hoist will
g capacity of 10 tons from a vertical depth of 10,000'. It is
the hoisting plant at No. 2 will be removed to No. 8 and the
No. 8 will be installed at No. 9.
aft, 1,928' north of No. 2, below the 77th level, being sunk
nd has about 22,200' of active openings extending from the
levels. This shaft yields Quincy's highest grade ore.
t: includes duplex hoist, with a 22' 6" straight-face drum,
skips; a 1,300-gal. bailer, a centrifugal feed-water heater being
ne cylinder of the hoist, and a 100-drill 2-stage compound air
The boiler house has four 250-h. p. water-tube vertical boilers,
locomotive firebox boilers, and a powerful fire pump.
klin mine lies next north of No. 6. The Quincy bought the
nine, 160 acres, for $170,000, taking possession December, 1908,
e mine immediately. It is doubtful if the old shafts ever will
e Quincy.
ft the Mesnard, 4,168' north of No. 6, is at the 69th level. It
in 1918 and has 21,800' of active openings extending from 51st
Levels in this shaft were opened at 135' intervals and former
ade the 24th level of No. 8 correspond with the 42d level of
lode was poor in the upper levels, but the lower workings,
eans up to the Quincy average of some years ago in quality of
, show a bed wider and better mineralized than above, and
of very satisfactory and profitable average, the improvement
the 10th level being very marked below the 20th level. The
ge of the lode at the Mesnard shaft is nearly up to the present
older workings. This shaft is connected with the workings
which at this depth are at 200' intervals, from the 41st, which
to pass under the old Franklin mine, to the 63rd inclusive.
production in 1907.
r-house at No. 8 has a 32x72" duplex-cylinder engine with
drum, of 12' 6" minimum and 18' 6" maximum diam., good
th, and a 65-drill 2-stage cross-compound air compressor.
m has ten 250-h. p. boilers. There is a large changing house
concrete at this shaft, and many well-built houses for em-

t: 2,600' north of No. 8 is the old 100' Pontiac shaft, given a
and cut down to 3-compartment size. The shaft is 2,900'
600' cuts a drift from No. 8, giving ventilation; it is not in

th of the Pontiac shaft there is a long stretch of ground,
rcadian Copper Co. and St. Mary's Mineral Land Co., carry-
n of the Pewabic bed and available for later development.
plant of the Quincy is very complete. Miscellaneous build-
include a large warehouse, general office, several hundred
mine location and a considerable number of houses at

oilers and potable use at the mine location is taken from
e pumps forcing water for a mile against a static head

y's private rail line, the Quincy & Torch Lake, built 1890,
touching at all shafts and shops at the mine and at the
arves and coal sheds at the mill. This line is connected
Range, Hancock & Calumet and Copper Range railways.

Equipment includes several locomotives, freight cars and ne
cars for rock, the latter having automatic couplers and air

Storage-battery locomotives have been added, and are

Stamp-mills: at Mason, on Torch lake, 6 miles from
8 stamps, with combined capacity of about 5,500 tons daily,
ing an average duty of about 700 tons. Two 36"x8' Hardinge
added in 1916. In 1917, steel balls were substituted for p
mills. In 1918, 2 additional buildings were added to house
mills and 240 tables for re-washing and re-grinding coarse
addition to No. 1 mill is 123'x215' and to No. 2, 91'x132'.
sprinklers have been installed in both mills.

No. 1 mill, of wood, has five 2-way stamps, taking st
pressure. There is a mill for regrinding raggings, and th
chinery includes 92 jigs, and 32 Wilfley tables.

No. 2 mill, 630' north of No. 1, has 3 heads, each set on
heavy timbers and concrete, surmounted by a bottom pl
a middle plate of 18 tons and a top plate of 18 tons, all of
ings, above which are the mortar boxes of the stamps. The
revolving screens for the mortar boxes, with hydraulic disc
the launders leading from the mortars, these yielding abo
copper secured. Finishing jigs and slime tables have been
Wilfley tables, 8 for each stamp, assisted by 3 Standard conc
stamp has 12 rough jigs, 6 Wilfleys for finishing and 2
Standard table for slimes. There is a settler from which s
to the Wilfley tables. Regrinding is done by a Chilean mill,
3 Wilfleys as auxiliaries. By the adoption of hydraulic disch
improvements the capacity of the stamp-heads has been
25%, while changes in the wash have given an increased c
with labor costs reduced 25% and loss in tailings cut do
About 35% of the present product of the mill is No. 3 grade
ing very fine copper.

The mill power-house at No. 2 mill, has four 250-h. p.
tube boilers. There is an electric light plant.

The mill and pump-house has a 20,000,000-gal. centrif
a 20,000,000-gal. triple-expansion pump, and the old pump ho
with combined capacity of 21,000,000 gal. daily. Water is
7x7' 6" tunnel, driven 100' under the bed of the lake. A 6x
long, connecting mills, boiler houses and pump houses, car
and steam pipes.

Tailings retreatment:

Tailings at the mills amount to millions of tons, and
ments on reconcentration have been conducted at intervals s
companies that have attacked this project have bankrupted
monotonous regularity, notwithstanding which, the successf
secured at the regrinding mills of the Calumet & Hecla off
the Quincy sands also may be retreated profitably at some
November, 1919, it was reported that the company was to sp
a plant for the treatment of this sand.

Smelter: this was blown-in Dec. 1, 1898. It is at Riple
of Portage lake, opposite Houghton, just east of Hancock a
mile from the mine. Remodeling of the mill was started
1919. Smelter treated 23,000 tons of mineral in 1918.

One building has four 40-ton reverberatory furnaces,
building has 60-ton and 120-ton reverberatories, the latter
matic casting machine. On arriving at the reverberator
trucks carrying mineral are lifted by electric cranes and c
into the furnaces, which are top-charged. An overhead trol
building permits handling large bars and cakes, and a
system is used for casting. Slags are trammed, in 3,00

elevator which raises the ladles and dumps their contents of a trestle. The cupola building has 1 blast furnace only, ory slags. A briquetting plant has 2 boiler-iron retorts for w-grade mineral before smelting. Miscellaneous buildings include an engine house, casting house, cooper shop, office, chine shop, 50x100′ warehouse, and a coal-shed.

has remained nearly constant for several years, but was ned by the labor strike of 1913. Silver production during troy ounces of metal about 80% pure and 20,800 troy ounces pure. Profit on silver in 1918 totalled $54,680.

oduction:

re	Lb. Mineral Produced	Ref. Copper Lb.	Lb. Cu. per Ton Ore	Cost(a) per Lb.	Sell. Price
..	.....	19,400,000	....	....	.....
47	31,970,969	19,948,965	16.99	18.7c	24.07c
37	35,785,490	22,195,577	17.33	15.6	28.6
26	33,864,280	21,065,612	17.5	12.4	25.5
00	34,251,765	22,054,813	17.38	9.42	18.01
.	22,612,460	15,356,380	.....	11.51	13.29
15	18,161,575	12,184,128	15.11	13.65	15.59
58	30,040,360	20,634,800	15.76	11.09	16.24
24	32,550,440	22,252,943	16.1	10.17	12.72

s mining expense, smelting transportation, etc., and taxes n.

it has followed an unswerving policy of expansion so that timate of a life of 7 years with production of but 200,000,000 as been altered by additional acreage purchased since that robable the production of over 1,000,000,000 lb. more copper ife of more than 50 years. The company has the longest nuous annual dividend payments of any American copper fair to continue disbursing large profits for at least another wo.

ND COPPER CO. **MICHIGAN**

of the Franklin Mining Co.

Congress St., Boston, Mass. **Mine office:** Demmon, Hough-n.

M. Edwards, pres.; Henry Tolman, treas.; Albert L. Wy-S. J. Jennings, H. M. Howard, Carl F. Moore and C. A. .

1898, in Michigan. **Cap.**, $2,500,000; $25 par; paid in $10.50. 2, of $1, was payable January 14, 1907, and assessment No. ayable June 15, 1910. The Franklin Mining Co. owns 99,524 acquired by exchange of 3 shares Rhode Island for one of nal meeting, second Wednesday in April. No bonded debt. sfer Co., Boston, transfer agent.

ort for 1917 shows rents $806, advanced by Franklin Min-l, total receipts, $16,597. Expenses amounted to $4,619 at es, balance being interest and incidentals.

300 acres, immediately north of the Franklin Junior mine. s been explored by extensive diamond-drill work, showing Mesnard epidote, Allouez conglomerate, Pewabic amyg-rge amygdaloid, and other copper-bearing beds. All g between the Kearsarge amygdaloid and the Calumet drilled by a series of holes, the Calumet bed sho r. The first cores from the Kearsarge bed showed co quantities from a bed of about 19′ width.

at: No. 1 shaft, 500′ deep, is sunk on the Pewabic amy,

loid. This lode is 8 to 10' thick, of which 2 to 3' near the h
well mineralized but spotty in the 4 levels opened.

No. 2 shaft, 1,227' deep, has 10 levels, with a 125' winze
The workings are north of the shaft, except on the 8th, 9th a
the latter 2,400' long. The 8th level south develops a stre
ground toward the Franklin Junior, and a 1,400' drift on the
showed 25 to 75' stretches of payable ground. The Rhode I
is being developed by the Franklin Mining Co., where at a
2,000', the Pewabic bed averages 8 to 10' width.

The Albany & Boston, or Allouez conglomerate, has be
crosscuts on the 500' and 1,000' levels, but the result was
A 250' crosscut on the 10th level, about 1,100' south of No. 2
closed an amygdaloid bed of some promise. The east cross
level, at depth of 1,000' cut 2 apparently valueless beds,
Mesnard epidote. The East lode, about 5' wide, carries a
but nothing of promise. The West lode, 96' from the Pewa
wide, carrying occasional bunchy copper. The 4 amygdaloi
between the West lode and the Allouez conglomerate have
N.-S. drifts, 3 proving barren.

Equipment: includes a frame shaft house at No. 2, w
house having hoist capable of raising 2-ton skips from a quar
and a 12-drill air compressor. Buildings include a machine sh
warehouse and 15 dwellings.

The Rhode Island is idle and the plan of developing at
through the north drifts of the Franklin is a good one, sinc
bed to the south of the Rhode Island has shown great impr
a depth of 2,000' in both the Mesnard shaft of the Quincy
shaft of the Franklin.

ST. LOUIS COPPER CO.

Out of business. Assets transferred to Calumet & Hec
For description, see Vol. XII.

ST. MARY'S MINERAL LAND CO.

Office: 705 Sears Bldg., Boston, Mass. **Mine office:** Hou
ton county, Mich.

Officers: Geo. Peabody Gardner, pres.; Walter Hunnewe
J. Paine, sec.-treas., J. F. Dolloff, asst. treas., with John E. T
Cameron Forbes, Albert S. Bigelow, Thos. N. Perkins, Charl
N. H. Stone and G. H. Russell, directors. Frederic W. Ni
agent.

Inc. March 4, 1901, in New Jersey. **Cap.** $5,000,000; $
$4,000,000. Controls through ownership of entire stock issue
ders' shares, the St. Mary's Canal Mineral Land Co., a corp
porated 1863, in New York, to acquire 150,000 acres of land
State of Michigan for the construction of the first ship cana
Marie. These lands in Houghton, Ontonagan and Keewe
formerly included the tracts on which the Calumet & Hec
mountain, Champion, Ojibway and other mines have been de
pany has about 400 shareholders. Shares are listed on the
Exchange, American Trust Co., Boston, transfer agent; Old
Co., Boston, registrar. Annual meeting, first Wednesday in
sey City, N. J.

Income of the company consists mainly of dividends re
pion Copper Co. small but steady revenue from
ber and wood al but irregular
mineral lands for 191
December 31, 1
$26,455; $215,000
Share asset
Champion Copper

Ing. Co.; 20,000 shares Pacific Copper Co.; 37,222 shares of pper Co.; 1,571 shares of Franklin Mining Co.; 2,000 shares ng Co.; 208 shares Copper Range Co.; 640 shares St. Mary's Co.; 8,340 shares Naumkeag Copper Co.; 17,902 shares Doug- Co.; 10 shares Amphridrome Co.; 100 shares D. A. Stratton Mayflower-Old Colony Copper Co.

3 to 1900 the old company paid cash dividends of $2,200,000, stock dividends of 1 share of Tamarack, 1884; 1 share of Iro- ¼ shares of Baltic and one-half share of Winona, 1898; 1 Colony and 1½ shares of Trimountain in 1899.

(of the present company)—

.....	$1	1912.....	$3
.....	1	1913.....	3
.....	2	1914.....	0
.....	4	1915.....	8(b)
.....	5	1916.....	19
.....	0	1917.....	14
.....	1	1918.....	5(c)
.....	1(a)	1919.....	4(d)
.....	3		

cluding Franklin stock distribution equivalent to $4.
cluding North Lake and Hancock stock distributions equiva- $2.59 a share.
ng $1 per share for depletion Champion ore reserves. Not na and Mayflower-Old Colony distribution, which amounted Winona Copper Co., and 16 shares of Mayflower-Old Colony r each share of St. Mary's Mineral Land Co., stock held. ntitled to fractional shares were paid 2½ for each share of Colony stock and 1½ for each share of Winona stock. December 15, 1919.

an. 1, 1919, consisted of 93,011.69 acres freehold, with min- 14,133.96 acres additional, property being scattered along or copper belt, with principal holdings on the South Range, ton, in Houghton and Ontonagon counties.
y, since its reconstruction in 1900, has refused to sell its utright, preferring to join with other land holders in the w companies, taking pay for its lands in shares, on a pro rtly in shares and partly in cash. This policy has involved r exploratory and development work, but has resulted in ny a half interest in a new mine, the Champion, which is furnishing funds to St. Mary's company for both divi- pment work elsewhere, and a continuance of this policy e in making St. Mary's Mineral Land Co. the part or sole r of fine mines. Owing to the great extent of its lands, the Keweenawan copper belt, stretching along the min- res of miles, the landed holdings of the company are of ue. The management is vigorous and far-seeing.

R CORPORATION MICHIGAN

adway, New York, and W. J. Uren, gen. mgr., 3 Calu- lde. Mine near Mohawk, Mich.
rick Walter Lewisohn, v. p.-treas.; E. Fish, Jr., T. F. Cole, F. deC. directors. O. B. Van Sant,

of and outstanding ach. Bankers ation, transfer

agents. Central Union Trust Co., New York and United Stat
Boston, registrars. Listed on Boston Stock Exchange and
Curb. Annual meeting, second Tuesday in February.

In January, 1920, company decided to issue 50,000 additiona
$500,000 of 8%, 5-year convertible bonds.

Corporation was formed to acquire control of the 11,207 s
Mining Co.'s stock; par 25, of which $10.05 was paid in, held
met and Hecla Mining Co. This stock was acquired January, 19
shares, minority stockholders being offered the same terms of
of new corporation's stock for $60 cash per share. Seneca Cop
tion has now acquired all the 20,000 shares of Seneca Mining
and that company is dissolved, the property passing to the n
tion, which now operates it.

In June, 1919 company purchased the Gratiot Mining Co. ho
prising 600 acres lying south and east of the Seneca property
ing the Kearsarge amygdaloid lode. The Gratiot Co. (contro
Calumet & Hecla Mining Co.), receiving $25,000 cash with ad
ments extending over a number of years. The Gratiot prope
shafts which can be sunk deeper to connect with the Seneca
ventilation and better working conditions.

In October, 1919, Seneca acquired from the Cliff Mining C
on north side of Keweenaw point consisting of 346 acres,
including a railway right-of-way across Section 34.

Income Account—Years ended December 31:

	Interest Received	Expenses	Surp
1918	$17,784	$8,635	
1917	30,772	22,849	

Balance Sheet, January 1, 1919, shows assets: mining prop
200; general construction, $162,757; development and explorati
material and supplies, $114,897; accounts received, $132; insuran
$704; cash, $94,312; U. S. Liberty bonds, $447,647; total $3,056,
ties: stated capital $1,000,000; cap surplus, $1,400,000; surplus,
counts payable, $24,425; liabilities insurance fund, $14,818; pro
$17,433; total, $3,056,676. Cash on hand at end of 1919 was over

Property: 1880 acres (exclusive of the Gratiot and Cliff pr
mentioned) north of the Mohawk and Ahmeek mines, is a sw
somewhat irregular in outline and heavily covered with drift.
erty carries the Calumet, Keweenaw and Allouez conglomera
Osceola, Kearsarge and other amygdaloidal beds, this stat
based mainly upon the outcrop of the Kearsarge lode seen
corner and extending for 1¼ miles across the property. The
the Keweenaw Central railway.

Development: the property was diamond drilled, 1907-09,
good cores from the Kearsarge amygdaloidal bed. This was
the sinking of a 957' 3-compartment shaft, located about 3,0
No. 1 shaft of the Gratiot mine. The shaft is sunk in the foot
being 60' from the Kearsarge bed on the 1st level, 250' on the
220' on the 5th level. Development shows little or no copper
[illegible], but on the 5th level the Kearsarge bed is about 13' [illegible]
[illegible] streak having fair copper content. No 4 shaft has
[illegible]

[illegible] 1918, company started another shaft [illegible]
[illegible] of three compartments, vertical for [illegible]
[illegible] from the Kearsarge amygdaloid [illegible]
[illegible] total the lode [illegible]
the [illegible] in 1919 it [illegible]
sinking [illegible]
incline [illegible]

Equ[illegible]

air-compressor and 2 boilers. Buildings include a boarding- bunk-houses.
ty is considered promising, and is being well, though judiciously Late in 1919, arrangements were made for shipping ore to mill. About $25,000 per month is being spent on development quipment.

MINING CO. **MICHIGAN**

arch 23, 1860, in Michigan. **Cap.**, $500,000; shares $25 par. A f the Calumet & Hecla Mining Co., was dissolved October 10, 1918, erty being conveyed to the Seneca Copper Corp., which see.

N & COLUMBIAN COPPER CO. **MICHIGAN**

s: care J. H. Rice, Houghton, Mich.
ty: lies next north of the Isle Royale mine and includes min- under many private residences, near Portage Lake. An impor- ery of sheet copper was made September, 1915, in an unidentified d in excavating a cellar in this tract. Described in Vols. I and II Handbook. Idle for years.

AKE MINING CO. **MICHIGAN**

60 Congress St., Boston, Mass. **Mine office:** Houghton, Mich.
s: R. M. Edwards, pres.-gen. mgr.; Arthur C. Paine, sec.-treas.; with Thos. S. Woods, E. C. Robinson and Geo. E. Davis,

eb. 25, 1880, in Michigan, as the **Aztec Copper Co., reincorpor-** 12, 1909, under present title and corporate existence extended s from Feb. 25, 1910. **Cap.**, $5,000,000, increased Dec. 11, 1917, ,000; par $25; 104,863 shares issued December, 1918; $7.60 paid ssessment 50c paid, April 22, 1919, previous assessment, 50c, 1918. American Trust Co., Boston registrar, Federal Trust Co., nsfer agent. Annual meeting, 1st Tuesday in March. Listed on ck Exchange.

total issued stock 40,000 shares were given to the old stock- re for share, 20,000 were offered and taken by the same stock- $2 per share and 10,000 shares were offered to holders of record at $6.60, but were largely taken by the underwriters; 10,000 were offered in March, 1915, and an additional 10,000 in Oc- at $5, both of these last offerings being practically all taken by s. In April, 1916, 10,000 shares more were offered to the stock- 7.75 per share.

2, 1918, the 100,000 new shares authorized by the increase in n of record were offered to stockholders of record at $2 per rate of one additional share for each share held. This money purchase 166 acres S. W. ¼ of Sec. 30, immediately north of for which company paid $90,000.

of liabilities December 31, 1918, was $178,176. Expenses at 6,984, including $38,905 for underground work and $274 for con- ash on hand $4,244. This compares with 1917 excess of lia- 6. Mine expenses, $203,593, including $130,049 for underground 919 for construction.

500 acres of mineral lands, being the W. ½ of Sec. 31 and Sec. 30 T. 51 N., R. 37 W., adjoining the Lake mine on the east, nture on the west.

work was begun on the property in 1862, though the name iginally given because the extensive prehistoric workings were e been the work of the Aztecs. A 16-lb. stone hammer was taken

stone mill in early days, and produced 756,853 lb. fine was secured in a single mass. Exploratory work was of the Evergreen series, by the Aztec- drilling was begun Sept., 1909, con-

tinuing until March, 1911, when suspended because of adverse fi
tions. Borings were begun at the base of Evergreen bluff, near th
Evergreen belt, thence working southward toward the eastern sand
drill-holes were put down at various points on the property.

Exploratory drilling having shown copper rock in five holes,
at the corners of a 200' square, actual mine development work wa
upon. The holes showed that the beds run N. 70° W. and dip
The drill-cores and recent underground work were carefully stud
Lane in 1916, who reports that of the four lodes cut by this work
or possibly a combination of number 1 and 2 lodes, is the Lake lo
the Lake Copper Co., and that lodes dipping north in the 300' cross
the South Lake shaft, are identical with, and the same as those dip
the 600' crosscut south of the shaft. This means that the veins fold
both N. W. and S. E., and that a vertical shaft can reach both
V-shaped fold.

A 600' vertical shaft, started 1912, opened up No. 1, 3, and the
all north of the shaft. Ore was mined from all 3 lodes in 1917, an
from the Butler, in 1918. A connection with the Lake mine on th
gives good ventilation. Owing to the long distance ore has to
stoping will not be started until mechanical haulage is installed.
lode is opened at 3 levels, viz., by crosscut into bluff from shaft co
600' level.

The tract north of the mine acquired in 1918, permits mining
lode to a depth of 5,000', and carries the Knowlton lode, that is wel
and worked in the Lake Copper Co. ground.

New work in 1918 amounted to 573' which compares with 2,
Operations were suspended in July, 1918, due to labor shortage an
duction costs.

Equipment: in 1915, a steel shaft-rock-house was comple
machinery including a 5-drill air-compressor installed.

Production: commenced May, 1916, and to end of 1917,
sent to the Franklin mill, yielding 754,433 lb. of refined copper, or
ton. In 1918 to July, 7,694 tons were stamped, producing 226,14
or 28 lb. per ton. Company has a decidedly promising property.

SOUTH RANGE MINING CO.

Out of business. Property sold, 1917, to Copper Range Cons.,

SOUTH SIDE MINING CO.

Liquidated, and final dividends paid 1916. See Vol. XIII.

SUPERIOR COPPER CO.

Controlled by the Calumet & Hecla Mining Co. through
50,100 shares.

Office: 12 Ashburton Place, Boston, Mass. **Operating offic**
Mich. **Mine address:** Houghton, Mich.

Officers: Rodolphe L. Agassiz, pres.; James MacNaughto
gen. mgr., with C. F. Ayer, Walter Hunnewell, directors; G. G. E
treas.; H. L. Bennett, asst. sec.-treas.; Ocha Potter, supt.

Inc. July 23, 1904, in Michigan. **Cap.,** $2,500,000; shares $2
issued and $1 paid. Listed on the Boston Stock Exchange. Old
Co., Boston, registrar; American Trust Co., Boston, transfer ag
meeting, second Tuesday in April. Company owns 18,386 shares
Milling, Smelting & Power Co.'s stock.

Operations [illegible] **ended December 31:**

| | Assets | | Surp. | Inc. m
Res. fo |
|---|---|---|---|---|
| | Total | | for year | Depr. & D |
| | | | $17,635 | $115,40 |
| | | | [illegible] | |
| | | | [illegible] | $1 paid |

N., and R. 34 W. The tract has room for 3 or 4 shafts, and has a den, the bed being proven by trenches at intervals of 1,000′, show- daloid of 35 to 40′ average width, with extensive carbonate stains, ering, and a little fine copper near surface. The property has been he eastern sandstone.

e has two workable copper lodes, the Baltic, locally known as the the West lode, discovered in 1911, a formation independent of the to 30′ thick, which, however, cannot be stoped until the Superior l. On the Superior lode all ground above No. 15 level has been

nent: by 2 shafts, sunk in the footwall of the lode, insuring but necessitating crosscuts at each level. Owing to the great copper-bearing stratum, it is necessary to crosscut along the bed als. The Superior mine is opened on the northern extension of ygdaloid bed, though some call this the Superior lode, not being the correlation is correct. The Baltic bed, in the Superior mine, r impregnations in the footwall, always an evidence of strong , and there is a conglomerate bed under the foot that carries a of copper. The milling ore is remarkably deceptive in appearance, oxidizes readily, and when it has been broken a few weeks, appears fresh fracture shows its true nature. As a triangular tract of land etween shafts No. 1 and 2 is owned by others, they cannot be ove the 12th level. The mine has about 11 miles of workings, work for 1918 totalling 2,564′, compared with 2,502′ in 1917, 5,136′ in 1915, and 2,654′ in 1914.

aft, 3,104′ deep, is 1,200′ from the northern limit of the property; e Superior lode on all levels, and the West lode from the 12th to . The ground, especially in the upper levels, is very treacherous, careful attention and close timbering. All recent development has to the West lode, which shows commercial values. Exceptionally opened on the 31st level for 350′. A raise made from the 19th to , provides for safety and ventilation.

aft has a frame shaft-rock house, of the Calumet & Hecla type, engine and two 23x36″ crushers. The hoist is good for 4,000′. pment at No. 1 shaft includes a combination boiler and engine 0″ boilers, a hoist, and 10-drill and 18-drill air compressors. No. nected with the main line of the Atlantic railway by a 7,000′ spur, the Isle Royale railway.

aft, 2,540′ S. W. of No. 1 and 2,400′ from the southern boundary, e footwall, at an angle of 53°, is 20′ below the 18th level or 1,628′ ment at No. 2 includes a steam hoist, formerly used at No. 1, ock house having 2 crushers and an engine, with rated capacity aily.

reports that the future of the mine depends on developments on 1st levels south of No. 1 shaft, as there is only a reserve of 150,000 be stoped.

include an office, warehouse, smithy, change house, and a number or employees at a small townsite lying between the shafts.

n: (begins January, 1909)

Tons Ore Stamped	Lb. Cu. per Ton	Cost per Ton	Lb. Cu. Produced	Cost per Lb., cts.	Rec'd per Lb., cts.
102,213	15.78	$2.682	1,676,446	23.29	24.22
129,587	16.99	2.50	2,201,672	16.88	29.39
185,315	16.38	2.07	3,034,656	14.61	24.67
212,051	18.23	1.88	3,866,484	12.29	18.125
191,628	16.79	1.75	3,217,635	12.43	12.645
130,826	22.87	2.36	2,992,765	12.86	15.387
172,322	22.76	2.33	3,921,974	12.75	16.45
162,599	19.90	2.39	3,236,233	15.31	12.70
140,514	22.64	2.69	3,181,041	14.29	12.63
16,835	22.22	....	374,077	.....	.....

The cost per pound in 1918, includes cost of depreciation a amounting to 5.78 cents per lb.

Production for 1919 was 555,660 lb.

The Superior has thus far been a disappointment, the copper of ore being much lower than calculated. The financial position of is, however, improving satisfactorily.

TAMARACK MINING CO.

Out of business. Property sold for $3,600,000, equal to $60 Calumet & Hecla Mining Co., on April 1, 1917. For history and d property, see Vol. XII.

TOLTEC MINE

Idle many years. **Office:** care J. M. Longyear, Marqu Owners, Gogebic & Ontonagon Land Co. and Galen L. Stone, of H & Co., Boston.

Mine at Greenland, Ontonagon county, Mich, 960 acres, carrie lay of the Evergreen belt and the Calico and adjacent beds of the

Production: 1851-1860, was 413,443 lb. fine copper. Som drilling was done in 1908.

TORCH LAKE MINING CO.

Idle. **Office:** 4-24 Exchange Place, Boston, Mass. **Mine** pold Bldg., Houghton county, Mich.

Officers: Thacher Loring, pres.; Chilton Cabot, sec.; F. agent.

Inc. in Michigan. **Cap.**, $500,000; shares $25 par; assessa

Property: 1,280 acres, Secs. 35 and 36, T. 56 N., R. 33 W. of the Tecumseh mine of the La Salle company and about midw Calumet and Lake Linden. The property was prospected, 1899-1900, drill.

TREMONT & DEVON MINING CO., LTD.

Office: First National Bank Bldg., Hancock, Mich. Mine Ontonagon county, Mich.

Officers: H. L. Baer, pres.; W. M. Gibson, v. p.; Chas. D. sec.-treas., with Claude Cooper, W. M. Gibson and Robt. T. Dunst at last accounts.

Inc. Dec., 1908, in Michigan. **Cap.**, $250,000; shares $25 issued; two 10c. assessments levied to date.

Property: 680 acres, freehold, including the old Tremont mines, adjoining and directly W. of the Victoria, carrying about the strike of the Keweenawan copper formation, and apparently in of the western extension of the Lake bed. The Victoria has a promise, outcropping about one-half mile from the Tremont & De little work was done many years ago by shallow shafts near the property, from which rock was taken, said to have yielded 500 lb. fi fathom of ground broken, which was better than 25 lb. of finished co

In Feb., 1916, the E. J. Longyear Co. began diamond-drilling. were put down; the first cut an unidentified lode lying above the the third is said to have shown good values in the Victoria lode information.

TRIMOUNTAIN MINING CO.

Office: 82 Devonshire St., Boston, Mass. **Mine office:** Mich.

Fully described under Copper Range Co., Mich., which see.

UNION COPPER LAND & MINING CO

Office: 70 State St., Boston, Mass.

Officers: Harry F. Fay, pres.; Samuel Carr and Allen [illegible]

Mich., [illegible]

Inc. [illegible]

issued [illegible]

Co., [illegible]

Exchange. Annual meeting, fourth Thursday in March. Books ore, and reopen day following.
d Jan. 1, 1919, $18,985, principally derived from timber sales,

n 1899, 50c per share and ⅛ share of stock of Old Colony 907, $2, and in 1908, 50c. per share; none since.
283 acres of land, carrying both surface and mineral rights, additional of mineral rights only, divided into 200 or more naw, Ontonagon and Gogebic counties, Mich. Company is holding corporation, although its charter empowers it to carry ions as well, and it has from time to time investigated various ne their mineral value. Greater part of the land is heavily in 1910, at $125,000.
xploratory work was done by diamond drill on 320 acres of f the Allouez and North Kearsarge mines, with satisfactory on the Quincy-Pewabic amygdaloid, which showed well in ouez conglomerate was cut; also several other beds carrying

PPER MINING CO. **MICHIGAN**

ongress St., Boston, Mass. **Mine office:** Victoria, Ontonah.
ed H. Williams, pres.; Chas. D. Hanchette, v. p.; Jas. P. vith Willard S. Martin and A. W. Chesterton, directors; , sec. and transfer agent; George Hooper, supt.; Chas. D. power supt.; G. A. Braun, Jr., engr.; A. R. Penberthy, clerk

1899, in Michigan. **Cap.**, $2,500,000; $25 par; all issued; ast assessment $1, April 15, 1914. Shares listed on the xchange. First National Bank, Boston, registrar. Annual Monday in February.

ount—Years ended December 31:

Receipts				
Sold	Other Inc.	Expenditures	Prev. bal.	Surplus
5,644	$84,678	$358,917	$267,836	$299,242
3,508	119,129	392,412	197,611	267,836
3,298	176,930	384,898	112,280	197,611

ization, the revenue totalled $4,832,088, of which $3,119,853 sales. Mining expenses were $2,223,632, equipment $629,, $387,862; surface $290,967; general $100,920; crushing elting, etc., $304,773.
389 acres mining lands, in Sec. 19, 20, 29, 30 and 31, T. 50 d Secs. 24, 25 and 36, T. 50 N., R. 40 W. This tract has an idth of 2 miles, and a N.-S. length of 2¾ miles, lying just nagon river. It is practically all on the mineral belt, only lying on the eastern sandstone. The tract may carry the n of the amygdaloidal bed under development by the Lake ighboring mines, all idle for many years, are the West e N., National on the E., and Tremont-Devon on the W. ll timbered, with an inexhaustible supply of good sandstone oses. Nearest railroad is the C. M. & St. P., at Rockland,

own attempt at Lake Superior copper mining was made in 70-71, on what is now the Victoria property. In 1849, the then as the Cushin, was opened on a line of prehistoric masses of native copper, one weighing upwards of a ton. Bought, 1850, to Forrest, and property reorganized, 1858 as ning Co. Under these titles the property made 373,279 lb. Issued shares $180,000. The mine was operated regularly,

on a small scale, 1849-'55, and thereafter spasmodically. It
1883, but remained idle until work was begun March 1, 1899,
company.

Geology: the mine is on a high and steep hill, notwithst
the solid rock is covered with heavy sand and clay drift.
amygdaloid bed, on which the mine is opened, is 5 to 80' w
about 12', but of very irregular width and dip, and very lunch
The average strike is N. 66° E., and dip 61° N. W., the lode
2 miles of outcrop on Victoria lands. The formation is mut
surface, the bed being irregular in dip, but widening at dep
regular walls. The lode is low in average grade, but fairly r
per contents, carrying low-grade milling ore, with best value
ing wall.

Considerable diamond drilling has been done N. of the
total of 15,292' of holes having been drilled, in 2 cross-secti
several beds that may warrant future attention.

Development: the old mine was opened by 5 shafts,
located at irregular intervals, with levels spaced at 55 to 65'.

The Victoria, or, No. 2 shaft, which was chosen for n
was enlarged to 2 compartments, and a third compartment wa
16° E. of the skipway. The two skips work in balance. The
deep, bottomed below the 27th level. Levels between the 4th
been opened at regular intervals of 100'; below the 23rd at in
with drifting on all levels. The total openings tributary to N
67,385' on January 1, 1919.

The productive part of the mine tributary to Victoria
is on the Forrest bed, an epidotal amygdaloid having an avera
to 12', widening to 80', at one point. Walls are quite regul
crush zones occur, the mineralization extends into the wa
occasional maximum of 50' width of ore. The footwall bed
Forrest, at a depth of 2 to 12', is well mineralized in places,
sional masses from 100 lb. to 3 or 4 tons in weight, but is
copper occurring mainly on the foot, with considerable e
hanging. Underlying this epidotal bed, at a distance of 60', i
loid showing much epidote and allied minerals, with a litt
Stopes opened on all levels from the 4th to the 22nd inclusi
uniform results.

The copper shoot developed by this shaft is 1,000 to 1,50
slight rake to the S. W. The ore stoped is low in average gr
regular in contents, with main values in stamp copper. All
the 17th are connected by winzes, giving ventilation and safety

	New drifts	New work	Cu.
1918	2,447'	2,847'	
1917	3,113'	4,090'	
1916	1,350'	3,806'	

Openings on the property totaled, January 11, 1919, 74
than 14 miles. The mine uses 35 drills.

No. 6 shaft, 3,455', E. of No. 2, started December, 1919
eastern end of the property already explored by diamond-
has three compartments with two skipways, designed for 6-t
shaft is 1,172' deep and has 2,593' of workings in generally p

The mine also has crosscut tunnels, 419', 150' and 724' lon
showing the contact between the Keweenawan trap beds an
sands[illegible] cutting several amygdaloidal beds on whic
the [illegible] encouraging copper mineralization.

[illegible] a new shaft house, equipped
32x7[illegible] [illegible] guard for 5[illegible], and
ing [illegible] and timber.

sufficient to take care of exploration to a depth of 5,000′, being 2,835′.

se has storage-bins for stamp ore and waste, with chutes, d air lifts, and there is a pneumatic hammer for mass ler house is for heating purposes only.

No. 2 shaft include machine and carpenter shops, smithy, g house, hospital, warehouse, general store, mine office, 76 dwellings, sawmill, lathe, shingle and planing mill. An for motion pictures, etc., was installed 1918. Water for fire protection is pumped from a well having a storage alf mile from the mine.

ill, on the bank of the river, near the hydraulic works, has llis-Cuyahoga stamp. The stamp of 650 tons daily capa- tar screens, and all oversize above 3/16″ is run to a set of lls. The washing floor contains 22 jigs, 5 Wilfley tables, Standard table, hydraulic separators and settling tanks. concentrating slime tables were installed. Machinery is 2″ piston-valve engine. A 12x36″ engine was installed in tarted June, 1906, shows tailing losses of only 0.1 to 0.15% extraction of 81%. Mineral (concentrate) was formerly Calumet & Hecla Co., but is now smelted at the Quincy . In 1916, three boilers were erected at the stamp mill to en the water supply is low. The mine and mill are con- ′ tram line, in two sections, the upper with 6%, and the grade. A stationary double-sheave hoist, at the top of the pull the empty cars up the steeper grades, but otherwise d by gravity, in counterbalance.

ant: a large water power has been developed from Glenn branch of the Ontonagon river, about a mile from the f $251,603. This is the best natural water power of the pper district, the stream dropping about 110′ on the com- by a series of small falls, between which are numerous lstone bottoms. The company utilizes 72′ of this drop. ed by means of a dam, canal and hydraulic air-compressor. 25′ between abutments, has an extreme height of 24′, is 14′ om and 8′ at the top, and has a 320′ main section with d 160′, giving a total of 580′, built with an arch up- vided with two 44′ flush gates, for drainage and flushing te, waste weir and sand fence.

erting water from the dam is 4,800′ long, 10′ deep at the a bottom slope of 1″ in 100′. At the end the canal opens at the extreme end of which the compressor shafts are al is equipped with drainage gates, slush gates, overflow ged measurement gates.

shafts of the compressor are 5′ in diameter, spaced 19′ nter. The shafts were sunk through solid sandstone, by iminary holes, bored to the required depth of 343′, then to 5′ in diameter.

ned throughout with concrete, formerly drew air through ubes. This proved unnecessary as the water falling down ir with it and this air is carried through 280′ of air cham- k at the bottom of the shaft. A water seal at the intake 3/8″ steel shells, firmly concereted into the bottom of the chamber is 281′ 6″ long, and 18′ wide, with minimum of of 26′ height, having a maximum capacity for 80.264 cu. air. The water seal at the upflow end is formed by an long, below which a tunnel 10′ high leads to the upflow x18′ in section, sunk at 72°, with a vertical depth of 271′, e, where the water is again discharged into the river. developed is 72′, and the pressure head 271′, giving a

maximum air compression of 117 lbs. per sq. inch. Imprison down the shafts by suction and swept along the tunnel in t rushing water, is released in the chamber where the cons of bubbles causes compression, escape backwards being pre ⅜" steel shells connected in the shafts. The chamber, know pressor, is connected with a 12" pipe line to mine and mil sure is relieved by a safety or blow-off pipe.

The Taylor hydraulic-pneumatic plant was completed in M nishes 4,000 to 5,000 h. p. under a full head of water, and has sho of 82% under test. It is the largest single-unit air compressor i the fifth installation of the sort in the world. It is possible to c of the inlet shafts if so desired, with corresponding variation of ef but only one unit is in regular use. The compression is auton isothermal, and the air as delivered is unusually dry.

An extensive topographical and hydraulic survey of the c and the watershed shows that an average of 15,000 h. p. can be d western branch of the Ontonagon river, but the expense of dev sarily will be large. During the drought of 1910, the water supp normal and additional storage for water was secured on the we the Ontonagon, near the outlet of Lake Gogebic.

Production:

Year	Tons Ore Stamped	Lb. Cu. per Ton	Cost per Ton (a)	Coppe Produced
1918.....	106,730	14.3	$3.12	1,533,53
1917.....	137,286	11.8	2.63	1,612,64
1916.....	146,690	11.3	2.16	1,661,83
1915.....	133,984	11.1	1.46	1,499,69
1914.....	139,862	10.6	1.41	1,486,24
1913.....	137,163	10.4	1.42(b)	1,428,69
1912.....	131,955	9.3	1.32	1,224,91
1911.....	126,894	10.2	1.20	1,303,33
1910.....	122,497	9.0	1.17	1,164,56
1909.....	118,605	9.0	1.48	1,062,21
1908.....	109,015	11.8	1.56	1,290,04
1907.....	95,035	12.7	1.71	1,207,23
1906.....	39,185	13.9	....	546,33

(a) Mining and milling. (b) High cost due to the labor footage, 7,428' of development.

Tonnage costs are low, but finished copper costs are high exceedingly low average tenor of the rock stamped which cont 0.65% copper. Costs would be ruinous, and the mine hopeless, the great advantage that the property enjoys through the chea is had by any copper mine in this or any other district. The con are extensive, exploratory work is being conducted with vigor agement has displayed both courage and good judgment in its op

The October, 1919, output was 110,000 lb., but it was said th been sold for a year.

WASHINGTON COPPER MINING CO.

Office: Calumet, Mich. Mine near Delaware, Keweenaw

Officers: Chas. A. Wright, Jr., sec.-treas.; Thos. F. Co Hill, G. G. Hartley and Thos. Hoatson, directors.

Inc. in Michigan. **Cap.,** $2,500,000; shares $25 par; iss Is controlled, through ownership of a majority of issued stock, b Copper Co. Annual meeting, fourth Tuesday in March.

Property: 1,050 acres, on the western short of Mosquito desultory work has been done at intervals in the past. Idle since

WEST MINNESOTA MINING CO.

Defunct. John Coughlan, receiver, 68 Devonshire St., **Inc.** about 1864, in Michigan. **Cap.,** $500,000; shares $25 par

e company owning 550 acres lying mainly W. of the Ontonagon
sold May, 1916, to F. W. Nichols of Houghton, presumably
Sale ordered because company's charter had expired.

RN LAND CO. **MICHIGAN**

913, and probably out of business. Owned 760 acres, in Secs.
N. R. 42 W., Ontonagon county, Mich.

E MINING CO. **MICHIGAN**

. C. Pryor, mgr., Houghton, Mich.
. F. Leopold, pres.; R. R. Goodell, v. p.; R. C. Pryor, sec.;
reas., with J. H. Rice, directors.
n Michigan. **Cap.,** $50,000; $25 par; all issued and paid.
240 acres in and adjoining village of South Range, Mich.
onducts a real estate business. Part of its mineral rights sold
nge Copper Co.

E COPPER CO. **MICHIGAN**

(Subsidiary of Calumet & Hecla Mng. Co.)
Ashburton Place, Boston, Mass. **Mine address:** Ontonagon,
ty, Mich.
L. Agassiz, pres.; Jas. McNaughton, v. p.-gen. mgr., with
d'k Ayer, Jr., J. M. Longyear and E. V. R. Thayer, directors;
sec.-treas.; H. L. Bennett, asst. sec.-treas.; Thos H. Wilcox,

Cap., $5,000,000; $25 par; in 150,000 common shares and
lative preferred shares; issued 85,320 common and 10,000 pre-
olled by the Calumet & Hecla Mng. Co., through ownership of
preferred stock and 42,602 shares of common stock.
ught and retired 24,759 shares preferred stock in 1917-18.

for years ended December 31:

tal eipts	Oper. Exp.	Taxes Divs., etc.	Surplus for year	Pfd. Stock Decrease	Balance Curr. Assts.
0,156	$724,649	$30,028	$95,479	$332,814	$402,040
7,935	455,850	73,925	368,160	472,336	509,733

on preferred shares, equal to $116,676, was paid Jan. 2, 1917.
he White Pine mine and surrounding land, formerly owned
w Association and others. The White Pine mine, 80 acres, is
N., R. 42 W., 3 miles E. of the Nonesuch mine at the extreme
Keweenawan mineral belt. The other property was paid for
mile railroad line connecting the property with the Chicago,
Paul R. R., was completed in Dec., 1915.
he tract shows eruptive rocks with interbedded sandstone
s of the secondary Keweenawan series. It also holds what F. E.
dote veins which are epidotal melaphyrs crossing the face of the
the sandstones, but showing evidence of faulting and crushing.
d set of minor, nearly vertical epidote veins which, unlike the
of copper. The sandstone beneath the melaphyr is a fine-
, almost quartzite rock that is jointed and has numerous calcite
onal threads of malachite which extend down a few feet from
e sandstone is, however, usually concealed by talus from the
pper also occurs in a very fine-grained sandstone-conglomerate,
un from 5 to 10%. The dip of the bedded formation is towards
g from 8 to 35°. The so-called Nonesuch formation consists
s of sandstone running from 4 to 8' in thickness and separated
ate, the entire copper-bearing ground having a width of about
rry considerable finely disseminated native copper which is as
This formation is badly faulted and ground is said to have
hat the payable lode abutted directly against the unpayable on
ns described, there is a third which lies about 45' back in f

t: includes 4 shafts. The No. 2 temporary shaft was 1,5
out 4,756' of openings, Jan. 1, 1919. It connects with the

White Pine shaft. This shaft is vertical for 581', has 392' of cu 45° underlay. A new hoist was installed in 1918. The main (called No. 3), located between the two temporary shafts (No. incline 1,090' deep, with about 9,666' of workings. It is equip skips.

The No. 4, an inclined shaft, west of No. 1 shaft, sunk in a considerable distance above the lode, is 977' deep and has a workings. It is equipped with 5-ton skips. New workings totaled 3,478' in 1917; 5,288' in 1916. The rock is soft and can be min cheaply. The property has been extensively diamond-drilled, holes having been made since work was begun in 1907. The consisted of 10 holes totalling about 1,000' showing the second lod to be of fair quality, and the third lode of shaft No. 4 to be Generally, recent development has shown good values.

Equipment: includes a power plant and compressor at 750-k. w. electric turbine on Iron river, 1½ miles from the mine a water for the mill.

Mill: company has a 1,000-ton mill equipped with gyra rolls and Hardinge mills instead of the steam stamps commo Superior copper country. Concentration is effected on Wilfley tailings saved, as future regrinding and leaching will undoubte reclaiming the copper content.

During 1917, experiments were carried on with a 50-ton Minerals Separation type, with results so encouraging that a 6 plant was erected. Two pebble mills were converted to ball grinding and 2 Dorr thickeners, 3-tray type, each 40' in diameter a is near the working shafts and connects with them by means which rock is transferred from the shaft rockhouses to the cr the mill.

Production:

	Tons Ore Treated	Lb. Cu. per Ton	Mine Cost per Ton	Lb. Cu. Prod.	Cos per l
1918....	194,568	16.83	$2.984	3,273,680	22.4
1917....	212,889	19.11	2.365	4,067,529	14.5
1916....	188,890	22.27	2.082	4,207,449	12.7
1915....	114,039	24.76	2.182	2,824,145	16.5

1915 production is for 8 months only.

Mine costs include mining, transportation, stamping and ta rock treated; 1918 cost per lb. includes 3.64c. per lb. for depreciat

Production for 1919 was 1,987,543 lb.

Property is decidedly promising and its life has been le flotation plant, which will reduce tailing losses and make availa grade ore and rock in which the copper is in an extremely fa division.

WHITE PINE EXTENSION COPPER CO.

Offices: 15 William St., New York, and Pine, Ont Mich.

Officers: J. R. Stanton, pres.; F. L. Smith, v. p. C. W treas., with Angus Smith, Gerrit Smith, L. P. Yandell and J. H. Hurley, directors; Wm. R. Rolls, supt.,

Inc. June, 1915, in Michigan. **Cap.** issued 85,640 shares, 85,000 of which have been paid Co., Boston, transfer agent; Boston Safe Deposit Listed on Boston Stock Exchange. Annual meeting

Due to labor conditions and high costs, all pended on Mar. 25, 1918, and mine was closed

Mine

1918
1917

1,440 acres mineral land in the White Pine district, Ontonmiles west of the White Pine property of the C. & H. Mng. Co. owns the leases and exclusive mining rights for 50 years, paying royalty. These leases were purchased from F. L. Smith of Detroit, who received 60,000 shares of stock in payment for their lands and t work done prior to June 1, 1915.

rty is similar to that of the White Pine Copper Co. in that it ie and soft shales and slates. Considerable copper glance was iamond drill exploration work the copper in the core of one hole only, no native copper being present.

ent: thorough diamond drill development has been comists of one line of holes, spaced 1,000' apart, which cut the copperbout 400' below the surface and on their dip; a second line of spaced, cut the beds about 600' in depth; the third line of holes, t, cut the beds at a depth of 1,100'. The second line was located en the holes of the first; the third line holes were put down 250' the second line. Drilling has disclosed very uniform values for ,000' along the strike of the formation and at an average depth

f the five shafts planned, 1,495' from the E. boundary, reached a 438' by 1918. It has 4 compartments, 21'14"x11' outside timbers, hoisting capacity of 1,500 tons per day. The first level is at 55' 220', third 320' and fourth 420'. Drifting and crosscutting in ,963'. Total drifting to date, 5,623', total crosscutting 1,322'. eals that the ground carries a shale (No. 1), 5' on the foot-wall, copper per ton, then 6' of barren sandstone, followed by shale ain lode, 4½' wide, containing 22 to 30 lb.; 9' below this is 18 rained sandstone, returning up to 50 lb. per ton. Work indicates s will outcrop on the property for 2½ miles. During 1918, a hale was encountered 33' E. of shale (No. 2) in the main crosscut, ssays 20 lb. copper for 3" along the foot, and contains fine copper disseminated through the mass.

on will undoubtedly be by means of the flotation system, experiowing possibilities of an 85% extraction.

: 60' head-frame, 329' trestle, shaft-house, hoist of 500-ton o 1,000' depth, 12-drill compressor, 3 boilers, machine-shop, saw-, water-supply, 26½-mile telephone line, and dwellings, etc., for ile railway is to be constructed.

: ore hoisted to date totals 18,189 tons of milling grade and w-grade ore. That for the mill is estimated to contain 21 lb. of

of this mine are good, and exploration is in capable hands.

NING CO. **MICHIGAN**

Vol. XIII. Probably out of business.

PPER CO. **MICHIGAN**

Congress St., Boston, Mass. **Operating Office:** Winona, , Mich.

S. Woods, pres; N. W. Dean, v. p., with P. D. Burke, A. Findley, R. H. Summers, and G. A. Braun, directors. A. C. R. R. Seeber, supt.

Michigan. **Cap.,** $2,500,000; shares $25 par; increased 1911 ed 166,667 shares, fully paid. Last assessment of $1 was paid company, in 1911, acquired the property of the King Philip 106,667 shares of Winona stock therefor. Boston Safe Co., registrar; American Trust Co., Boston, transfer agent. Stock Exchange. Annual meeting, last Tuesday in March.

Income Account—Years ended December 31:

	Copper Sales	Other Income	Expenditures	Prev. Surplus	Cu. S payt. n
1918..	$166,228	$14,043	$284,020	$1,197,613(a)	....
1917..	355,624	16,000	480,162	330,045	$79,6
1916..	473,583	15,500	545,202	223,324	162,8

(a) Deficit. The books being readjusted to meet pre requirements.

Property: 2,608 acres, with timber rights to 1,768 acre 3 to 5 miles S. of the mine.

Geology: the main tract carries the outcrop of the loidal bed for about 2 miles. The mine was discovered 186 Indian pits along the outcrop, and a single shallow shaft wa to entire lack of transportation facilities little was accomplish was leased in 1880 and worked for mass copper, but did not p until the present company began work April, 1898, when the down, retimbered and deepened, and 3 new shafts sunk. The amygdaloid of 12' minimum, 20' average and 46' maximum 59° E., and having an average dip of about 70°. The Winona resembles both the Baltic bed and the Knowlton bed of th carrying considerable epidote, calcite and quartz, with a limit mass and barrel copper, though the bulk of the metal occu Diamond drilling has located several cupriferous beds on all lean where cut. The older workings show mineral of the somewhat heavier copper at depth. The mine is on a spur of railway.

Conditions underground are much better to the S. of the original workings to the N., but the mine has been exten contains a large tonnage of rock available for stoping.

Development: No. 1, the discovery shaft, has 3 compar deep, with 4 levels opened, which show a little heavy coppe rock in the northern drifts, but is of little promise and has b

No. 2 shaft is 1,000' deep, with 9 levels opened, showi depth of about 200', but with poor ground below, and has be 1906.

Old No. 3 shaft, 750' deep, has been idle for years.

New No. 3 shaft, 1,650' S. W. of No. 2, is bottomed at t 3d to 10th levels, inclusive, have been extended to No. 4 shaf showing alternations of good and poor ground. The opening rock carrying 12 to 15 lbs. fine copper per ton, allowing fo and reasonable selection of ground broken.

Equipment at No. 3 shaft includes a steel shaft rock ho two 18x24" crushers, pneumatic steel gates, and pneumatic tr

No. 4 shaft, about 1,700' S. W. of No. 3, is bottomed a the 15th level. The shaft is sunk in the footwall. Connecti King Philip workings on the 5th, 7th, 8th, 9th, 10th and 12th le

No. 4 shaft is equipped with a modern steel shaft roc cylindrical ore bin of about 40' diameter, built of heavy steel crusher. The hoist at No. 4 shaft is about 1,700' from the good for 1,500' depth; it operates two 3-ton skips, working at a speed of 1,200' per minute.

King Philip No. 1 shaft, about 1,400' S. of Winona No in size, sunk about 85' inside the footwall, at an angle of 70° 1,500'. Copper content was improving in Nov., 1919. The l of 20 to 25', and carries considerable epidote. Company plan and explore the Winona lode at depth.

King Philip No. 1 has a wooden shaft and [illegible] 1916, which allows a 15% increase in output.

King Philip No. 2 shaft [illegible] ing river, and 1,400' [illegible]

rily idle, is also sunk in the footwall; it has crosscuts on the levels to the Winona bed, which show about the same copper l shaft with which it has underground connection on the 8th

o. 2 shaft has an isolated steam hoisting plant. It contains a 4" crusher, and a mass hammer of drop type.
n 1918 amounted to about 166' of new openings. Due to the evelopment some lean stopes were opened to keep up tonnage. has been confined principally to stoping for some years past.
he power plant at No. 3 shaft includes an Allis-Chalmers 0-cycle 2,300-volt cross-compound a. c. generator. The equip- t includes a motor-generator set which has a 450 h. p. 3-phase variable speed induction motor, at 600 r. p. m., connected on ble couplings, to two 20-ton fly-wheels, 10' in diameter. The et has 2 bearings of 11x33", and 2 bearings of 9x27" with oil hem at the rate of 16 gals. per minute, automatically filtered insuring perfect lubrication. A 150 k. w. motor-generator ic locomotives, transforms a 2,200-volt alternating current into rrent. There is a 25-drill air compressor in the central power is provided by three 270 h. p. water-tube boilers, operated at m pressure.
ip boiler house has a battery of two 300 h. p. Parker tubular ' power house has a 50-drill, 3-stage air compressor.
include a carpenter shop, machine shop, smithy, warehouse, oarding houses and about 150 dwellings for employees. There with wing for boilers, and a wing containing a shingle mill, daily capacity of 20,000' of sawed lumber.
: the mill, built at a cost of about $300,000; is near No. about 13c. per ton in transportation charges. The mill secures Sleeping river by a dam, with a storage capacity of 150,000,000 graphic surveys for 3 years show that the watershed tributary about 3,000,000 gal. per day, which is enough for the mill.
r ton transportation charges saved by the new mill may seem , but it actually means about 1c. per lb. on the cost of finished ean the difference between success or failure, so closely are adjusted in a low-grade Lake Superior copper mine. The years past has been to put Lake Superior mills some miles es, on large bodies of water, but in the case of the Winona, s had to consider costs rather than the easier solution of its

the mill by electric locomotives, is crushed by 2 Allis-Chalmers head having a 24" cylinder, and 1 a steeple-compound head ylinders. Equipment includes 6 Hardinge conical tube-mills, nd 12 setting tanks. Under the wash floor there are 6 large he wash water, which is reused after clarification. Tailings -conveyor for a distance of 321' from the mill, and delivered above the ground, forming a great hill of waste at hand for e future time. Slimes are delivered by a 1,200' steel launder the sand discharge. During 1918, a concrete building 48x66' was built adjacent to stamp-mill, to be used as a flotation ntract was let for equipment of a 600-ton flotation plant con- -cell Minerals Separation machine, Dorr thickeners, classifier, one Oliver filter. This plant was ready for operation in

14, the mine was shut down on account of the low price of essees started work, the rock being shipped at first to the mill, and after January 1, 1915, to the Trimountain mill, hen the company resumed work, sending the mine output to

re again suspended in July, 1917, as company had been pro- 0 lb. of copper per month at a cost of 27c. per pound, and

copper was then selling at 23½c., the price fixed by the Gov
being inevitable, the mine was leased in October, 1917, to the st
others on a royalty basis. Company resumed operations, May,
February, 1919, and resumed August, 1919.

The Winona has made various separate campaigns of pr
the percentage of copper extracted ran down to unpayable fi
occasions. Returns show an average of 18.95 lb. fine copper r
of rock stamped in 1904, 14.34 lb. in 1906, and 12.59 lb. in 1907

Winona's ore actually averages 20 lb. of copper per ton,
the copper is light and flaky, the mill has never been able t
recovery. Much experimental work has been done in an atte
problem, and the new flotation unit may be the solution.

Production: 1902, 101,188 lb. copper; 1903, 1,036,944 l
lb.; 1905, no production; 1906, 278,182 lb.; 1907, 1,285,863 lb,
1910, no production.

Recent production:

	Tons Ore Stamped	Mineral Lb.	Lb. Copper per Ton Ore	Lb. Copper Rec. per Ton Ore
1918	57,837	1,359,055	23.67	14.15
1917	112,083	2,640,780	23.56	13.33
1916	161,829	3,700,180	22.85	13.39
1915	102,594	3,032,045	29.55	16.79(
1914	123,339	2,239,170	18.15	10.96
1913	120,806	2,467,460	20.42	11.99
1912	181,148	3,586,520	19.79	12.738
1911	97,445	2,533,870	26.00	13.091

(a) Higher recovery due to closer selection of rock stamp
sold, 1917, at about 20.05c. per lb., and 1918, at about 26c. per lb

(b) Does not include 756,826 lb. produced by lessees for the
of the year.

Notwithstanding the unsatisfactory results secured thus fa
believed to have a very good chance of making a successful
The management is efficient and resourceful.

WOLVERINE COPPER MINING CO.

Office: 15 William St., New York. **Mine office:** Kears
county, Mich.

Officers: L. P. Yandell, pres.; R. E. Graver, treas.; I
sec. Directors: L. P. Yandell, C. D. Lanier, W. A. Paine, J.
Stanton and Theo. Dengler. Theo. Dengler, genl. mgr.; W.
Chas. L. Noetzel, clerk; Arthur Williams, mine capt.; A. Floe

Inc. 1890, in Michigan. **Cap.,** $1,500,000; $25 par; $15
in. The company owns $80,000 stock in the Michigan Smelting
Trust Co., Boston, registrar; American Trust Co., Boston,
Annual meeting, first Monday in August. Listed on Boston
In August, 1919, stockholders voted for continuation of corpo
a further term of 30 years beyond date of present article of
is July 28, 1920.

Financial Statement for fiscal year ending June 31

	Receipts	Tot. Exp.	Profit	Div.	Su
1919	$997,376	$967,376	$122,000	$150,000	$2
1918	1,074,401	737,711	336,789	570,000	2
1917	1,707,443	691,050	1,016,393	780,000	2
1916	1,000,286	634,068	733,218	660,000	2
1915	639,196	600,991	218,201	360,000	4
1914	494,063	428,955	81,075		
1913	1,580,591	1,542,[illegible]	665,114	600,000	
1912	2,[illegible]	[illegible]	913,[illegible]	840,000	2

$630,000; copper, $72,015, equal to $14.13 per share, which com-
59 a share in June, 1918.
: the first dividend was paid Oct. 1, 1898, and 45 dividend
to Jan. 1, 1920, aggregated $10,350,000.
320 acres, 280 acres freehold, and 40 acres mineral rights,
f the strike of the Kearsarge amygdaloidal bed, on which the mine
ighboring properties are the North Kearsarge (Osceola Cons. Mng.
, Mayflower on the E., Mayflower and South Kearsarge (Osceola)
Centennial on the W.
arge bed averages about 16′ in width on the Wolverine property,
was for many years the richest amygdaloidal mine in the Lake
ct, second in richness only to the Calumet & Hecla among all Lake
r mines. All shafts are sunk at an angle of 41°, and skip tracks
n crossties, in place of longitudinal stringers, following the plan
the Calumet & Hecla, which permits the use of a cheaper grade
allows quicker repairs. All levels, except some of the very upper
ed at 100′ intervals. Owing to the uniformity of the cupriferous
from the 1st to the 23d, inclusive are opened through the entire
ecting all 4 shafts to the bottoms of No. 1 and 2 and connecting
nly below the 17th level.
ase of life was given the mine by working the footwall rock of
rked out stopes, throughout the mine. The total width of the
20′; in the original work only 12′ was mined, so there remains 3′
which contains about 18 lb. copper per ton.
ear ended June, 1919, 35% of the total rock hoisted was secured
n of this re-working practice compared with 40% from similar
ended June, 1918.
is reported negotiating for the purchase of 640 acres from the
the Kearsarge properties. This would allow shafts to be carried
about 10,000′. No authentic confirmation of the report could be

ent: several parallel lodes have been prospected, an ex-
cut being driven for 2,000′ across the formation on the 14th level,
Kearsarge conglomerate on the W., where it was barren. Another
osscut, 1,600′ long, driven E. on the 28th level, intersects the Old
,489′ E. of the Kearsarge amygdaloid and cuts other cupriferous
drifting on the Old Colony lode failed to disclose payable ground.
lying 80′ W. of the Kearsarge has been opened by several levels,
able ore.
erine lands also carry the Osceola amygdaloid, but it proved non-
a 631′ shaft with drifts on 5 levels.
ft near the Kearsarge line, was abandoned years ago. No. 2 shaft,
omed at 1,700′ and is used for handling men and supplies.
ft sunk in the footwall, is bottomed at the 39th level, total depth
g was stopped at the 39th level as the hoist had reached the limit
pacity. It is proposed to open and mine the remaining 100′ below
by means of a winze 600′ S. of the shaft. This inclined winze will
ain a depth of 700′ in order to reach the boundary of the property.
o. 3 and 4 are connected by drifts down to and including the 33rd

ft sunk 45′ in the foot, to guard against drawing, has reached the
al depth 4,460′, the bottom of the mine.
ent in 1918-1919 amounted to 1,259′ which compares with 1,972′
year. All ground north of No. 3 shaft, from the 25th to the 40th
he exception of about 90′ of shaft pillars, was stoped out in 1919.
ge showed a satisfactory grade. In 1918, levels No. 40, 41, 42 and 43
e reached the southern boundary, and drifting showed the levels to
railed.
1919, the South Kearsarge mine of the Osceola Cons. Mng. Co.,
mprising the lower levels. The Wolverine management was forced
m the 29th level to the South Kearsarge 23rd level, and cement

in pipes with control valves and pressure gauges. The water i
2,870′ along the 31st level to a fork at the 30th level in No. 3 sh
tional safeguard, concrete dams were built on the 38th and 39t
shaft No. 4, to intercept any sudden, large volume of wate
facilities were doubled and a 1,400-gal. boiler installed in shaft
handles 110,000 gals. of South Kearsarge water per day, in addi
water.

Equipment: at No. 3 shaft duplicates that of the Mohaw
at No. 4 includes a 14″x60″ duplex-cylinder hoist with doul
having a maximum diameter of 18′, capable of raising 4-ton s
depth, with a 1¼″ steel cable. There are 20-drill and 22-drill
3 water-tube boilers, with automatic stokers and fuel economi

Mine has electric pumps, 3 at No. 2 shaft, and two at shaf
at shaft No. 4, three pumps having an average lift of more than

The principal mine buildings are at No. 4 shaft, but there is
house at No. 3 shaft. A telephone system connects undergrou
and all buildings. The company maintains a 6-ward hospital an
a large number of substantial dwellings, the location being ex
perous in appearance.

Rock is transported between the mine and mill by the Mo
Bay railroad, with a down-grade haul of 13 miles.

Mill is near the mouth of Tobacco river, on Traverse
perior, and adjoins the Mohawk mill, both being served by a
managed by a joint superintendent. The mill has 2 Nordber
Wilfley tables. Mineral from the heads and wash is sluiced
through iron pipes, going to the works of the Michigan Smelti
ton. A tailings plant provides for settling out the water and
ings 800′ from the mill by belt conveyor.

The boiler-house contains a battery of 200 h. p. water-tube
with automatic stokers.

The pump-house, owned jointly by the Wolverine and
20,000,000-gal. horizontal triple-expansion pump, with 18″, 33
cylinders and 22″ water plungers, with 36″ stroke, besides an a
gal. triple-expansion water-end pump, with 3 plungers. Th
located on the river, near its mouth, the intake being protecte
running 300′ into the lake to prevent clogging from floating ba

Work was started, 1919, on an intake shaft and tunnel
Pump station was cut at 90′ below lake level; shaft was 110′
and tunnel was driven 1,423′ to July, 1919. Estimated length
30′ of water will be attained.

A concrete building, 42x42x18′ was constructed in 1918,
k. w. capacity, 60-cycle, 3-phase, 2,200-volt mixed pressure turb
will furnish power to drive all the mill machinery plus three 7,0
driven centrifugal pumps to be installed at pump house, th
present boiler pumping plant. This expense is being shared
Mining Co.

In normal times the average number of men employed
was 370, but during 1919 the force averaged 30% below nor
20% below normal.

Recent Production: (fiscal year ending June 30).

	Tons Ore Hoisted	Cost per Ton	Tons Ore Stamped	Cost per Ton	Lbs. Cu. per Ton	Mineral Lbs.
1919.....	298,279	$2.117	298,089	$2.118	15.306	7,339,025
1918.....	304,015	1.911	303,498	1.914	15.185	6,961,500
1917.....	354,899	1.54	352,845	1.63	16.59	8,753,945
1916.....	391,898	1.31	388,989	1.39	17.07	9,127,790
1915.....	403,219	1.28	397,614	1.30	18.23	9,734,850
1914.....	188,147	1.85	182,127	1.92	18.86	4,606,015
1913.....	403,514	1.53	388,502	1.62	21.49	10,782,405
1912.....	414,544	1.53	401,308	1.58	23.45	12,164,780
1911.....	400,296	1.59	388,476	1.64	24.75	12,227,500
1910.....	405,790	1.55	390,837	1.61	24.96	12,359,000

(a) Cost per pound includes construction, but does not include costs of
and taxes, which amounted to 4.395 c in 1919, and 4.324 c in 1918.

lendar year of 1919 was about 5,000,000 lb.
produced to June 30, 1919, a total of 165,944,757 lb. copper.
Wolverine was trying to get options on certain blocks of land
m to indicate that the management is contemplating expansion.
ge resources, small share capitalization, and efficient organiza-
it such a policy.

OPPER CO. **MICHIGAN**

evonshire St., Boston, Mass. **Operating office:** Houghton,
ce: Winona, Houghton county, Mich.
shley Watson, pres.; Jos. Dorr, v. p.; Chas. E. Adams,
ank L. Van Orden, mgr. Louis La Rochelle, mng. capt.
1899, in Michigan. **Cap.,** $2,500,000; shares $25 par; paid in,
nent $1, levied August, 1917, payable 50c., Sept., 1917, and 50c.,
s levied assessments of $700,000 since organization. Shares are
on Stock Exchange. State Street Trust Co., Boston, registrar;
., Boston, transfer agent. Annual meeting, second Monday in

shortage and excessive costs, plus the fact that many stock-
to pay the last assessment, operations were suspended in April,

65 acres, adjoins the Winona, in Secs. 16, 20 and 21, T. 52
xploratory work, begun Feb., 1899, was done in search of the
r to locate the southern extension of the Baltic amygdaloid,
on was turned again to the Winona bed, and latterly to develop-
aloidal bed, the No. 8 lode, lying about 2,300′ E. of the Winona
e strike of the Keweenawan formation on this land is N. 53°
ge dip of 65°, and the Wyandot lands carry the strike of the
led series for about 1½ miles.
: by several shafts, No. 1, 1,000′ deep, located in the S. E.
52 N., R. 36 W., is sunk in the footwall of the Winona bed.
ry shaft is sunk 710′ on a stratum paralleling the Winona
e of 1,200′. This bed looked good when first opened, and
es were rich, but proved poor under development. A crosscut
n the bottom of No. 11 shaft for 2,640′, intersects 13 distinct
s, Nos. 3 and 2 showing copper. Drifting done on No. 3 bed
able mass and barrel copper, but No. 8 is the more promising.
work of the past includes a 102′ vertical shaft, sunk on a
bed, known as the Misery river bed, in Sec. 16, T. 52 N., R.
ng of value was developed. Some years ago a vertical shaft
ls held under option, near the W. quarter post of Sec. 28, T.
to depth of 250′, and crosscuts driven both E. and W. with
le of workings. This work crossed the horizon of the Baltic
as deemed the Baltic amygdaloid was found highly altered,
s was the whole country in the neighborhood.
mond-drilling has been done on the property and a core, taken
orizon of the Lake bed, showed a little copper, but was not
tant at that time. The ground has been carefully prospected
drill, in Secs. 16 and 21. Holes Nos. 21 and 22 showed beds
gement, and some trenching was done on 1 bed, 48′ wide, carry-
r from foot to hanging. Another trench, 1,500′ N. E. disclosed
ly 16′ of overburden, and a shaft known as the Sec. 16 shaft,
epth of 65′. A crosscut at this depth shows the bed to be 38′
ely-disseminated copper for about 10′, with small masses along

Recent activity has been centered in development work i
1,100' S. E. of the No. 11 shaft. This lode is opened by the
the 700' level, and below this depth by a 115' winze, with abo
on the 815' level, 400' of drifts on the 900' level and about 600
1,000' level, the bottom of the winze, up to March, 1918. The
levels has been varied and sufficient work has not been done to
the value of the lode.

Equipment: includes a steam plant with hoist, good for
pressors of 12 drills aggregate capacity.

Two mill tests have been made, the second in 1917, on 65
21.62 lb. copper recovered per ton.

The Wyandot company has worked persistently and wit
than a decade to make a profitable mine, and, though not ye
not exhausted the possibilities of its holdings.

MICHIGAN IRON MINES

Normally, the American production of iron ore is about
Of this, the Lake Superior region contributes 85%, Michigan ave
its output in 1919 being over 13,000,000 tons. There are three
districts in Michigan, namely, the Gogebic, Marquette and Men
the first named is in Wisconsin, but the most important section
The iron formation rests on quartzite, cut by igneous dikes. Th
soft, red hematites, carrying 54% iron 0.03% phosphorus, and
of the mines are over 2,000 feet deep.

The Marquette range is smaller than the others. The f
quartzite and greenstone, and is cut by dikes. The ores are mass
hematite (rarely magnetite) similar to those of the Gogebic are
iron, 0.5% phosphorus, and 7% silica. The mines are also dee
feet. The Menominee range though usually considered a Mic
partly in Wisconsin. In Michigan, the productive formation o
dipping narrow belts, resting on dolomite and overlain by slat
soft, bluish-black hematites containing 55% iron, 0.6% phos
silica. Mining is conducted to a depth of below 1,500 feet.

From the various Ranges the ore is railed to docks on Lake
by steamer to lower lake points, and then by rail to furnaces a
other centers.

ANTOINE ORE CO.

Address: F. J. Webb, mgr., Youngstown, Ohio. **Mi**
Mountain, Dickinson county, Mich.

Company equipped mine with a new plant, in 1918, includi
compressor. Controlled by Republic Iron and Steel Co.

ASHLAND MINE

See Hayes Mining Co., Michigan.

BREITUNG IRON CO.

Name changed July, 1918, to Marquette Iron Co., which se

BRISTOL MINING CO.

Office: E. W. Hopkins, mgr., Ironwood, Mich.

Property: on the Menominee range, Mich. **Ore:** ha
Bessemer hematite, containing 49.48% iron, 3.96% manganese,
and 7.25% silica. Mine closed 1917, but reopened March 1918

Mining method: by stoping on [illegible]

Production: 186,688 tons in 1917, [illegible] of 1916
917 reported as 4,759,233 tons.

ON IRON MINING CO. **MICHIGAN**

H. Munger, mgr., Sellwood Bldg., Duluth, Minn. **Sales** ds, Mather & Co., Cleveland, Ohio.

the Brotherton mine on the Gogebic range.

emer and non-Bessemer hematite, carrying 49.83 to 53.37% 073% phosphorus and 11.75 to 15.86% silica. Mining by under- to depth of 1,342'.

: 55,947 tons in 1918 and 2,559,733 tons to date.

RON MINING CO. **MICHIGAN**

falo, N. Y.

. H. Wickwire, Jr., pres.; Harry Yates, treas.; E. L. Bowers, ron River, Mich.

00; $25 par.

the Homer mine, Iron River, Iron county. Shaft 458' deep.

: in 1917, 202,592 tons compared with 156,528 tons in 1916, in 1915, when first shipment was made.

NING CO. **MICHIGAN**

09 Security Bld., Minneapolis, Minn.

red B. Snyder, pres.; J. F. VanDerlip, sec.; R. M. Bennett, Varren, gen. mgr., Minneapolis, Minn; T. J. Nicholas, supt., Pickands, Mather & Co., Cleveland, Ohio, sales agents. Oper- corporation.

Isabella mine, Marquette county, developed by 930' shaft, s. The ore is mined by the square set and stoping systems. n jasper, in contact with diorite dike.

: 80,691 tons in 1918, compared with 67,708 tons in 1917; 16, and 36,225 tons in 1915. The product is a Bessemer and non- re.

IRON CO. OF AMERICA **MICHIGAN**

. H. Binham, sec., Detroit, Mich. W. E. McRandle, supt.,

he Yale mine on Geogebic range.

les, all soft red, one a Bessemer, the second non-Bessemer cious hematite. The best ore contains 52.6% iron, 0.043% phos- % silica.

t: by 1,200' shaft. Ore mined by caving to a depth of eported that new machinery for both underground and surface nstalled.

149,155 tons in 1916; 73,633 in 1917, and 1,013,486 to be-

CLIFFS IRON CO., THE **MICHIGAN**

land, Ohio. M. M. Duncan, mgr.

G. Mather, pres.; M. M. Duncan, v. p.; G. G. Heer, treas.; with T. H. Newberry, C. W. Benham, Samuel Mather, J. H. mond and B. F. Bourne, directors; E. H. Jaynes, asst. sec.; and tor.

Virginia. Cap., $10,000,000; $100 par; 995,740 issued. riced, $3,500,000, issued; $1,575,000 outstanding May, 1919; teral trust gold 6s.

1918 shows an income from all sources of $5,778,449, of s profit. **Dividends:** 2½% per quarter.

mines in Michigan and Minnesota that yielded 3,465,715 e Minnesota properties, see Cleveland-Cliffs Iron Co., Min- ol. Michigan mines are:

Mine	Range	Mining System	Ore
Angeline	Marquette	Underground	Bessemer
Austin	"	Caving	B. and non-B.
Athens	"	Caving	non-B.
Bunker Hill	"	Caving	"
Cliff Shaft	"	Open stope, room and pillar	"
Francis	"	Caving	"
Gwinn	"	Caving	B. and non-B.
Holmes	"	Caving	"
Jackson	"	Open pit	non-B.
Lake	"	Caving	B. and non-B.
Maas	"	Caving	"
Morris-Lloyd	"	Open pit, caving, shrinkage stoppage	"
Negaunee	"	Caving	"
Republic	"	Open and shrinkage stoping	"
Salisbury	"	Caving	"
Stephenson	"	Caving	"
Spies	Menominee	U'rground milling	non-B.

The above figures represent the season's shipments. May or the season of Lake navigation. Actual production goes on the ore is stocked at the mines. It frequently happens that duction figures are considerably larger than shipments; and reverse.

The McClure power project was completed 1919, after 2 menced in August, 1917. The dam on the Dead River, 7 miles Mich., is the largest hydro-electric project in northern Michi 500′ long, spillway 200′ long, height 50′ from foundation, a tapering to 4′ at top of spillway. It is of concrete constru A pipe-line 13,600′ long connects with the power-house; 10,00 fir wood-pipe 7′ in diameter, the remaining 3,600′ is steel, 7′ in

The power-house built at the junction of Rainy creek a 90′ long, 45′ wide and 25′ high. Two 5,000 Kva. generators ar h. p. turbines. The transformers are outside the building; the at 2,000 volts and stepped up to 30,000 volts for distributio company's mines.

This plant is described in the "Eng. and Min'g. Jour.," Se

DAVIDSON ORE MINING CO.

Office: 403 White Bldg., Buffalo, N. Y. **Mine office:** I

Officers: F. N. Beagle, pres.; Geo. Davidson, v. p.; sec.-mgr.; L. R. Davidson, treas. Rudolph Ericson, supt.

Inc. 1910, in Michigan. **Cap.,** $500,000; shares $25 pa outstanding.

Property: 160 acres, includes the Davidson No. 1, 2 a Iron River. **Ore** is a non-Bessemer limonite.

Development: by 2 vertical shafts 550′ and 230′ deep a shaft.

Equipment: includes 3 hoists, 2 compressors and ste

DUNN IRON MINING CO.

Office: First National Bank Bldg., Milwaukee, Wis.

Officers: E. G. Wilmer, pres.; C. N. Turner and M. p.; H. J. Schlesinger, treas.; W. Sacker, sec.; E. L. Cullen, mgr. supt.

Inc. April, 1895, in Wisconsin. **Cap.,** $25,000; shares

about 160 acres, at Bessemer, Menominee Range, Mich. ine was reported closed.

D., M. A. MICHIGAN-MINNESOTA

0 Leader-News Bldg., Cleveland, Ohio.

L. C. Hanna, M. Andrews, H. M. Hanna, Jr., F. B. Rich- ns, R. F. Grant, J. D. Ireland and L. C. Hanna, Jr. Operated and does not furnish reports for publication.

the following operating companies: Virginia Ore Mining Co., Consumers Ore Co., Buhl, Minn.; La Rue Mining Co., Nash- merican-Boston Mining Co., Diorite, Mich.; Richmond Iron Co., Hollister Mining Co., Crystal Falls, Mich.; Wakefield Iron Co., .; Hanna Ore Mining Co., Virginia and Hibbing, Minn. Also of 8,915 average tonnage on the Great Lakes.

sales agents for the following:

ny	Mine	Range	Tons 1918	Tons 1917	Total to date
Corp.	Magpie	Mes.	.....	.....	.....
n Mng. Co.	American	Gog.	120,756	142,526	1,576,025
	Bates	Men.	98,194	141,890	.....
	Ann		.....	.....	.....
	Kevin		21,602	35,846	.....
	Lamberton	Mes.	655	20,187	.....
	Margaret	"	43,933	.....	.....
	Patric	"	236,776	95,888	.....
	Smith	"	39,292	253,223	.....
	Hanna A.	"	111,212	136,114	1,521,956
	Hanna B.	"	.....	.....	.....
	Frantz	"	169,777	78,302	.....
	Cohoon		.....	.....	.....
	Anvil	Gog.	674,460	481,465	.....
	Palms	"	14,131	54,407	.....
	Empire	Mar.	45,947	38 392	.....
	Florence	Men.	97,322	47,193	.....
	Ernst	"	173,155	70,416	.....
Co.	Brunt	Mes.	257,597	112,289	1,478,680
"	Dale	"	.....	10,423	.....
"	Harold	"	280,495	145,966	.....
"	Hobart	"	.....	.....	.....
"	Pilot	"	.....	.....	.....
"	Thorne	"	44,904	74,997	.....
"	Uno N.	"	82,954	117,028	.....
"	Uno S.	"	130,483	99,992	.....
	Carpenter	Men.	384,148	269,387	.....
	Monongahela	"	27,739	.....	.....
	Ravenna	"	.....	37,848	.....
	La Rue	Mes.	295,916	330.349	2,693,705
	Loretto	Men.	155,891	193,950	2,262,294
S.	Mahoning	Mes.	2,024,595	2,524,110	.....
	Maitland	Mar.	19,625	.....	.....
	Keweenaw	Gog.	142,037	130,374	441,563
	Newport	"	1,041,697	1,003,229	14,615,506
ng.	Penn Group	Men.	210,632	459.784	11,780,108
Co.	Miller	Mes.	329,151	312,875	3,717,445
	Wacootah	"	174,342	73,908	.....
	Bessemer	"	.....	.....	1,238,546
	Cambria	"	143,305	114.031	3,163,068
	Kinney	"	203,542	184.591	4,247,265
	Pettit	"	258,174	192.920	1,887,410
	[illegible]y	"	.....	777	.....
	[illegible]mond	Mar.	144.104	148,834	.....
	[illegible]	Mes.	119,023	168,953	.....
	[illegible]d	Gog.	1,130,432	1,144,411	4,316,186

HAYES MINING CO.

Office: First National Bank Bldg., San Jose, Cal. **Min** wood, Mich.

Officers: E. A. Hayes, pres.; J. O. Hayes, sec.-treas.; wit C. L. Hayes, directors. Robt. King, supt.; L. R. Davidson & C Buffalo, N. Y.

Inc. 1899, in Wisconsin. **Cap.,** $1,000,000; $25 par; a bonds. Annual meeting in May. Transfer office: San Jose, Ca March, 1919. Total, $266,600, or $66.65 per share.

Property: the Ashland mine, 120 acres, at Ironwoo opened in 1884. Developed by inclined shaft 2,120' deep, with workings.

Ore: two grades of red hematite are produced, know hard and soft non-Bessemer and Ashland, a soft Bessemer ore. A for 1916, of all shipments, samples dried at 212° Fahr. Ashland phos., .042; silica, 9.24. Globe ore: iron, 60.0; phos., .067; sil ments 1884-1916, 6,312,600 tons.

Ore is shipped by boats to Ashland, Wis., thence by boa lake ports.

Ref. Iron Ores of Lake Superior, 1917, Crowell & Murray.

HEMLOCK RIVER MINING CO.

See Pickands, Mather & Co., in Minnesota.

Office: Western Reserve Bldg., Cleveland, Ohio.

Officers: H. G. Dalton, pres.; Wm. McLaughlin, v. p.; sec.; E. P. Williams, treas.; C. A. Munger, mgr., and C. E. La Mich., supt.

Inc. April, 1884, in Michigan. **Cap.,** $500,000; $25 par.

Property: the Warner mine, 80 acres, near Alpha, Iro to show ore containing 54.46% iron. Company estimates ore res tons. Developed by 743' shaft.

Production: in 1918, 78,855 tons. Total, 187,420 tons.

INDIANA MINE

Address: John M. Thomas, owner, Milwaukee, Wis.; G supt., Iron Mountain, Mich.

Is an iron property producing ore carrying 40.4% iron an phorus. Uses electric hoist, pump, tram and steam driven comp

Production reported as 52,570 tons, 1915; 44,162 tons 1916; 4

JONES AND LAUGHLIN ORE CO.

Office: 3rd Ave. and Try St., Pittsburgh, Pa.

Property: the Forbes mine, in the Iron River district, contains a yellow, non-Bessemer hematite. Developed by 2 opened in 1912, shipments commenced 1913. Reported to 298,020 tons up to January, 1917.

The Rolling Mill mine, Marquette county, yields a so Bessemer hematite. Shaft is 786' deep; shipping since 187 duction to 1917 was 1,552,617 tons.

Company is developing the South Agnew mine in Hibbing range, Minnesota.

JUDSON MINING CO.

Address: Alpha, Mich. M. E. Rich[illegible] mgr., T. Chicago; Cavour Hard[illegible] Duluth [illegible] Ande Nevada Mining Co.

Inc. 1[illegible]

Pro[illegible]

Tons [illegible]

IOR IRON & CHEMICAL CO. **MICHIGAN**
Vol. XIII. Name changed to Charcoal Iron Co. of America,

ON CO. **MICHIGAN**
Fulton St., Chicago, Ill.
Ward Amberg, pres.; D. F. Brenner, v. p.; J. H. Amberg,
erg, treas.; C. H. Baxter, supt., directors.
nois. **Cap.**, $400,000; $10 par; all issued. Is a close cor-

80 acres leasehold on Menominee range at Loretto, Dick-
Iich., opened up in 1892. Main orebody averages 10-40′ in
out 1,000′ long with an overburden of above 25′. Ore varies
content.
t: to vertical depth of 800′.
174,173 tons in 1916; 193,949 tons in 1917; 155,891 tons in

IRON CO. **MICHIGAN**
ged from Breitung Iron Co., July, 1918.
esident: 5 Nassau St., New York, N. Y.
d directors: R. S. Child, pres.; C. B. Dunster, v. p.-gen.
amilton, sec.-treas., with E. N. Breitung and E. B. Boies.
supt., Negaunee, Mich.
1917, in Delaware, as Breitung Iron Co. **Cap.**, common
hares, no par value, and preferred stock, $3,000,000, 7%
value $100. Outstanding: common, 90,000 shares; preferred,
preferred is convertible share for share into common stock
olders. Redeemable at option of corporation at $110 per
ued dividends. Privilege of conversion up to thirty ays,
ed for redemption. No bonds, but $1,036,500 first lien, con-
red notes were outstanding Nov., 1918. The unissued com-
00 shares, is reserved to provide for conversion of the first
nd preferred stock. After July, 1921, 10% of surplus earn-
lends having been paid for each year) shall be applied to
of preferred stock at $110 and accrued dividends. Quarterly
le on first of Jan., April, July and October.
subsidiary companies and their locations are given below,
e percentage of capital stock of each one held by the Mar-
other than directors' qualifying shares.

ubsidiary Companies	Location	Iron Ore Range	% Capital Stock Owned
Mng. Co....	Negaunee, Mich.,	Marquette Range...	95%
ite Mng Co.	" "	" " ...	95%
.....	" "	" " ...	100%
g Co.....	" "	" " ...	70%
n Co.....	Humboldt, "	" " ...	51%
o.....	Ironton, Minn.,	Cuyuna Range.....	100%
n Co.....	Iron Mtn., Mich.,	Menominee Range..	80%
o.....	Wilde, Ont., Can.	Algoma Range.....	90%

of April 1, 1917, the American Appraisal Co. of 120 Broad-
N. Y., appraised the properties of the subsidiaries, as fol-
assets: permanent equipment and development: $1,227,563;
d leases, $7,078,250; investment in ships, $325,259; total,
nt assets, $1,324,698. Less: current liabilities, $428,978;
notes of two subsidiaries (less sinking fund for re-
$1,104,050. Total net assets, exclusive of good
The Appraisal company states that these

The Marquette Co. reports that since this appraisa
ships have been sold for more than the amount carried o
bonds and notes of subsidiaries reduced, Jan. 1, 1919, to
through a subsidiary, it has acquired by deed and stock o
95% of the lands occupied by Mary Charlotte Mining Co.,
tite Mng. Co. and Juliet Iron Co.

Property: over 1,300 acres in one solid tract in the
of the Marquette Iron Range in the Lake Superior regio
in other districts.

Subsidiary Properties.

Mary Charlotte Mining Co. holds leases on 130 acres
estimated to contain over 4,000,000 tons of high-grade Be
ores, disclosed by development work and drilling; and
lower grade ores. Ore assays from 54.50 to 59% iron
phorus. Mine has operated since 1903 and has produced o
Production averages 300,000 tons per year.

Breitung Hematite Mining Co., Ltd., has 50-year lea
175 acres of iron ore lands estimated by development and
tain 4,000,000 tons of high grade Bessemer and non-Bess
ing 63% iron and 0.023% phosphorus. Property compris
1 mine on which company has spent in recent years a
new shaft and development; has produced, since 1911, a
The No. 2 mine, producing non-Bessemer ore since 1906,
000 tons.

Juliet Iron Co. holds 50-year lease on 960 acres in the
iron formation and adjoins the Breitung No. 1 mine on the
surrounds the Breitung Hematite No. 2 mine and the
practically undeveloped except by shallow workings that
prospects. From one tract of 80 acres, known as the
400,000 tons were produced. Mine idle since 1916, but con
prehensive drilling and developing in near future.

Lucky Star Mining Co. owns in fee 50 acres north
Hematite; property is crossed by a very rich orebody,
more than 4,000,000 tons. A shaft has been sunk to withi
and company reports that it should soon be producing.

Washington Iron Co. owns in fee and operates the
the Humboldt district of the Marquette range. Has 4 gra
non-Bessemer specular and magnetite ores, which are cu
shipment. No. 2 ores assays 56.83% iron, 0.136% phosph
silica. Since 1908 property has produced 350,000 tons.
acres situated in the iron formation with considerable
in the small portion prospected.

Hopkins Mining Co. holds 46-year lease on 80 acres
near Ironton, Minn. Drilling in 1914 showed 468,366 tons
manganiferous ore. Later work in that section indicated
At present time shaft has been sunk 145'. During 1918, 3
produced.

Clifford Extension Iron Co. holds a 24-year lease
Menominee
Above the
that
by

Pre
acres
farm
McKi
Offic
Minnesota.
Officers:
mgr.

ly believed to be a re-organization of Corrigan, McKinney & was dissolved in 1917. Said to be operating the following prop-

Baker Mine.

in Sec. 31, T. 43, R. 34, Iron county, Mich. Ore: soft, red, er hematite. First opened in 1909.
ion: totals about 267,107 tons.

Colby Mine.

in Sec. 16, T. 47, R. 46, Gogebic county, Mich. Ore: soft, blue nd non-Bessemer hematites, assaying 53.79 to 53.98% iron, 0.039 phosphorus and 5.89 to 6.15% silica. Mined by underground

ion: 423,553 tons in 1916; 353,880 in 1917; total, 4,613,007 tons.

Commodore Mine.

Sec. 9, T. 58, R. 17, near Virginia, St. Louis county, Minn. lue Bessemer and non-Bessemer hematites, assaying 51.83 to 0.048 to 0.032% phosphorus and 7.67 to 6.01% silica. Mined by tem.
ion: 1916, 579,285 tons.

Ironton Mine.

in Sec. 17, T. 47, R. 46, Gogebic county, Mich. Ore: soft, red d non-Bessemer hematites, assaying about 51.38% iron, 0.248% and 4.96% silica. Ore mined by underground system. First 86.
on: 1916, 148,200; 1917, 244,517; a total of 1,805,382.

Richards Mine.

in Sec. 36, T. 43, R. 33, Iron county, Mich. Ore: soft, brown r hematite, assaying 51.22% iron, 0.566% phosphorus and 6.47% d by underground system. First shipment, 1914.
on: 1914, 7,069 tons; 1915, 92,807 tons; 1916, 29,381 tons; 1917, total, 173,147 tons.

Stevenson Mine.

rom Great Northern Iron Ore Properties, Minn.
in Secs. 7, 8 T. 57, R. 15, near Hibbing, St. Louis county, soft, blue Bessemer and non-Bessemer hematites, assaying iron, 0.047% phosphorus and 7.19% silica. Mined by open First shipment, 1900.
on: 349,960 tons in 1916; 345,265 tons, 1917; 323,514 tons, 1918. 11,527,385 tons.

St. James Mine.

in Sec. 3, T. 58, R. 15, near Aurora, St. Louis county, Minn. e non-Bessemer hematite, showing 50.88% iron, 0.068% phos- 90% silica. Mined by underground system.

St. Paul Mine.

in Sec. 24, T. 57, R. 22, near Keewatin, Itasca county, Minn. ne non-Bessemer hematite, assaying about 50% iron, 0.50% 7.58% silica. Mined by open pit system.
n: 181,400 tons. No shipments reported since 1913.

Tobin Mine.

Sec. 30, T. 43, R. 32, Iron county, Mich. Ore: soft, red, assaying 52.75% iron, 0.470% phosphorus and 6.31% system. First shipment, 1901.
1917, 188,590 tons; totaling 2,831,897

unty, Mich. Ore: soft, red, 47% phosphorus and 5.50% ent in 1910.
1917; totaling 690,887

MINERAL MINING CO.

Office: 910 Wells Bldg., Milwaukee, Wis. **Mine o** Mich.

Officers: G. D. Van Dyke, pres.; W. D. Van Dyke, E. F. Brown, mgr. and sec.; above are directors.

Inc. May 7, 1904, in Wisconsin. **Cap.,** $100,000; share issued. Annual meeting, first Tuesday in May. Compan poration.

Property: the Osana, Wauseca, Nanaimo and Breen Iron River, Mich., the Osana worked up to 1918 and the up to 1917. No later information obtainable.

Production: capacity: 500,000 tons yearly. Output Osana), ore averages 55.3% iron and 0.45% phosphorus, up to 1918 of about 1,020,000 tons.

MUNRO IRON MINING CO.

Office: Iron River, Mich.

Officers: W. A. Rogers, pres.; Hugh Kennedy, v. p. sec., Erie county Bank Bldg., Buffalo, N. Y. G. L. Woody close corporation.

Property: 4 mines, about 560 acres. The Hiawatha mile S. of Iron River; the Rogers, 3 miles E. of Iron River 6 miles E. of Iron River, and the Munro at Norway, Mi iron ore in lenses. Assays average 53% iron, 0.4% phospho 9% manganese.

Development: by shafts, 400 to 1,200′ deep and about

Production: 1913, 316,019 tons; 1914, 293,296 tons; 19 1916, 427,182 tons; 1917, 426,819 tons; 1918, 376,988 tons. about 1,000,000 tons of ore blocked out.

NEGAUNEE MINE

Address: M. M. Duncan, mgr.; G. R. Jackson, supt., **Sales agents:** Cleveland-Cliffs Iron Co., and Pickands, Cleveland, Ohio.

Property: in sections 5, 6, T. 7, R. 26, in Marquett has been worked since 1887.

Development: ore mined by caving system to vertical

Ore: two grades; Negaunee, a soft, red, Bessemer h ing 52.04% iron, 0.083% phos., and 6.72% silica; and Neg assaying 53.59% iron, 0.053% phos., and 6.72% silica. Mo both. Cargo analyses in 1916 averaged 59.20 to 60.90% iron phos., 7.65 to 7.12% silica, and 0.31 to 0.27% manganese.

Production: 573,760 tons in 1917; 528,701 tons in 1918. duction of over 7,000,000 tons to date. See Cleveland-Cliff

NEVADA MINING CO.

Address: M. E. Richards, gen. mgr., Alpha, Mich.

Inc. 1916, in Michigan. **Cap.,** $2,500,000; $10 par; officials as Judson Mining Co.

Property: about 80 acres in Sections 22, [illegible] county, Mich., includes the Annas Forte mine placement iron ore deposits to date that is

Development: [illegible] contain 700

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O

l Bessemer and non-Bessemer hematite, carrying up to
% phosphorus and 10.58% silica. Ore is mined by sub-
2,274' depth.
,315,980 tons in 1916; 986,853, 1917; 1,002,243, 1918. Total
tons.

RA MINE **MICHIGAN**

ver Iron Mining Co., Ironwood, Mich. J. H. McLean,
dson, gen. mgr.
Gogebic county, Mich., was first opened in 1885, and de-
vertical depth.
,855,863 tons in 1916; 1,646,606 tons in 1917, making a total
ut 35,000,000 tons since 1885. Ore is of 5 grades, all soft
ssemer hematites, and one grade of non-Bessemer hema-
mine is 54.31% iron, 0.036% phosphorus, 6.21% silica, and

INING CO. **MICHIGAN**

lcan, Mich.
C. Dinkey, pres.; J. C. Agnew, v. p.; D. B. Gehly, sec.-
Kelly, directors. Wm. Kelly, mgr.
gan. **Cap.**, $150,000; $25 par; all issued.
Menominee range, Dickinson county, includes the Cy-
East and West Vulcan, Brier Hill and Curry mines. De-
of 1,600' by vertical shafts. Ore: Bessemer and non-Bes-
56.77% iron. Reserves estimated by company at 1,200,000
919.
at the rate of 350,000 tons iron ore per year, a total to
8 tons.

MICHIGAN

Wells Bldg., Milwaukee, Wis.
D. Van Dyke, pres.; W. D. Van Dyke, sec.-treas., with
H. McLean and D. G. Kerr, directors. E. F. Brown, mgr.;
upt.
1887, in Wisconsin. **Cap.**, 8,000 shares; $25 par, all issued.
ration.
wabic and Walpole iron mines at Iron Mountain, Dickin-
n. On April 1, 1918, operations were suspended until more
ons permit mining the low grade ore.

INING CO. **MICHIGAN**

eveland; Ohio. L. M. Hardenburgh, gen. supt.; A. Mat-
a, Mich., local supt. Under direction of Pickands, Mather
rn Reserve Bldg., Cleveland, Ohio.
ns and operates a lease on the Plymouth mine, an iron
Gogebic range near Wakefield, Gogebic county. Property
-Bessemer hematite, containing 53% iron, 0.069% phos-
silica.
by open-pit system. In May, 1919, company was em-

arted in 1916; totaled 330,427 tons; 1917, 656,473; 1918,

STEEL CO. **MICHIGAN**

section of this book.

MICHIGAN

Ireland, mgr.; John Huhtala, supt., M.
gents.
Marquette range, Marquette county,
matite assaying 38.98% iron, 0.048%
worked by open pits.
tons.

SPRING VALLEY IRON CO.

Address: E. H. Willis, mgr., Wellston, Ohio. J. E. Loon

Property: on the Menominee range, Iron county, Mich., o

Ore: a soft, red, non-Bessemer hematite, assaying 51.75% iron, phorus, and 6.3% silica. Ore is mined by top slicing system 350'.

Production: 145,716 tons in 1916; total production up 916,661 tons. The Zimmerman mine opened by this company taken over by the Tod-Stambaugh Co., of Minnesota, in 1918.

SUNDAY LAKE IRON CO.

See Pickands, Mather & Co., Minnesota.

Address: L. M. Hardenburgh, gen. supt., Hurley, Wis., or local supt., Wakefield, Mich.

Property: the Sunday Lake mine, on Gogebic range. Mi hard, purple Bessemer and non-Bessemer hematites; assay 59.70% iron, 0.032 to 0.089% phosphorus, and 0.20 to 0.35% m

Production: 131,425 tons in 1918. Total, 2,476,395 tons.

VERONA MINING CO.

See Pickands, Mather & Co., Minnesota.

Office: Sellwood Bldg., Duluth, Minn.

Officials: C. H. Munger, gen. mgr.; W. P. Chinn, asst. g A. Rose, chief mng. engr.; W. H. Gallagher, chief mech. engr. rence, gen. supt., Palatka, Mich.; W. G. Hanson, Palatka, M Baltic, Bengal and Caspian mines; A. Matthews, Jr., Verona, of Mikado mine.

Property: the Baltic, Bengal and Caspian iron mines on range and the Mikado mine on the Gogebic range.

Mine	Depth feet	Men employed May, 1919	Tons, 1918
Baltic	653	Idle	166,882
Bengal	376	260	303,788
Caspian	389	365	346,028
Mikado	...	Idle	...

WAKEFIELD IRON CO.

Address: J. D. Ireland, Leader-News Bldg., Cleveland, Hunner, mgr., Duluth, Min.; W. C. Hart, gen. supt., Wak Sales agents, M. A. Hanna & Co., Cleveland, Ohio.

Property: the Wakefield mine, at Wakefield, Mich., on G Gogebic county, Mich., first opened in 1913. Ore: two grade "Andrews," a soft, red non-Bessemer hematite, carrying 52.50%; phosphorus, .073%, and silica, 3.62%; 2nd, the "Du brown to blue-black hematite carrying iron natural, 50.28%; .077%; silica, 4.08%, and manganese, 2.25%.

Mining is by open pit and by underground work to depth

Production: 1913, 15,260 tons; 1914, 313,050 tons; 1915, 1916, 1,061,730 tons; 1917, 1,144,411 tons; 1918, 1,130,432 tons. 183 tons.

WICKWIRE MINING CO.

Address: E. C. Bowers, Buffalo, N. Y. H. Duff, supt., Mich. J. M. Riddell, engr.

Property: the Virgil and Wickwire iron mines on the range, Iron county, Mich. **Ore:** yellow-brown and red-brown hematite, the former containing 51.04% iron, 0.396% phosphorus silica. Ore mined by sub-stoping to 250' in the Virgil and caving to 315' in the Wickwire.

Production:

Virgil	...	...
Wickwire	...	...

MINNESOTA

on ranges of this State supply 60% of the annual production e total for 1918 being over 43,000,000 tons. The Mesabi is rtant area; its ores are mostly soft and hydrated hematite d are found in shallow deposits in greenstone, but few mines feet deep. Some of the mines are very large, yielding an-00,000 tons each.

una range the iron-bearing formation rests on slate, under zite. Mining is done to a depth of below 1,400 feet. The lue and red hematites in part manganiferous. The two lat-luce over 1,500,000 tons each yearly.

INING CO. **MINNESOTA**

Sellwood Bldg., Duluth, Minn., R. M. Sellwood, mgr.

he Adriatic mine, on Mesabi range, St. Louis county, Minn.; **Ore:** soft, red, non-Bessemer hematite, containing 49.31% osphorus and 10.48% silica. Ore is mined by underground of 180'.

: 220,818 tons in 1916, which made a total of 1,041,268 tons.

NGANESE CO. **MINNESOTA**

an Iron Co.

erguson Bldg., Duluth, Minn. W. A. McClaren, mgr.

14, 1916. **Cap.**, $500,000. Reported Oct., 1917, that com-roperty to the Onahman Iron Co. for $530,000.

Algoma mine, in Sec. 33, T. 47, R. 29, Crow Wing county, ertical depth of 100', the ore averaging 29.13% iron, 19.50% % phos.

MANGANESE MFG. CO. **MINNESOTA**

e a consolidation of the Cuyuna-Mille Lacs Iron Co. and Iron Co.)

Bullitt Bldg., Philadelphia, Pa.

. E. Marshall, pres.; Wm. Selfridge, v. p.-sec.; W. H. with W. E. Arnold, Reiner Hoch, W. A. Powell, R. L. Tay-h, D. F. Bush and A. G. Dickinson, directors.

in Pennsylvania. **Cap.**, $6,000,000 common, and $6,000,000 red; par $50, all outstanding. In 1917, $1,250,065 com., and rred shares, also $1,021,000, 5% notes were issued to pay for e Costa Rica Manganese Mining Co. properties (see Vol. l debt, exclusive of above notes, outstanding on Dec. 31, ,287,634.

nanufactures products, such as ferro-manganese and man-

he Mille Lacs mine, Cuyuna range, Minn.; and several of mineral lands, including four developed mines producing in Costa Rica; also 375 acres of coal lands in Connellsville county, Pa.

Mille Lacs is a hard manganiferous, non-Bessemer hema-.31 to 40.02% iron, 8.96 to 21.22% manganese, 11.46 to 22% to 0.096% phosphorus, mined by underground methods to pth.

Lacs mine was closed down in Feb., 1919.

90,564 tons in 1916, which made a total of 203,137 tons.

N MINING CO. **MINNESOTA**

he Great Northern Iron Ore Properties, which see.

. Hunter, supt., St. Paul, Minn.

he Leonard mine on the Mesabi range. Ore is a non-ging 51.61% iron, 0.057% phosphorus and 5.51% silica. pit and underground methods to 253' depth. Leased in na Ore Mining Co.

Production: 316,589 tons in 1916; 305,416 tons in 1917; 7
1918. Total to date, 9,822,212 tons.

ASH IRON CO.

Office: Duluth, Minn. **Mine office:** Riverton, Minn.

Inc. in 1917, by W. B. Congdon, J. Wanless, C. A. Hu
Adams and K. Todd. **Cap.,** $500,000.

Property: operating the Congdon-Adams property in Sec
29, near Riverton, which is said to contain manganiferous or

BALKAN MINING CO.

Address: C. H. Munger, mgr., Sellwood Bldg., Duluth.

Officers: D. B. Cavan, supt., Belgrade mine, Gilbert, M
Leach, supt.; Danube mine, Bovey, Minn.; W. J. Pekins,
mine, Crystal Falls, Mich.

Property: the Belgrade mine, Mesabi range and the
Menominee range. In 1917 company acquired the Washoe
mile N. of Bovey, Minn., and N. E. of the Walker and Ca
Mesabi range, from the No. Pacific Ry. Co. Property was
Danube mine.

Production: see under Pickands, Mather & Co.

BANGOR MINING CO.

Controlled by Pickands, Mather & Co., Cleveland, Ohio.

Office: C. H. Munger, Sellwood Bldg., Duluth, Minn.

Property: Bangor mine on Mesabi range, opened in 191

Ore: soft, red, non-Bessemer hematite, assaying 49.39%
phosphorus, and 9.10% silica. Mined by underground slicing
tical depth.

Production: 223,576 tons in 1916 and 276,611 tons in 1917,
1,274,668 tons. Mine was idle in 1918-'19.

BENNETT MINING CO.

Is controlled by Pickands, Mather & Co., Cleveland, Ohi

Officers: F. P. Botsford, gen. supt., and A. E. Schneider,
Keewatin, Minn.

Property: the Bennett mine, formerly owned by the Keew
Co., in Sec. 24, T. 57, R. 22, Itasca county, Minnesota, devel
depth. The mine was opened in 1912. Product is a Besse
and a non-Bessemer hematite carrying about 2% manganese
employed 330 men in May, 1919.

Production (tons):

1913.....	88,931	1915.....	50,475	1917..	
1914.....	25,868	1916.....	672,572	1918..	

BUTLER BROS.

Address: 1002 N. Y. Life Bldg., Duluth, Minn.

Producers of Bessemer and non-Bessemer iron ore fro
mines on Mesabi range: Ann, Harrison, Kevin, Margaret, N
son, Patrick, Quinn and South Lamberton.

Analysis: Bessemer; 53-57% iron; 0.015-0.045% phosphoru
der 10%; non-Bessemer, 51.50% iron and silica under 10%.

Sales agent: M. A. Hanna & Co., which see.

CLEVELAND-CLIFFS IRON CO., THE

(See Cleveland-Cliffs Iron Co., Mich.)

The principal properties in Minnesota are:

Mine	Range	Mining System	Ore	Appr Iro
Crosby	Mesabi	Open pit and side slicing	Bessemer	Cont 56,89
Fowler	"	Open		
Helmer	"	Open		
Meadow				
Wade				

1918, the Helmer mine, near Buhl, St. Louis county, Minn., from Swallow & Hopkins, Chicago, Ill.

TWEED **MINNESOTA**

07 Lonsdale Bldg., Duluth, Minn.

explores, operates and is sales agent for mines in the Mesabi, Gogebic ranges in Minnesota and Michigan.

mber, 1919, company was interested in the following mines: , Julia, Hillcrest, Portsmouth and Townsite, producing Bes- on-Bessemer ores and mined by both open pit and under- g systems.

NE **MINNESOTA**

inney Steel Co., Mich.

RE MINE **MINNESOTA**

inney Steel Co., Mich.

MILLION AND EXTENSION CO. **MINNESOTA**

2 Sellwood Bldg., Duluth, Minn.

T. J. Walsh, pres.-treas.; J. M. Christie, v. p.; A. M. Oullette, dent, M. C. Williams and Angus Cameron, directors.

., 1911, in Minnesota. **Cap., $900,000; $2 par; $620,000** out- bonds. Stock transferred at Company's office. No dividend. consolidation of the Vermillion Steel and Iron Co. and the the Vermillion Steel and Iron Co. Operates under 50-year

estimated, June, 1917, 20,000 tons of ore in stockpile with f about 200 tons a day. Developed tonnage, claimed, 1917, tons at a depth of 440'. A sample from stockpile was said % iron and 0.76% manganese. No recent returns received.

S ORE CO. **MINNESOTA**

C. E. Hunner, gen. mgr., Fidelity Bldg., Duluth, Minn.

two mines, the Hanna "A" and the Hanna "B" on Mesabi ouis county, Minn.

-Bessemer hematite, assaying in "A", 48.80% iron, 0.064% nd 5.65% silica; in "B," iron 47.14%, .047% phosphorus and "A" mine is worked by open pit system to depth of 175'. ine ore is mined by a steam shovel in an open pit.

n: started on "A" 1909, and amounted to over 1,200,000 tons started 1913.

RON CO. **MINNESOTA**

d by Pickands, Mather & Co., Cleveland, Ohio. D. B. Gavan, Minn.

the Corsica mine, on Mesabi range, Minn., opened in 1901. , red Bessemer and non-Bessemer hematite, assaying 52.74 n, 0.043 to 0.056% phosphorus, and 7.76 to 7.27% silica. Mined nd slicing system to 248' vertical. Employed 225 men, May,

n: 384,692 tons in 1918, and a total of 2,725,252 tons.

NING CO. **MINNESOTA**

C. H. Munger, mgr., Sellwood Bldg., Duluth, Minn.; Robert supt., Hibbing, Minn.

Albany mine on Mesabi range, opened in 1903. Also leasing e from the Great Northern Iron Ore Properties.

yellow, non-Bessemer, soft, red Bessemer, and soft, blue, hematite, assaying from 46.81 to 53.52% iron, 0.015 to 0.047% nd 6.25 to 3.71% silica. Mined by milling and underground ts to 200' vertical.

See under Pickands, Mather & Co.

RON CO. **MINNESOTA**

luth, Minn.

$1,000,000; shares, $1 par, 756,000 out-

Property: iron-ore leases in Crow Wing Co., Minn. Re over by the American Manganese Mfg. Co., which see.

CUYUNA MILLE LACS IRON CO. M

Office: W. H. Locker, pres., 505 Lonsdale Bldg., Duluth,

Property: the Mille Lacs mine, on Cuyuna range, near I Wing county, Minn. **Ore:** hard, manganiferous non-Bessem Ore mined by underground system, to 205' depth.

Production in 1918, 175,000 tons.

Company reported merged into American Manganese Mfg see.

CUYUNA MINNEAPOLIS IRON CO. M

Office: Ironton, Minn. W. H. Fetzer, mgr.; P. C. Merrill,

Property: leased on S. W. ¼ S. E. ¼ sec. 23-47-29, k Ida May mine, on Cuyuna range, Minn. **Ore:** non-Bessemer a ferous showing 40% iron, 0.20% phosphorus and 16% manga mined by underground system.

Production: 20,000 tons in 1918, which was the first outp

FEDERAL CONSOLIDATED MINING CO. M

Office: 327 Palace Bldg., Minneapolis, Minn. L. F. Lamm purch. agt.

Property: the Ajax mine, near Biwabik, on Mesabi range, a non-Bessemer showing 58.46% iron, 0.08% phosphorus and ganese, is mined by underground system.

Production, to date, 200,000 tons, none in 1918. Compan ship 100,000 tons in 1920.

FEIGH MINE M

Address: Carl Zapffe, supt., Brainerd, Minn.

Property: on Cuyuna range, Crow Wing county, first ope is a subsidiary of the Northern Pacific Ry. Co. Ore is a hem

GORDON MINING CO. M

See Hill Mines Co. and Hillcrest Mining Co.

Office: Hill Bldg., Saginaw, Mich. **Mine address:** Crosb

Officers: A. B. Coates, pres.; R. R. Hill, v. p.; G. P. Tw treas.

Took over the Portsmouth mine, June, 1918, which was le plored by the Hill Mines Co.

Property: S. W. ¼ of S. W. ¼ Sec. 2-46-29, Crow Wing c

GORHAM-GARBETT CO. M

Office: 627 First Ave., Minneapolis, Minn.

Officers: J. Pye, pres.; S. H. Wood, v. p.; C. F. W. Carlso above with S. Bailey, S. F. Grover and R. W. McGarry, direct

Inc. January, 1908, in Minnesota. **Cap.**, $1,000,000; $ issued.

Dividends: 2% 1917, and 1918 5%.

Property: 360 acres of iron and manganese ore land on C Crow Wing county, Minn., all leased on royalty plan. Lessees Mtn. Mng. Co., Onahman Iron Co., Chas. W. Potts and asso

GREAT NORTHERN COPPER CO. M

Idle since 1911. **Office:** 504 Globe Bldg., Minneapolis, Mi Hinckley, Pine county, Minn. Fully described Vol. XI Copp

GREAT NORTHERN IRON ORE PROPERTIES M

Offices: First Nat'l Bank Bldg., St. Paul, Minn., and 52 New York City. G. R. Martin, comm.

Inc. Dec. 7, 1906. Is a trust created by directors and shareholders of the Great Northern Railway Co. Trustees: J James N. Hill, Ralph Budd and E. T. Nichols. Trust St. New York City. Bankers: Trust Co. on New York Stock Exchange.

Shareholders of the Great Northern Railway Co. [illegible]

stees of the Great Northern Iron Ore Properties, shares in ng companies, conservatively worth $1,738,400. Any divi- by the Allouez Bay Dock Co., or by Duluth, Superior & al Co., up to Dec. 31, 1912, were to be paid to the trus- ed by them to the uses of the trust.

rust was created, the trustees issued certificates of bene- nounting to 1,500,000 shares, to stockholders of the Great ., at the rate of one share of "Trustee's Certificates" for ock of Great Northern Ry. Co. The trustees' income has lends from stocks held and from interest earned. This inistration expenses, is distributed as dividends to holders Beneficial Interest.

ount—Years ended December 31:

pts, etc.	Administr. Expenses	Distr'n to cert. hold'gs	Bal. for yr.	Prev. Bal	Total Surpl.
725	$72,222	$6,000,000	$1,477,496(a)	$2,079,775	$602,279
958	101,366	2,250,000	2,260,408(a)	4,340,183(b)	2,079,775
548	89,663	1,964,663	213,884(b)	4,126,299(b)	4,340,183
rplus.					

by Trustees, December 31, 1918:

o.(a)	$50,000	Polk Iron Mining Co.(a)	$50,000
Co.(a)	50,000	Tyler Iron Mining Co.(a)	50,000
.(a)	12,000,000	Van Buren Iron Mg. Co.(a)	500
(a)	50,000	North Star Iron Co. of W. Va.(b)	587,900
.(a)	50,000	Leonard Iron Mining Co.(c)	100,000

(b) Over 90.6% of entire issue. (c) 50% of entire issue.

of the West Missabe Land Co., expired in 1917, and the ng Co., was organized June, 1917, to acquire its properties. olders of Certificates of Beneficial Interest received per 908 and 1909, $1 each; 1910, $1.50; 1911, 1912, 1913, 1914, 916, $1.25; 1917, $1.50; 1918, $4; April, 1919, $2; Oct., 1919, ber, 1919, $26,625,000.

et—Years ended December 31:

	1918	1917
	$7,862,488	$9,660,723
	4,994,847	5,107,501
	181,433	511,796
id leases	84,929,483	74,170,608
	3,675,623	4,150,422
ts	1,053,905	702,248
., org. exp.	36,144	13,269
e	978	.....
	$102,734,911	$94,316,568

	1918	1917
	$12,988,400	$12,988,400
s	638,466	633,442
rs	1,135,006	715,162
	87,973,039	79,979,565
	$102,734,911	$94,316,568

,091 acres of iron ore land in the Mesabi district, Minn. ade in 1917 and in previous years, the proprietary com- ised of their developed mines, except interests in the and Walker mines, now idle. The principal leases were

with the Interstate Iron Co., a subsidiary of Jones & Laug
and with the Hanna Ore Mining Co. The Interatate Iron
3 mines, the net royalties ranging from 30c to 75c per ton o
the 1918 minimum was 924,000 tons. The Hanna Ore Mng. C
10 mines, and royalties range from 40c to $1.15 a ton.
mining operations on an increasing scale each year. Since
proprietary companies have withdrawn from active mining o

Production—shipments and receipts are as under:

From Old Leases:	1918	1917	1916
Shipments, tons	2,734,678	3,284,469	3,207,0
Receipts	$392,680	$505,506	$562,7
From Arthur Iron Mining Co.: (a)			
Shipments, tons		150,996	617,2
Receipts	$127,385(b)	$308,771	$544,9
From New Leases, 1913 and subsequent years:			
Shipments, tons	3,136,749	2,247,634	1,215,7
Receipts	$1,817,207	$1,637,051	$984,9

(a) includes the following mines: Harold, Leonard, Nor
Uno, Thorne and Wentworth. All business of a general ch
ried on in the name of Arthur Iron Co., which company
the agent of each of the other proprietary companies in
finance and operation.

Mining operations by the Arthur Mining Co. ceased Ju
account of its having leased all its operating properties.
had on hand in stock piles, 1,380,082 tons of ore to be dispos
388,412 tons, and in 1918, 633,913 tons were disposed of from
by lessees, which yielded $646,501 and $1,340,770 respectively

(b) receipts are additional on account of ore sold in prev

HALE DEVELOPMENT CO.

Office: 408 Exchange Bldg., Duluth, Minn.

Officers: F. A. Day, pres.; A. E. Brown, v. p.; H. W.
treas.

Inc. in Minnesota. **Cap.**, $150,000; $10 par; 5,000 share
holding corporation.

Dividends: at rate of 50c per share, quarterly. On A
an extra dividend of 10c per share was paid. Company had n
in 1917. Later returns unavailable, as "company has a dor
position and does not care for any notices."

Property: 360 acres on Cayuna range, Crow Wing coun
80 acres have been thoroughly explored, which portion is
Wilcox mine. These 80 acres have been leased on a royalt
Division Co. of Minneapolis, Minn. The Minnesota Stage T
estimates these 80 acres to have 937,811 tons of iron ore.

HALE MINE

Name ch[illegible] Mine added in

HANNA & CO.

See same

HANNA ORE [illegible]

Office: Duluth

Officers: F. [illegible]
Mesabi; F. H. Colon[illegible]
of the M. A. Hanna [illegible]
Buhl, Virginia, Hibbing and [illegible]

The mines included in [illegible]
L. & W. Enterprise, Harold,
No. 1, Wabigon No. 2, and Tim[illegible]

	1918 tons	1917 tons	Total tons (a)
.....	279,987	146,485	1,807,334
.....	29,484	75,024	204,436
.....	.....	.....	609,528
.....	737,674	305,416	9,922,212
.....	.....	.....	.....
.....	12,576	12,792	72,849
.....	.....	.....	.....
.....	1,892	.....	1,318,216
.....	17,650	.....	1,251,403
.....	.....	.....	.....
.....	15,549	.....	15,549

ere leased to Hanna Ore Mining Co. in 1917; the total des tonnage mined under Great Northern Ore Properties

E **MINNESOTA**

own as Hale Mine, located on Mesabi Range in Sec. 1, T. uis county, Minn. First opened 1893. Produced total of losed down 1911. Produced soft, yellow, non-Bessemer exhausted.

N MINE **MINNESOTA**

ned by Swallow & Hopkins, Duluth, Minn., sold 1918 to ron Co., which see.

s: Kinney, St. Louis county, Minn.

,498 tons of iron ore in 1918.

INING CO. **MINNESOTA**

nes Co., and Garden Mining Co.)

Bldg., Saginaw, Mich. **Mine address:** J. W. Van Evera, nn.

B. Coates, pres.; R. R. Hill, v. p.; G. P. Tweed, sec.-treas. ¼ S. E. Sec. 9-46-29; W. ½ N. W. ¼ of S. W. ¼ Sec. 10 ¼ of N. W. ¼ sec. 10, T. 46, N. R. 29 W., Crow Wing 1919, company took over the Hillcrest mine on Cuyuna perated by the Hill Mines Co., Minn., first opened in 1918. it, red, non-Bessemer hematite, assaying 50.59% iron, 0.208 4.80% silica.

: by open pit and hydraulic stripping.

approximately, 320,000 tons to Jan. 1, 1919; most of this in 1917 and 1918.

CO. **MINNESOTA**

Bldg., Saginaw, Mich.

er R. Hill, pres.-treas.; J. G. Williams, v. p.; J. J. Quinn,

1914, in Maine. **Cap.**, $5,000,000, increased in 1917 from $1,177,840 issued.

ron mines, one on Cuyuna range, near Crosby, the other Mesabi, near Aurora, Minn. Ore is hematite in schist, in a to be 200' wide. Average assays, 58% dry, 50.58% natural. uth mine formerly leased to this company was taken over, e Gordon Mining Co., and the Hillcrest mine was taken rest Mining Co., April, 1919.

ncludes 2 compressors, pump, 2 steam shovels, electric motives.

MINING CO. **MINNESOTA**

Duluth, Minn.; D. R. Cavan, Gilbert, ... Pickands, Mather & Co.,

in 1889, and the

LIBERTY MINING CO.

General office: 106 Providence Bldg., Duluth, Minn.
ton, Minn.

Officers: M. L. Fay, pres.; C. E. Schulze, v. p.; G.

Inc. 1917, in Minnesota. **Cap.**, $100,000; $100 par.

Property: the Bonnie Belle iron mine, near Ironto
Minn., producing a high-grade non-Bessemer ore, assaying
phosphorus and 0.66% manganese.

Production: in 1918, 1,636 tons; to Sept., 1919, 33,27
ships by rail to Duluth, Minn.

LONGYEAR, E. J. & CO.

Office: Minneapolis, Minn.

Principally an exploration company. Owns the orebo
Park, near Hibbing, Mesabi range, Minn. and had drills
testing the orebody. Company owns the Mace No. 2 m
operated by Butler Bros. from which 250,000 tons annually
pany also has a large tract near Sudbury, Ont., on which
exploration by diamond drilling proved up an orebody of
7,500' long, and 10'-120' thick in a mineralized zone 11,200'
ing downward to a maximum depth of 1,000'.

LYCOMING CO.

Office: 708 Lonsdale Bldg., Duluth, Minn. Was a
company. Inactive and no assets.

MACE IRON MINING CO.

Office: 709 Security Bldg., Minneapolis, Minn.

Officers: R. M. Bennett, pres.; O. B. Warren, sec. an
MacKillican, supt., Hibbing, Minn. Pickands, Mather
Ohio., sales agents. Operated as a close corporation.

Property: Mace No. 1 mine on Mesabi range, in
Minn., producing a high grade, direct shipping. Besse
developed by shaft 120' deep, operated by steam hoist.

Mace No. 2 mine, on Mesabi range, in Itasca county,
high grade, concentrating Bessemer iron ore, and devel
system, worked with steam shovels and locomotives, etc.

Production: Mace No. 1, 1915, 120,888 tons; 1916,
122,500 tons; 1918, 66,405 tons. Mace No. 2, 1916, 307,496
tons; 1918, 247,590 tons. Ore from Mace No. 2 is concen
Plant.

MAHNOMEN MINING CO.

Address: Clement K. Quinn, 1107 Alworth Bldg.,
P. Scollon, supt.

Property: on the Cuyuna range, first opened in 191
from 40 to 57.5% iron, and 0.8 to 14% manganese. Mini
derground (250' deep) and open-pit methods.

Production: 800,000 tons in 1918.

MAHONING ORE AND STEEL CO.

Office: W. C. Agnew, Hibbing, Minn.

Property: Mahoning mine on Mesabi range, Minn.

Ore: soft, blue Bessemer and soft brown non-Besse
taining 57.18% iron, 0.052% phosphorus, and 2.50% silica
pit system to 200' vertical depth.

Production: 2,215,768 tons to 191
in 1917, 2,021,976 tons; 1918,
MANGAM IRON & STEEL CO.

80 acres, including Mangan mine on Cuyuna range, Minn., ganiferous ore, containing 40% iron, 0.150% phosphorus and e. Developed by two shafts, 200' deep.
: 2 hoists, compressor, 3,000-gal. pump.
: 1917, 50,000 tons, 15% manganese; 1918, about 75,000 tons, se. Company reports ore reserves of 500,000 tons. Mine ay, 1919, waiting improved market conditions.

TEEL CO. **MINNESOTA**
Michigan.

MINING CO. **MINNESOTA**
sby, Minn. Said to be controlled by the John A. Savage Co. operates the Croft mine, near Crosby, Cuyuna range, Minn. ft, reddish blue Bessemer hematite assaying 54.61% iron, orus and 9.21% silica.
was reported, that company had taken a lease and option on on ore lands, near the Croft mine. Fee owners said to be n and J. G. Williams, of Duluth, Minn. and B. McGoffin, of nn.

EVELOPMENT CO. **MINNESOTA**
Plymouth Bldg., Minneapolis, Minn. Franklin W. Merritt, mgr.
operating Merritt mines, No. 1 and No. 2, in Cuyuna range, ng manganiferous ores showing 25 to 40% iron, 0.080% phos- o 25% manganese. Ore is mined by underground method.
can produce 150,000 tons of ore per year that will average iron and manganese.

N CO. **MINNESOTA**
ayden, Stone & Co., 25 Broad St., New York; and 808 Sell- uluth, Minn.
harles Hayden, chairman of directors; D. C. Jackling, pres.; n, W. E. Corey, P. A. Rockfeller, C. M. MacNeill, Sherwood Smith, A. C. Dinkey, S. W. Mudd, H. V. Winchell, K. R. Swart (metallurgist) and J. C. Agnew, directors. Dwight , cons. eng.
Cap., $3,000,000 of 8% cumulative convertible preferred r. and 150,000 common shares of no par value. No public e made until property is at productive stage.
nds carrying low-grade iron-ore (magnetite) deposits in the the Mesabi range, Minnesota.
investigations were started in 1913, and by 1915 a syn- ied to drill, develop, and make metallurgical tests on the concentrating plant was completed at Duluth by mid-1916, ntil the end of 1918, producing several thousand tons of concentrate, desired by smelters. The Syndicate has spent work, and finds that the problems resemble those of the orphyry) copper deposits. A 3000-ton daily mill is being mines on a branch of the Duluth & Iron Range Railroad, to start marketing an agglomerated concentrate, carrying w in phosphorus, early in 1921.
to be a big and sane project, backed by men experienced of low-grade copper and gold ores, and is not likely to t befell the Edison process in New Jersey and Norway.

UNA IRON LAND CO. **MINNESOTA**
llwood Bldg., Duluth, Minn.
Murray, pres.; C. W. Stilson, v. p.; P. L. DeVoist, sec.; W. H. Patten, directors.
$250,000; $1 par; outstanding, $218,084.
ranges, in St. Louis, Cook, lease to various com-

panies. No ore has been mined, but company received $11,750 on "minimum output" basis. Lands contain manganiferous a Developed by 150′ shaft.

MONTREAL MINING CO. M

Office: E. W. Hopkins, mgr., Ironwood, Mich.

Ore: soft, red Bessemer and non-Bessemer hematites, ass iron, 0.041% phosphorus and 6.48% silica. Mined by slicing method to 2,300′.

Productions: 530,813 tons in 1916 and a total of 4,662,938 No recent returns available.

MUTUAL IRON MINING CO. M

Office: 519 Providence Bldg., St. Paul, Minn. **Mine office** supt., McComber, Minn.

Officers: J. Coates, pres.; G. H. Rowe, v. p.; J. L. Dorsey, B. Schultz, treas., with E. O. Olund, A. H. Beyers, M. C. Miller, I. F. Green, J. C. Houck and W. D. Limeman, director

Inc. in Minnesota. **Cap.,** $350,000; $1 par; outstanding 33

Property: leased on the McComber mine, in St. Louis c sub-leased September, 1918, to the National Mining Co., which

NATIONAL MINING CO. M

Address: McComber, Minn.

Officers: C. A. McCann, pres.; A. F. McBride, v. p.; C. S. J. B. Sullivan, sec.-mgr, with J. Hicks, directors.

Inc. 1918, in Minnesota. **Cap.,** $500,000; $1 par; all outst

Property: leasing the McComber iron mine, in St. Louis c developed by shafts 250′ and 400′ deep and by 700′ of tunnels.

Equipment: includes steam hoist, compressor and tramwa

Company recently commenced shipping; output to date tons of 60% ore.

NORTH AMERICAN IRON MINING CO. M

Ground transferred to a new company 1918, this compa $300,000 for a controlling interest.

Property: 160 acres, adjoining Minnesota mine, at Souda veloped by a 400′ concrete shaft with about 1,300′ of working formation had not been cut, but the shaft workings are in qua 25,000 tons on the dump said to have assayed $10 in gold and $1 ton.

Equipment: included machinery and machine shop that C. M. Simpson, of Shawnee, Okla., writes that fully $250,000 ha in development and equipment.

NORTHERN MINNESOTA ORE CO. M

Office: Deerwood, Minn.

Officers: C. W. Potts, pres.; L. Peterson, v. p.; C. M. Far treas.; with C. E. Updike, H. M. Miller, A. Murry, John Berg a ingsley, directors. A. K. Knickerbocker, supt., Cuyuna, Minn.

Inc. March, 1917, in Minnesota. **Cap.,** $700,000; $1 par; $460,000.

Property: 12 fee interests, totaling 520 acres, and leases known as Northland mine, 2 miles north of Cuyuna on Cuyuna **Ore assays:** from Northland No. 1, iron, 36.30%, 0.140 phosph manganese and 12% silica; Northland No. 2, iron, 40%, phosp manganese 14% silica 12%; Northland No. 3, iron, 54.10%, phosp manganese, 1% and silica 10%.

Development: by shaft 200′ deep and 200′ of workings. top slicing and selective stoping on manganese ore.

Equipment: includes two hoists, compressor and pump. pected to start shipping in 1919.

OLIVER IRON MINING CO. M

Company, a subsidiary of the U. S. Steel Corporation, is a clos owning, controlling and operating mines in Michigan, Minnesota, a

lvin Bldg., Duluth, Minn.
. J. Olcott, pres.; P. Mitchell, v. p.; G. D. Swift, sec.-treas.; enl. mgr.; O. C. Davidson, gen. supt., Eveleth, Minn.; L. D. Davenport; L. R. Salsich, mgr., Western Mesabi district, Hibbing, Mich.; gen. supt., Coleraine district, Minn.; F. R. Mott, genl. supt., Minn.; W. W. J. Croze, geologist.
: in season of 1918, was 338,344 tons from Marquette range; om Menominee range, Mich.; 1,916,220 tons from Gogebic range, tons from Vermilion range, Minn.; and 21,461,223 tons from Minn; a total of 25,671,908 tons. In 1917, the production was 1916, 29,927,767 tons; 1915, 21,079,224 tons; 1914, 14,586,454 tons; tons.

perated, include: Range	Ore Bessemer or non-Bessemer	Content Dry Iron, 1918 %	Production 1917 Tons	1918 Tons	Total Tons
Menominee	B. & n-B.	57.94	301,934	296,426	8,116,478
"	"	52.68	715,001	735,950	21,510,747
"	n-B.	54.61	11,740	114,751	3,472,343
Gogebic	"	60.87	20,557	1,943	145,446
"	B. & n-B.	63.36	122,193	114,472	412,560
"	n-B.	57.59	5,772	29	94,933
"	B. & n-B.	58.61	1,633,503	1,483,545	36,892,419
"	"	60.31	248,146	182,527	1,228,069
"	B.	60.72	48,897	17,208	110,594
"	B. & n-B.	58.67	120,496	116,496	6,162,043
Marquette	"	56.75	294,449	288,133	17,282,289
"	n-B.	.....	67,242	.....	8,195,123
"	"	.....	30,325	.....	418,417
A. Right of					
"	"	59.08	99,744	50,211	350,852
Vermillion	B.	61.85	332,182	273,633	10,977,002
"	B. & n-B.	64.26	193,834	155,626	2,925,156
"	n-B.	64.77	145,338	140,707	9,211,158
"	B.	61.86	368,453	239,028	5,514,532
Mesabi	B. & n-B.	59.19	1,549,658	1,096,406	21,033,510
"	"	58.02	314,073	295,546	609,619
"	"	58.80	695,663	749,884	15,648,741
"	"	55.22	1,648,226	1,426,465	13,428,652
"	.....	.....	.....	12,401	12,461
"	B. & n-B.	55.11	354,979	331,964	797,352
"	"	61.17	367,725	326,097	6,510,794
"	"	59.43	268,087	198,154	6,423,348
ass)	"	.....	4,735	.....	7,923
"	"	52.95	111,866	60,668	347,511
"	"	53.62	.....	.....	88,701
"	"	59.28	2,022,816	1,393,589	28,998,857
"	"	57.74	171,504	181,224	8,698,241
"	"	59.62	443,446	618,571	3,917,345
"	n-B.	.....	238,904	.....	1,155,327
"	B. & n-B.	58.03	310,264	954,154	1,385,436
"	"	55.28	835,464	736,551	6,792,969
"	"	60.18	6,468,483	5,485,715	42,312,566
"	"	.....	50,278	.....	634,137
"	"	62.72	1,586,409	2,027,589	4,153,671
ass)	"	.....	448	.....	988,487
"	B. & n-B.	58.27	782,343	664,605	4,182,515
"	n-B.	46.80	.....	4,106	2,211,119
"	B. & n-B.	58.79	62,931	1,173,311	4,109,649
"	.....	.....	1,980	.....	162,374
"	B. & n-B.	54.47	.....	.....	2,832,658
"	"	56.12	1,605,701	1,944,558	14,150,141
"	"	58.30	38,685	9,114	1,610,155
"	"	57.13	126,121	74,853	6,469,786
"	"	59.53	383,968	100,517	880,076
"	n-B.	58.15	.....	519	706,794
"	B. & n-B.	55.28	230,572	191,517	575,553
"	"	56.70	605,223	511,918	9,342,812
espass)	B.	60.80	.....	747	747
Trespass)	"	60.80	.....	274	274
"	B. & n-B.	58.05	1,575,057	865,211	8,636,782
"	"	.....	1,841	.....	1,841
"	"	54.44	193,392	123,348	552,242
"	"	57.19	369,117	577,565	10,257,759
"	"	55.70	186,721	182,009	596,995
"	"	56.06	80,639	42,468	320,575
"	n-B.	.....	12,889	.....	758,089

driving a 10" two-stage centrifugal pump for the clear water, pipe and a 250 h. p. motor driving a 12" two-stage centrifugal sa

Production: in 1919, about 1,300 tons daily. In 1918, 109 to date, 687,120 tons.

PROVIDENT IRON CO.

Office: Duluth, Minn.

Officers: W. D. Edson, pres.; Herbert Warren, v. p.; T treas., with W. B. Dunlop and D. J. Curry, directors.

Inc. 1913, in Maine. **Cap.,** $150,000; $10 par; 11,700 ou

Property: a lease on 280 acres of iron lands on the Minn. The deposit of 58% ore, estimated to contain 1,500,000 t and schist. No recent returns available.

QUINN, CLEMENT K. & CO.

Office: Alworth Bldg., Duluth, Minn.

Officers: C. K. Quinn, pres., Duluth, Minn; E. P. Crosby, Minn.

Property: the Quinn mine, on the Mesabi range, in Se 22, Itasca county, is worked by underground steam shovel and o The product is Bessemer and non-Bessemer hematite.

Recent production: 49,251 tons in 1914; 91,007 tons i tons in 1916, and 800,000 tons in 1918.

REPUBLIC IRON & STEEL CO.

See same title in U. S. section of this volume.

ROGERS BROWN IRON CO.

Address: W. C. Agnew, mgr., Hibbing, Mich.

Property: the Susquehanna iron mine, on the Mesab Opened in 1906.

Ore: Bessemer and non-Bessemer, assaying 48-50% ir stripping method.

ST. JAMES MINE

See McKinney Steel Co., Mich.

ST. PAUL MINE

See McKinney Steel Co., Mich.

SEAFIELD EXPLORATION CO.

Office: Ironton, Minn.

Officers: Wm. Seafield, pres.; H. M. Stetson, sec.-treas.

Inc. March, 1908. **Cap.,** $8,000; $100 par.

Company does exploration work only.

SHADA MINING CO.

Address: 1197 Alworth Bldg., Duluth, Minn. C. K. Q

Property: the Shada iron mine, Sec. 2, T. 56 N. R. 23 range, Itasca county, Minn., carries a soft red Bessemer hem 54.01% iron, 0.036% phosphorous and 7.28% silica. The washe concentrators assays 59.35% iron, 0.04% phosphorous and 8% was reported in 1917, to be operating the Pierson mine in Sec. Mesabi range, Itasca county, which carries a soft brown Be Mine had been idle since 1913.

Operates by steam shovel methods at the Shada; slicing an at the Pierson.

SECTION THIRTY MINING CO.

Address: Sellwood Bldg., Duluth, Minn.

Officers: G. A. St. Clair, mgr.; H. G. St. Clair, supt.

Property: iron mine in the Vermillion range, Lake coun is a hard, blue Bessemer and non-Bessemer hematite, containing iron, 0.044 and 0.080% phosphorous and 7.13 and 11.14% sil Ore is crushed, and cargo analyses show 63% iron in Bessem non-Bessemer.

Worked by open pit and sub stoping methods to 650' vertic

Production: 468,525 tons from 1909 to 1916. No rec tainable.

FURNACE CO. **MINNESOTA**

E. J. Maney, Pittsburgh, Pa.

Shenango, Tioga, Webb and Whiteside iron mines, on Mesabi county, opened in 1904, 1916, 1905, and 1910, respectively.

ur produce soft, brown Bessemer and non-Bessemer hema- 53.23, 50, 53.52, and 50.85% iron; 0.041, 0.039, 0.051, and 0.088% nd 4.75, 10.97, 6.13, and 7.49% silica, respectively. Ore is mined and open-pit methods to 300′ in the Shenango; underground to ga; underground and stripping to 250′ in the Webb mine, and 250′ in the Whiteside. Company also owns the South Tener eloped property.

: company's average annual production is 1,100,000 tons. In Shenango was reported closed.

NDLER MINE **MINNESOTA**

. M. Pattison, lessee, Sellwood Bldg., Duluth, Minn. W. J.

an iron mine on Vermillion range, St. Louis county, Minn., d in 1888, abandoned 1905 and reopened 1913, mainly working worked.

Bessemer crushed hematite, containing 54% iron, 0.042% d 8.3% silica.

licing system, to 800′ vertical.

MINE **MINNESOTA**

ey Steel Co., Mich.

NES CO. **MINNESOTA**

I. H. Bradt, mgr., 207 Fargusson Bldg., Duluth, Minn. A. t.

ssolved 1918, and all assets taken over by the Oneida Mines Co. the Sultana comprised the first directorate of the Oneida. The a reorganization, cutting down the outstanding stock to one- da Mines Co.

he Sultana and Clark iron mines on Cuyuna range, Crow inn.

INING CO. **MINNESOTA**

H. Munger, mgr., Sellwood Bldg., Duluth, Minn.; W. P. ckands, Mather & Co., sales agents, Cleveland, Ohio.

he Hudson mine, on Mesabi range, St. Louis county. **Ore:** on-Bessemer hematite, assaying about 49% iron, .075% phos- % silica. Mined by open pit system to 110′.

about 1,500,000 tons since 1910.

UGH CO., THE **MINNESOTA**

A. Thompson, v. p., Cleveland, Ohio. J. S. Lutes, mgr. for ines. Sales agents for the following iron mines:

ange	Mining System	Ore	Iron Content %	Production* Tons
esabi	Open pit	Bessemer and non-Bessemer	55 to 50 / 52	428,944
sabi	Open pit	Bessemer and non-Bessemer	51 / 50	797,933 / 600,000
sabi	Open pit	non-Bessemer	50	623,556
sabi	Underground		50	44,940
sabi	Underground	non-Bessemer	49	104,710
yuna	Open pit	non-Bessemer	51	206,085
sabi	Open pit	non-Bessemer	52	300,000
nominee	Underground	non-Bessemer	51	225,000

te 1918 production.

, opened in 1893, has produced 11,559,883 tons; the Dean- 048,250 tons; the Morton, in 1912, 139,430 tons; the North Eddy, ons; the Zimmerman was opened in 1907 by the Spring Valley

Iron Co., and was taken over by the Tod-Stambaugh Co. in 191
tion to December, 1918, about 3,000,000 tons.

UNION ORE CO.

Address: Youngstown, Ohio. F. H. Webb, mgr.; Willia

Property: the Union mine, on Mesabi range, St. Louis
two grades, soft red and blue Bessemer and non-Bessemer he
43 to 55.50% iron, .040 to .070% phosphorous and 9.10 to 10.60%

Production since 1900, when first opened, over 1,800,000 ton

WAWBECK MINING CO.

Office: Alworth Bldg., Duluth, Minn. C. K. Quinn, pre

Company has warehouse, engine and boiler houses, office
shop at its newly acquired mine near McKinley, Minn.

WHITE IRON LAKE IRON CO.

Office: 526 Manhattan Bldg., Duluth, Minn.

Officers: J. P. Labrec, pres.; Jos. Trudel, treas., with C
P. Teepoorten, Jos. Lafortune, R. Hoch, directors. R. Bellepe

No details of property or production received as yet.

WILCOX MINE

Owned by Hale Development Co., Minnesota, which see.

WISCONSIN STEEL MINES

Owned by the International Harvester Co. **Office:** 606
Chicago, Ill. Mine office: Nashwauk, Minn.

Officers: H. F. Perkins, gen. mgr.; B. W. Batchelder, g
Williams, chief eng.; W. B. Edgar, purch. agt.

Property: the Agnew mine at Hibbing; the Hawkins
wauk; and the Sargent mine at Keewatin, Minn.

Agnew Mine: on Mesabi range, opened in 1902, and co
red, non-bessemer hematite assaying 58.34% iron and 0.057
Mined by underground system.

Production: 1918, totaled 97,933 tons.

Hawkins Mine: on Mesabi range, near Nashwauk. Fir
Ore is a Bessemer hematite, assaying 58.73% iron, and 0.140
Mined by open pit system to about 200' depth.

Production: in 1918, 613,325 tons; to date, 5,549,931 ton

Sargent Mine: on Mesabi range, near Keewatin. Firs
Ore is a non-Bessemer hematite, assaying 57.61% iron and 0.06
Underground mining system used. The property has been explo
drilling which showed ore estimated at 10,000,000 tons. A 4-co
180' deep, is planned.

WISTAR MINING CO.

Address: McKinley, Minn. C. K. Quinn, mgr.

Operating 40 acres, known as the Wistar mine, near M
range. Property explored 1917, and development started in 1

YORK IRON MINING CO.

Office: Nashwauk, Minn.

Officers: A. B. Coates, pres.; G. P. Tweed, sec.-treas
mgr.; John Sandberg, supt.

Property: the York mine, on Mesabi range, containin
non-Bessemer hematites. Ore mined by open pit system, shows
.07% phosphorous and 7.7% silica.

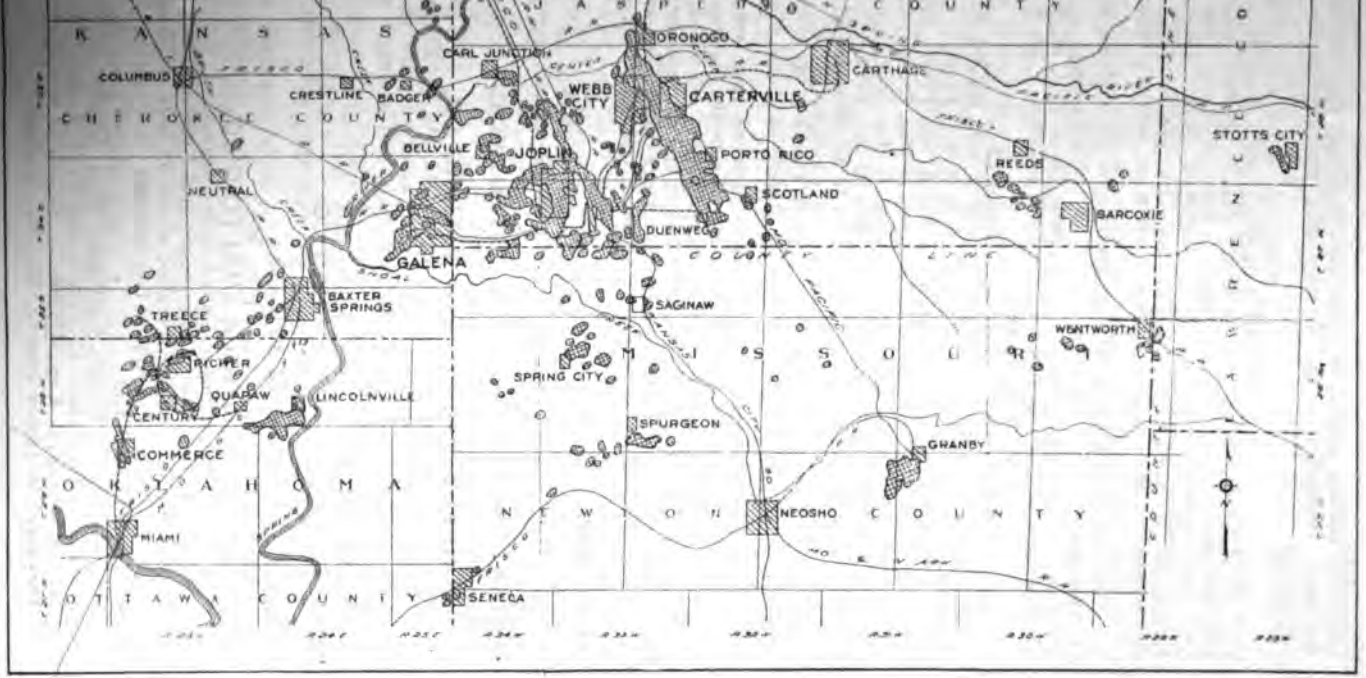
Development started 1917; no production figures received.

MISSOURI

The State contains two distinct metalliferous districts, o
and the Southeastern regions. These are described independent

JOPLIN DISTRICT

Joplin, in southwestern Missouri, is the center of a distri
sq. miles, partly in Oklahoma and Kansas. The ore deposits a



MAP OF AREAS WHICH HAVE PRODUCED ZINC AND LEAD ORES IN THE JOPLIN, MISSOURI, DISTRICT OR TRI-STATE REGION.

paratively shallow depths, in chert and limestone, the ore ca
and lead. Production of the Missouri field, according to the
Survey, is:

	Soft ground			
	1916	1917	1918	1916
Crude ore, tons	4,711,700	3,447,850	1,710,990	8,848,700
Zinc, per cent	1.70	1.99	2.30	1.86
Lead, per cent	0.22	0.25	0.32	0.23
Lead in concentrates, per cent	78.00	76.10	77.40	78.50
Zinc in concentrates, per cent	58.10	58.20	58.00	59.20
Lead concentrates, per ton	$82.00	$97.94	$87.35	$85.02
Zinc concentrates, per ton	77.94	69.50	52.71	86.02

Publications describing mining practice in the district in

Subject	Author	Publication
Geology	H. A. Buehler	Bull. 130 of A. I. M. E.
Ore treatment	C. A. Wright	Bull. 130 of A. I. M. E.
"	R. W. Johnson and C. E. Heinz	Joplin Globe
"	Temple Chapman	Eng. & Min. Jour
Markets	Otto Ruhl	Min. & Sci. Press
"	Otto Ruhl	Min. & Sci. Press
General	H. W. Kitson	Eng. & Min. Jour
"	A. E. Bendelari	Eng. & Min. Jour
"	T. A. Rickard	Min. & Sci. Press
"	L. V. Rice	For R. W. Hunt & Co., of Chicago
"	C. A. Wright	Bull. 154 of U. S. Bureau of Mines

Little information of value has been obtained from min
State, despite repeated requests for same. From the figures
seen that, in the aggregate, an enormous quantity of work has
field. Owing to the lack of a market for lead and zinc concentr
mines closed down and others merely kept mines open. The ou
55,692 tons of blende, 12,135 tons of calamine, and 6,715 tons o
$3,169,140.

ACME MINE

Address: S. L. Hurlbut, owner, Houston, Texas.

Property: a mine on one of eight 40-acre tracts in th
near Joplin, mined to depth of 195'.

ADAMS-HICKS LEAD & ZINC CORPORATION

Address: B. D. Adams, Joplin, Mo.

ADIRONDACK MINING AND MILLING CO.

Mail returned from W. 11th St., Joplin, Mo. W. H. Rober
Inc. 1916, to operate a lease on 20 acres of mineral
the City of Joplin. Developed by 200' shaft, and equipped w

ADMIRALTY ZINC CO.

Address: Cosgrove Bldg., Joplin, Mo.

AMALGAMATED ZINC & LEAD CO

Out of business, August, 1918. See Vol. XIII

AMERICAN ZINC & SLATE CO.

Address: A. B. Barnes, Joplin, Mo.

AMERICAN ZINC, LEAD & SMELTING

See same company under Granby, Mo.

Address: E. J. Young, Joplin, Mo.

Production: at Carl
City 230 tons.

ANALEE MI

Address:

Pollard, M

Inc

Pr

MINE **MISSOURI**

: I. L. Burch, Joplin, Mo.
y: at Stinsonville, Mo. Idle from 1907 to 1918.

IS LEAD CO. **MISSOURI**

: A. J. Meir, mgr., Annapolis, Mo.
al shareholders: F. M. Strickland, St. Louis, Mo.; D. G. Cook ana of Vessie, Mo., and J. A. Nolan of Webster Groves, Mo. Missouri. **Cap.,** $2,500,000.
y: on the Missouri Pacific R. R. near Annapolis, in Iron county. $50,000 is said to have been spent up to March, 1919. In November, ur line was constructed and a shaft was to be sunk to open the lead by 79 drill-holes. A 500-ton mill is contemplated.

MINING CO. **MISSOURI**

s: W. J. Forbes, mgr., Sarcoxie, Mo.
ty: a lease on 140 acres, 5 miles west of Sarcoxie. A plant to ling and a 350-ton mill were proposed at last accounts.

C MINING & SMELTING CO. **MISSOURI**

s: Webb City, Jasper county, Mo. Charles T. Orr, pres. and James B. Millar, treas; C. A. Rice, supt. Is under same control as nd Wingfield companies. Formerly operated under name of Gopher .
ty: 100 acres of the Jasper County Royalty Co.'s land at Duen- in 1915; purchase price said to be $150,000. Lead-zinc ore occurs in d at depth of 240'.
pment: by seven 240' shafts. **Equipment:** includes a 1,500-ton g mill and a smelter at Fort Smith, Arkansas.
tion: 402 tons of blende per week in Feb., 1918.
vns the Oronogo Mutual mine acquired from the Waring family in 1918, consisting of 40 acres of zinc-bearing land, and including the mine on the Elliott land, the Hockaday tract, purchased from the . L. & Sm. Co.; also mining rights on city lots at Oronogo. The is developed by 2 shafts, 165' and 170' deep.
nent: includes 16 air drills, 2 electric hoists, 2 compressors, also 500-ton electrically driven concentrating plant with 2 sets of jigs, and 11 tables, and a steam power plant consisting of 2 boilers, con- ine, and 2,600 cu. ft. compressor.
tion begun the latter part of 1914, was at the rate of 113 tons of 87 tons of lead concentrate per week in 1918.

INING CO. **MISSOURI**

existence. See Vol. XIII.

MINING CO., INC. **MISSOURI**

s: W. 7th St., Joplin, Mo.
s: W. O. Cragg, pres. and mgr.; Bert Lease, mine supt.; Jason supt.
Maine. **Cap.,** $500,000.
ty: 280 acres at W. 7th St., Joplin, in center of sheet ground re carries [illegible] and lead. The deposit is 12' thick. Five shafts 195'.
ment: [illegible] of 350 tons capacity per 24 hours; [illegible] land on the south end.
[illegible] reported to have sold 2,435 tons of [illegible] and 477 tons lead ore for [illegible] Lead concentrate assays

MISSOURI

[illegible] M. Boyd, Mo.,

Property: a lease on land near Chitwood, Mo., and at
A 250-ton mill was to be built, at last accounts.

BARNETT MINING CO.

Judgment of $174,000 rendered against this and other defen
of R. R. Conklin of New York, on ground of misrepresentation
Porto Rico No. 1 mine, near Duenweg.

BEN B. MINING CO.

Address: Box 271, Joplin, Mo.

Officers: O. Longacre, pres. and mgr.; B. W. Brice, v
G. J. Hiatt, sec.-treas.

Inc. Oct. 25, 1917, in Missouri. **Cap.,** $30,000; increased
to $50,000.

Property: 80 acres, 2½ miles W. of Joplin, on 7th Street,
is 20' thick, opened to 145' depth and carries 8% zinc.

Equipment: 150-ton mill with crusher, rolls, 2 jigs, table
gines.

BERTHA A MINING CO.

Address: Chas. T. Orr, pres. and gen. mgr., Webb City,
Millar, treas.

Inc. in Missouri. **Cap.,** $10,000;

Property: a lease on 160 acres of mineral land, owned by
Morse Royalty Co., Webb City, Jasper county, Mo. Company
largest producers of zinc and lead concentrates in the district.

Development: by 8 shafts to a depth of 221' and equippe
ton concentrator, electric hoist, pump, air compressor and dri
employs 125 men.

This company, together with the Athletic M. & S. Co., of W
the Wingfield Mining Co., near Picher, Okla., are operated joint
and associates. The three mills vary from 1,000 to 1,200 ton c
hours, and their joint production in 1916, was 32,000,000 lb. zinc
value of $1,230,000. In February, 1918, the weekly output of h
tons.

B-G-M. MINING CO.

Address: J. B. Gibson, mgr., Carthage, Mo.

Officers: Z. A. Metzler, pres.; J. B. Gibson, v. p.; S.
sec.-treas.

Inc. in Missouri. **Cap.,** $100,000.

Property: 60 acres N. of Webb City, Mo. Ore carries
lead and is opened to depth of 180'.

Equipment: 800-ton mill (24 hours), containing crusher, r
sludge tables. Concentrate assays 59 to 61% zinc. Cost of mini
is $1.25 per ton.

No recent returns.

BIG BEN MINING CO.

Address: A. Baker, v. p., Springfield, Mo.

Property: 6 miles S. E. of Springfield. In 1919, mine
producing 6 tons of zinc and 2 tons of lead concentrates daily.

BLUE ROCK MINING CO

Sold assets in 1917 to the Empire Lead & Zinc Corporation.

BONANZA MINING CO

Address:

Productio

BOSTON

Min

LEAD & ZINC CO. **MISSOURI**
723 Frisco Bldg., Joplin, Mo.
: a lease on the St. Louis-Joplin Lead & Zinc Co.'s land, com-
f the A. B. C. Mining Co's ground, and the Martha Ball mine, in
district, near Joplin, Jasper county, Mo.
d-zinc occurs in disseminated deposits in the A. B. C. and as
thick at depth of 200', in the Martha Ball.
ment: by shafts. **Equipment:** 250-ton mill on Martha Ball
ive operations began March, 1915. Company operating a second
in the West Joplin district, at last accounts.

MINING CO. **MISSOURI**
: Ed. James, Webb City, Mo.

BEE MINING CO. **MISSOURI**
: Joplin, Mo.
ion: 140 tons of blende per week during part of 1918.

MINING CO. **MISSOURI**
dead, as letters were returned unclaimed in 1919.
Missouri. **Cap.,** $10,000.
y: two 20-acre tracts of J. I. Walker land in Jasper county, Mo.
y: developed by 5 shafts, average depth 150', and equipped with
entrator. Output is zinc concentrate.

BROS. MINING CO. **MISSOURI**
: Waco, Mo. A 250-ton mill was to be erected late in 1918.

ANSAS MINING CO. **MISSOURI**
: D. C. Connor, Acme mine, Waco, Mo.

HILLS MINING CO. **MISSOURI**
ddress: Box 201, Joplin, Mo.
: Herman Schmelzer, pres.; J. H. Estes, v. p.; H. F. Hoffman,
. H. Moreland, mgr.
3, in Missouri. **Cap.,** $10,000.
operated the Lone Elm 150-ton custom mill, which was struck by
August, 1918, and burned. Conditions did not warrant re-building.

CTION COMMUNITY DEVELOPMENT CO. **MISSOURI**
: Carl Junction, Mo.
: D. G. Evans, pres.; C. M. Dawns, v. p.; C. W. Roney, sec.;
er, treas., with J. A. Magoon, C. E. Hawk and J. B. Coons, direc-

tnership of local business men, who each pay $10 monthly drilling
le west of Carl Junction. When ore is found, the lease will be
to responsible operators for development. This is a well-directed
ulate new interest in the Joplin field, now rather quiet.

& SQUIRES MINING CO. **MISSOURI**
Room 14-16 Wagner Bldg., Webb City, Mo.
Missouri. **Cap.,** $2,000.
y: mines in S. W. Missouri, including Gwinn land, 2 tracts, one
r 40 acres of Kelly land, all located in Jasper county, the old
e, 20 acres, in the north Webb City sheet ground district, pur-
30,000, in November, 1915, and the Old Virginia mine, near Car-

ment: The Gwinn tract has 2 shafts, depth 186', and a 250-ton
The 20-acre Kelly tract is opened by 200' shaft, and has a 150-
[illegible] 40-acre tract is opened by 180' shaft and has a 200-ton con-

-zinc concentrates, not reported.

CO. **MISSOURI**
arling, Oklahoma City, Okla.
Neosho Granby Metal Co., at Granby, bought in
mill was remodeled to 250 tons capacity.

& ZINC CO. **MISSOURI**
Cave Springs, Mo.

Property: a lease on 50 acres of land owned by the K. L. & Z. Co., including the Grass Roots and Cave Springs mines producers, at Cave Springs, west of Joplin, Jasper county, Mo.

Ore: contains zinc and lead sulphides. Developed by deepest 260', with levels at 130' and 240'. This shaft was un 240' level in 1915. Ore in Grass Roots mine is taken out by oper

Equipment: 100-ton concentrating mill, centrifugal pump tric power and surface buildings.

CENTER CREEK MINING CO.

Office: O'Neill Bldg., E. Daugherty St., Webb City, Mo

Officers: I. D. Snedeker, pres.; M. L. Sears, v. p.; wit Stewart, Thos. McCroskey and J. H. Capelli, directors. R. F. treas. and gen. mgr.

Inc. 1889, in Missouri. **Cap.,** $200,000, reduced in Jul $1,500,000; shares, $10 par. Listed on St. Louis Stock Exchange

Dividends:

Year	%	Year	%	Year
1917	3½	1911	2	1905
1916	6½	1910	2	1904
1915	4	1909	1	1903
1914	2	1908	1	1902
1913	3	1907	3	1901
1912	2½	1906	14	1900

Company does not carry on active mining operations, but to operators, among whom are S. Y. Ramage, C. D. & R. Mng. Co Co., J. R. Wisby, Twin Cities Mng. Co., Nearby Mng. Co., Re Jewel Mng. Co., Carlatt Mng. Co., and the Good Shepherd Mng royalty on all ore produced.

Property: 200 acres and mill-site between Webb City and Jasper county, Mo., developed by 13 shafts from 110' to 165' d both lead and zinc ore. Five mines and mills are operated.

Production (years ended March 31):

Year	Zinc, Pounds	Lead, Pounds
1918	8,631,115	1,367,940
1917	10,529,930	920,480
1916	15,250,870	1,107,547
1915	6,823,320	[illegible]
1914	11,223,690	[illegible]

Total output from start of operati[illegible]

CENTRAL ZINC MINING CO

Address: Frank Danglade, su

A new mill was erected late in

CHICAGO MIAMI LEAD & ZIN

Address: Box 573, Joplin, Mo.

CLEAR PEACHER MINING CO.

Address: Fletcher Clear, supt.

Property: 3 miles E. of Joplin. average of 28' of ore was reported as

CHICAGO MINES CO.

Address: 301 Miners Bank Bldg.

Property: 10 acres owned by the C City, Jasper county. Opened by two 200 mill.

CLEVELAND & AURORA MINERAL

Address: Auror

t T. Gill, pres.; H. J. Baldwin, sec.; J. J. Sullivan, treas.;

s.

mpany owns zinc and lead lands, which it leases to others.

ING CO. **MISSOURI**

t Pitts, supt., 4th and Gray Ave., Joplin, Mo.

ses on the Malloy tract just south of Duenweg. Drilling
eminated ore at 86 to 165' depth. A 150-ton mill was to be
ounts.

AD & ZINC CO. **MISSOURI**

arthage, Mo.

. Jennings, pres.; C. D. Smith, v. p.-mgr.; W. E. Parker,

erates a lease on 120 acres, owned by Amsden & Amsden,
istrict, Jasper county, Mo. Ore occurs in sheet-ground and
owns land in Barry county, Mo., where several shafts have
discovered, but not worked at present.
by 4 shafts, 160 and 180' deep. **Equipment:** includes 2

, the No. 3 mine at Porto Rico was closed, due to low prices
sive water. From 1909 to 1916, company operated a 900-ton
fter which the 1,400-ton mill was started. (The latter made
). In 10 years, 2,040,031 tons of ore was hoisted, 362,506 tons
tal costs were from $1.16 to $1.25 per ton during the past 3

n 1918 was about 270 tons of blende concentrate weekly.

ING CO. **MISSOURI**

ing Co., Missouri.

ZINC CORPORATION **MISSOURI**

fth Ave., New York.

s M. Turner, pres.; W. S. Hallowell, v. p., with P. W.
rner, J. J. Coyle, A. H. Lippincott, W. S. Hallowell, W. H.
mith, directors; Elwood Burdsall, treas.; M. A. Pappert, sec.
14, in New York, to hold securities of Oronogo Circle
hich it owns the entire capital stock, and to operate zinc
ly, 1917, company took over leases and cancelled stock
e Oronogo Circle Co., and now owns and operates this
uthorized and outstanding $1,000,000; $25 par. Fidelity
, transfer agent. Incorporated Com[illegible] Annual meeting second
Di[illegible] per annum.
[illegible] has been a pro-
[illegible] side-
[illegible] and
two 24-in.
40-in. high
orr thickeners,
0 h. p. of steam
steam engine, and
8,000 tons of blende

INC CO.

c., Joplin, Mo.

at last reports.

D INTERSTATE MINING C[illegible]

in, Mo.

reported in be 40 tons of blende

CONSUMERS MINING CO.

Address: W. 7th St., Joplin, Mo.

Cap., $10,000.

Property: lease on 15 acres of mineral-bearing land merly worked by Otis Mining Co.

Development: by 2 shafts to 185' level.

Equipment: includes 300-ton concentrating mill, cr air drills, 2 hoists and pump. Employs 80 men. Producing

CONTINENTAL ZINC CO.

Office: 87 Milk St., Boston, Mass. **Mine office:** 7t Joplin, Mo.

Officers: Jere A. Downs, pres.; J. B. Hardon, v. p.; treas., with F. T. Rubidge, Chas. Hayden, Galen L. Ston directors.

Inc. April 4, 1902, in Maine, as successor to Contine Sm. Co. **Cap.,** $550,000; $25 par; all outstanding. $110,000; shares $5 par. No bonded debt. Hayden, Stone & fer agent; Old Colony Trust Co., Boston, registrar. An Tuesday in April. Listed on Boston Stock Exchange.

Dividends: formerly 8% per annum, quarterly, reduc 1909 and 1910 none; since 1910 to 1916 at the rate of 4% paym J. and J. 1; Dec. 31, 1915, $10 per share, in part liquidation. cents in 1918.

The profit and loss account for 1917 showed a total of surplus of $190,967 from 1916. After paying $22,000 in div depreciation, etc., the surplus was $154,453. In 1918, the $4,501. After paying $11,000 for dividends, allowing for loss of the Litteral tract, the surplus was $124,522 at December 3

Property: 2 tracts of land, 200 acres, at Joplin, Mo., which are fast becoming exhausted; the Kohinoor and Litt a profit of $37,364 in 1916, $20,317 in 1917, and $4,921 in 1918. in 1917, opened rich ore at 200' in the Kohinoor, but the L pleted. House lots continue to be sold on the Empire an addition and Continental Fourth street addition.

Continental Zinc must be considered a liquidating prop

COW CREEK MINING CO.

Address: W. H. Clark, supt., Carl Junction, Mo.

A 200-ton mill was to be erected at last report.

CRESCENT LEAD & ZINC CORPORATION

(Succeeds Blue Rock Mining Co., by purchase of assets

Office: 804 Grand Ave., Kansas City, Mo.

Officers: Lawrence E. Smith, pres.; Lewis H. Bailey, Rowe, sec.; W. T. Grant, treas. Phillip Gatewood, mine mill supt.

Inc. March 21, 1917, in Missouri. **Cap.** $[illegible], all To September, 1919, a total of $165,000 had been expended machinery.

Property: the Blue Rock mine, 40 acres of the prop Also 480 acres of land at Sunnyside, Ottawa county, Okla Baxter Springs, Kansas. This property is undeveloped and operations at present.

Rock mine has 2 shafts opening on [illegible] ing at [illegible] feet [illegible]

3- and
hopper
steam-drive
The 250-

separators and classifiers, three trommel screens and 5 tables. it has 3 distillate engines, two of 80 and one of 50 h. p., and one age compressor.
es will contain 61% zinc and the lead 80%. Costs are estimated mining and 55c for milling.

LEAD & ZINC CO. **MISSOURI**
Belville, Mo.
n: said to be 22 tons of blende weekly.

ING CO. **MISSOURI**
A. J. Burnham, mgr., Joplin, Mo.
a lead-zinc mine near Prosperity; a veteran sheet-ground ling 1,000 tons per day of 2% ore in 1917. Mine has 3 shafts, shift daily.

NING CO. **MISSOURI**
lead, as mail is returned from Joplin, Mo.
Little Bess mine, on the Knight land at Carl Junction, Jas-o.; also 20 acres of the Nilson land.
ent: on the Knight land, 2 shafts, deepest 170'. The Nilson shaft.
t: 300-ton concentrating mill and sludge mill for treatment ime from large mill.

MINING CO. **MISSOURI**
Box 224, Webb City, Mo.
E. M. Drummond, pres.; M. O. Curd, v. p.; R. C. English,

entucky. **Cap.,** $300,000; $1 par.
200 acres, 1 mile N. of Webb City. Shafts are 150' deep.
t: 500-ton mill treats 3% zinc-lead ore.

AD & ZINC CO. **MISSOURI**

issouri. **Cap.,** $3,000.
a lease on 40 acres of land belonging to the McCown estate City-Beef Branch district, Mo.
nent: 3 shafts with average depth of 200'. Has 2 concentrators capacity of 250 tons. Output consists of galena concentrates and and silicate concentrates, averaging 48-50% zinc.

MINING CO. **MISSOURI**
en up, 1916, and company out of business.

HER LEAD CO. **MISSOURI**
title under Oklahoma.

OD MINING CO. **MISSOURI**
Joplin, Mo.
on: averaged about 27 tons of blende per week, at last report.

C CO. **MISSOURI**
by U. S. Steel Corporation, which owns the whole capital.
Bank Bldg., St. Louis, Mo. Company has large zinc
furnace with 600 retorts, was in continuous opera-
of smelter.
in the Carondelet section of St. Louis, was closed
one of the oldest zinc works in America, being in

has another large and modern smelter, using

MISSOURI
and mill, also the Joe-Bob and other

MISSOURI

EVAND HALL SOY MINING CO.
Address: J. Manning, Duenweg, Mo.

FAIR HOPE MINING CO.
Address: M. L. Kline or E. D. James, Porto Rico, via
Officers: Albert Boiling, pres.; D. M. Murphy, Greenst and W. E. Brown, Connersville, Ind., directors.
Property: 23 acres purchased in 1918 from Playter E operated for a while by company, then leased, May, 1919, to 200-ton mill is in operation.

FERCH MINING CO.
Property: company early in 1918 was operating on West Joplin, under a lease from the Continental Zinc Co. Good at depth of 224'.

FIFTEENTH STREET MINING CO.
Property: on east 15th St., Joplin, Mo., was sold by G Galena, Kansas, and associates, to H. C. Clinton of Clinton, others, for $100,000. Two shafts were sunk, opening rich ore
Production: 85 tons of blende per week.

FINK MINING CO.
Property: near Ozark, Mo.
Development: by 210' shaft and levels at 90, 135 and ore. The face is 20' thick. A 400-ton mill was in operation in

FLANNERY ZINC CO.
Address: W. F. Friday, Sarcoxie, Mo.
Property: the Boyd zinc mines at Sarcoxie, acquire $40,000 spent in rehabilitating mine and mill.
Equipment: includes a 1,000-ton concentrator and a Die ore is blende, but some calamine is also mined.

FRANKLIN MINING CO.
Address: Webb City, Mo., but company probably defunc there were returned in 1919.
Property: a tract of shet ground, carrying zinc ore a Equipped with 880 cu. ft. air-compressor and a 600-ton mill.

FREEHOLD OIL, GAS & MINING CO.
Address: W. S. Marquis, Waco, Mo.
Property: several leases in the Waco field. Two mil producing 64% zinc concentrate, while a third was nearly r 1919. A fourth tract of 40 acres was being drilled with good other mill is planned if the zinc market improves.

GAGE MINING & MILLING CO.
Address: F. D. Gage, Joplin, Mo.

GEORGE BALL MINING CO.
Address: George Ball, supt., Webb City, Mo.
A 150-ton mill was proposed at last accounts.

GEORGETTE MINING CO.
Address: O. B. Henry, mgr., Wentworth, Mo.
Property: 400 acres in Newton county, Mo. Thirty- showed ore 60' thick. Three shafts are in ore. Two mills w 1918 producing 63% zinc concentrate from 7 to 10% ore.

GIBSON MINING CO.
Address: Joplin, Mo.
Production: 60 tons of blende per week.

GILT EDGE MINING CO.
Company held lease on zinc land, 2 miles E. of Tipton F Mo. Lease transferred, June, 1916, to Wade Mining & Millin Probably dead.

GOLDEN RULE MINING & MILLING CO.
Address: Fred Kincannon, mgr., Granby, Mo.
Inc. in Missouri. **Cap.**, $8,000.

ses 30 acres of zinc-lead land at Granby, developed by 5 shafts,

100-ton concentrating mill, compressor and steam power.

MINING CO. **MISSOURI**
isco Bldg., Joplin, Mo.

NG CO. **MISSOURI**
ss. Formerly operated at Joplin, Mo.

NE **MISSOURI**
H. Hughes, mgr., Joplin, Mo.
lease on Scotia tract, 5 miles S. W. of Joplin. An old
paired, a new one sunk, and a 250-ton mill erected.

T MINING CO. **MISSOURI**
nuary, 1918, with capital of $25,000, by E. A. MacBride, A. B.
. Johnston of Kansas City, Mo.

AD & ZINC CO. **MISSOURI**
ginaw, Newton Co., Mo.
ds a lease from the Saginaw Mining & Leasing Co. on a 750-
last report was to erect a 350-ton mill.

G MINING CO. **MISSOURI**
alter Smith, Thomas Phelps, or A. Carney, Joplin, Mo.
32-acre lease hold near Eighth and Indiana Ave.., Joplin.
ore was opened at depth of 60′, and hand-jigs were used to

IINING CO. **MISSOURI**
5 Miners Bank Bldg., Joplin, Mo.
A. Barbour, pres., Hartford, Conn.; H. H. White, sec.-
th S. B. Griswold, Carthage, Mo., and C. C. Spencer, Joplin,
. White, gen. mgr., Joplin, Mo.; Geo. Elliott, supt., Galena,

Missouri. **Cap.**, $100,000; shares $100 par; all outstanding.
c-lead concentrates; figures not available.

HODGES MINE **MISSOURI**
. Heaton, supt., Granby, Mo.
tract in the sheet-ground area of Joplin district, in which
pth of 210′. Reported that shafts were sunk and a mill erected

MINING CO. **MISSOURI**
emple Chapman, or George Ball, mgr., Webb City, Mo.
0 acres in the Waco district, Mo., held under lease on a
is.
t: 17 drill-holes cut good ore at depths of 135 to 150′.
sunk.
a motor-driven mill, finished in April, 1919, handles 300
day.

& ZINC CO. **MISSOURI**
. B. Wolcott, Joplin, Mo.
Cap., 300 shares; $100 par.

IINING CO. **MISSOURI**
Vebb City, Jasper Co., Mo.
n the North Webb City sheet-ground district, said to show
urring at depth of 200′. A 300-ton mill on the property, operat-
nuously for 10 years was to be dismantled and replaced by one
city per 10 hours. Company hoists ore from the Florence shaft,
ne mill.

AD & ZINC CO. **MISSOURI**
risco Bldg., Joplin, Mo.

MINING CO. **MISSOURI**
ness and dissolved. See Vol. XIII.

INC CO. **MISSOURI**
. M. Robinson, Bell Center, Mo.

INCLINE MINING CO.

Property: a lease on part of the lands belonging to the Mining Co., between Webb City and Carterville. Developed depth of 150', showing lead and zinc ore.

Equipment: included 2 concentrators of 500 tons capacity and steam power.

JASPER COUNTY LAND & MINING CO.

Address: Frank Danglade, supt., Webb City, Mo.

Property: the McKinley mine, near Carterville, Jasper co veloped by 2 shafts, mining a large body of zinc blende and le of from 190-210'. A 350-ton concentrating mill, erected in 1914 tions in April, 1915.

JOPLIN-KENTUCKY LEAD & ZINC CO.

Address: Joplin, Mo.

Inc. in Kentucky. **Cap.**, $50,000.

Property: a lease on 33 acres of mineral land owned by Joplin L. & Z. Co., at Joplin.

Development: by 3 shafts to depth of 150'.

Equipment: includes 125-ton concentrating plant, 2 p steam power, 3 hoists, crusher and 2 Wilfley tables. No pr available.

JOPLIN ZINC METALS CORPORATION

Company dissolved; see description in Vol. XIII of this boo

JULIAN MINING CO.

Address: Charles McDonald, supt., Joplin, Mo.

A 150-ton mill was to be erected at last report.

KANSAS CITY-JOPLIN MINING CO.

Company probably dead, as letters were returned, 1919, fro West Fourth St., Joplin, Mo. Company reopened the Red Li Joplin, Mo., on which there was a 200-ton mill.

KATY MINING & MILLING CO.

Address: J. R. Underwood, Granby, Mo.

KENEFICK ZINC CORPORATION

Office: 233 Broadway, New York.

Control acquired by United Zinc Smelting Corporation, by e share Kenefick for 1¼ shares U. Z. S. Corp. stock.

Inc. Feb., 1916, in New York. **Cap.**, 5,000, 7% prefer $100, and 200,000 shares of common stock without par value; offered to subscribers at $12.50 a share in February, 1916; all com $450,000 preferred outstanding. Stock listed on New York Curb Co., New York, transfer agent; Bankers Trust Co., New Y Fifty per cent. of net earnings, after deducting dividends is a ment of preferred stock.

Dividends: five of 10c each were paid on common stock After payment of a 7% dividend on preferred and $1.20 annu stock, 50% of net earnings are to be applied to the retirement stock at par.

Property: producing zi the Aireda mines at Joplin Milan and Webb City, mine at Baxter

Company a the k zinc mills i and 3 others ful to treat 200 tons.

Production, grade zin assaying 60% zin

Control of C was ac M. Schwab and a said tions on same scal

KIRKWOOD MI

Address: Webb

Production: sale

MINING CO. **MISSOURI**
l February, 1918, with capital of $48,000, by G. G. Bayless of Car-
hil Gray of Webb City.

LL MINING CO. **MISSOURI**
W. J. Cochrane, mgr., Webb City, Mo.
: a lease west of Chitwood, adjoining on the south the prop-
t. Regis M. & S. Co., also the St. Louis-Joplin Lead & Zinc Co.,
rch, 1919, filed suit for $25,000 against the Little Bill for alleged
raction of ore.
nent: drill-holes yielded up to 18% zinc and lead, and shafts
180' level. A 200-ton mill produces from 40 to 50 tons of concen-

ARTHA CORPORATION **MISSOURI**
H. B. Wolcott, Joplin, Mo.
: N. of Chitwood, said to produce 75 tons of blende weekly.
property was assigned for the benefit of creditors to H. W. Blair,
Mo. The entire holdings were valued at $10,000.

ARY MINING CO. **MISSOURI**
Webb City, Jasper county, Mo.
0,000.
: a lease on 40 acres of mineral land, owned by D. S. Weaver.
3 shafts to depth of 175'.
nt: includes 500-ton concentrating mill, pumps, 3 drills, 2
power, and compressor. Employs 25 men. No record of produc-

N MINING CO. **MISSOURI**
Duenweg, Mo.
L. P. Dixon, pres.; G. S. Parsons, v. p.; O. M. Long, sec.-
vith S. W. and C. Van Dyne, Z. W. Weldon and Sam Fulkerson,

: the old Log Cabin mine near Duenweg, said to have yielded
th $1,000,000 from depth of 40', all concentrated by hand-jigs, and
s are to be re-treated. At depth of 175 to 200' more ore has been
mill was erected in July, 1919.

I DEVELOPMENT & MINING CO. **MISSOURI**
: N. of E. St., Lone Elm Road, Joplin, Mo.
: a lease on 240 acres of Granby land and 80 acres of Picher
oplin, Mo. Company unwatered the ground, sublets its holdings in
and operates a 150-ton custom mill.

E-CHAPMAN MINING CO. **MISSOURI**
l in June, 1917, and all profits distributed. Described Vol. XIII.

EVEL MINING CO. **MISSOURI**
: Sarcoxie, Mo. Is a reorganization of the Bearcat Mining Co.
s: J. W. Boyd, J. J. Stephenson, Geo. Spiva, and Sam Tamblyn.
: the Cameron mine on J. W. Boyd land, at Sarcoxie, 20
Joplin, Jasper county, Mo., is a zinc producer. Developed by 278'
ts.
ent: includes compressor, boilers and 400-ton mill.

INING CO. **MISSOURI**
: J. G. Marcum, sec and mgr., Joplin, Mo.
stated in 1918 that it had 8 active mines in the district, with the
nt and costs lower than the average.

ELL MINING CO. **MISSOURI**
: Webb City, Mo.
ion: 18 tons of blende weekly.

GER MINING CO. **MISSOURI**
transferred, 1916, to Utah-Missouri Mines Co., which see.

INING CO. **MISSOURI**
R. McGee, mgr., Duenweg, Mo.

Property: a lease on a tract near Duenweg, to which a n
in Granby district was to be moved.

MAHATMAH MINING CO.

Address: E. D. Hornbrook, Webb City, Mo.

Production: about 83 tons of blende weekly during 1918.

MALCONA MINING CO.

Address: Joplin, Mo.

Production: 32 tons of blende weekly.

MANSFIELD MINING & DEVELOPMENT CO.

Address: J. R. Sardage, supt., Mansfield, Mo.

Property: 1,712 acres in Wright county. The ground wa
a 250-ton mill was to be erected in September, 1918.

McBRIDE MINING CO.

Address: R. E. McBride, mgr., S. L. Kenney, supt., Jopli

Property: 37-acre lease of the Conner land in the No
field. Out of 15 drill-holes put down, 12 showed ore, 6 of them
15% ore beginning at depth of 85'. A 150-ton mill concentrates

MEDIA MINING CO.

Address: N. Allen St., Webb City, Mo.

Property: a lease on Guinn land, north of Webb City, co
of the old Hold Out mine.

Ore: zinc sulphide, in sheet-ground formation at a depth
ore faces 9' high. Company has one of the largest mills in the Mi
Oklahoma district, capacity 600 tons per 10 hours.

Equipment: mill includes two 18" crushers, 3 sets of 4
48 by 96" trommels, jigs and tables. Mill can treat 2% ore pr
centrates assay about 59% zinc, with only a trace of lead. S
used.

No record of production.

MIAMI-WACO LEAD & ZINC CO.

Mail returned, 1919, from last address: W. P. Cunningham
Missouri.

A 250-ton mill was to be erected, at last accounts.

MISSOURI COPPER MOUNTAIN MINING CO.

Office: Room 4, Pehl Bldg., Sedalia, Mo. **Works** off
Franklin county, Mo.

Officers: S. Urban, pres.; F. Maerschel, v. p.; Peter Pehl,
Graham, sec., with H. H. Graham, C. C. Kelly, and F. T. Mulcah

Inc. Jan., 1903, in Arizona. **Cap.**, $1,500,000; shares $1
$1,396,000.

Property: about 7,000 acres in Crawford and Washing
Missouri, including some farm lands. The Copper Hill mine, 32
in a small way before 1850, shows an orebody with a good gossan
limestone.

Development: by a 50' shaft and about 200' of tunnels
returns.

MISSOURI LEAD & ZINC CO

Office: [illegible] W. L. Chambers, m

Inc. [illegible]

Prop [illegible] county, Mo. Ore c
calamine

Deve [illegible] deep. **Equipm**
three mill[illegible] a royalty ba
1919, comp[illegible] and
sale, and o[illegible] by

MISSOURI [illegible]

Office: [illegible]
Mo. Albert M[illegible]

Officers: [illegible]

. W. Fegan, treas.; Guy E. Neault, mine supt.; David Shoe-

916, in Delaware. **Cap.**, $500,000
1916 amounted to $155,000, and operating expenses to $55,000.
in 1916 and 1917 were 30% and total, $500,000.
3 acres at Neck City, Mo., including the Quick Seven,
mines.
high-grade zinc blende and no lead The deposit is 900 by
d by 8 shafts to 160′ depth.
includes three 250-ton mills using crushers, rolls, jigs,

from one mill was 500 tons of 60% zinc concentrate per
ounts. Cost of mining by open pit was 50c per ton.

ING CO. **MISSOURI**
J. Williams. pres., or C. A. Davis, mgr., Granby, Mo.
Granby. Ore is mined at depth of 240′ and treated in a

INING CO. **MISSOURI**
plin, Mo.
ouri. **Cap.**, $10,000.
lease on 40 acres of mineral land owned by E. N. Perry at
nty, Mo. Developed by 2 shafts to depth of 200′. Production
n the 180′ level.
includes 250-ton concentrating plant, 450′ aerial tram, steam
hoist. Output is lead-zinc concentrate.

NC & LEAD CO. **MISSOURI**
bably dead, as letters were returned, 1919, from 53 State St.,
420 Main St., Joplin, Mo.
R. Brown, pres.; F. G. Wright, sec.; J. J. Hammers, treas.
0; shares $1 par; 300,000 shares issued. Stock is listed on
oston Curbs. Company has paid dividends of 42%, or $126,000,
1915, to May, 1917.
t Dixie, Neck City, and Webb City, Mo., developed by
eep, sunk in pay ore. Company operates four large mills on
es, also the Slim Jim zinc mine in the Picher district of Okla-
ch ore at 227′. One of the mills was moved from Missouri to
y that now worked by the Carnegie Mining Co., which see.

ING CO. **MISSOURI**
ebb City, Mo.
23 tons of blende a week.

INING CO. **MISSOURI**
C. Burgess, mgr., R. R. 5, Joplin, Mo.
Missouri. **Cap.**, $150,000.

ND ZINC CORPORATION **MISSOURI**
l returned from former address: Belle Center, Joplin, Mo.
necticut. **Cap.**, $100,000.
lease on 160 acres of mineral land owned by C. W. Ed-
per county, Mo. Developed by 3 shafts to depth of 150′.
includes 150-ton concentrating plant making a recovery
zinc; pumps, air drills, steam hoists, and compressor. Com-
d to have had a lease on the Leckie land at Klondike, Mo. Out-
oncentrates.

MO MINING CO. **MISSOURI**
plin, Mo.
31 tons of blende per week.

ICAN ZINC CO. **MISSOURI**
and company out of business, March, 1919. See Vol. XIII of

EAD CO., INC. **MISSOURI**
New York.

Officers: at last accounts, Benj. L. Love, pres.; John L. [illegible] cipal owner, v. p. and sec., Germantown, Phila., Pa.; above with Douglas Fenwick and Hugh T. Halbert, directors; E. R. Cowa[illegible] **Inc.** Feb. 25, 1916, in New York. **Cap.**, $100,000; $5 pa[illegible] $50,000. Douglas Fenwick & Co., 34 Wall St., New York, transf[illegible] lin Trust Co., New York, registrar. Stricken from New York [illegible] 1918. Dividends: 1% paid April, 1916.

Financial statement of April 21, 1916, showed cash, $1,865. from ore sales, $7,004; cost of production, $3,523.

Property: formerly known as the Brattleboro mining le[illegible] East Joplin mining district, has lead-zinc ore occurring at 65'-8[illegible] to be proven by 6 drill holes.

Development: a shaft with drifts east and west for only [illegible]

Equipment: includes hoist and 2 boilers.

O. F. & L. MINING CO.

Address: Duenweg, Jasper county, Mo. Probably disso[illegible]

Inc. in Missouri. **Cap.**, $30,000. Operated a lease near property of the Boston-Duenweg M. Co.

Development: by two 200' shafts. **Equipment:** includes [illegible] trating plant, boiler, pump, steam power. Was a steady produce[illegible]

Company's former holdings in Sec. 3 were sold to the Baltic

OKLAHOMA MINING CO.

Address: C. T. Jacobs, Seneca, Mo.

A mill costing $75,000 was to be built in 1918-19.

ONAMENA MINING CO.

Plant sold in 1918, and company out of business. See Vo[illegible] book.

ONCE MORE MINING CO.

Out of business. See Vol. XIII of this work.

ORANGE MINING & MILLING CO.

Address: F. C. Wallower, Carterville, Mo.

ORONOGO CIRCLE MINING CO.

Stock and charter cancelled, July, 1917. Property now [illegible] necticut Zinc Corp'n., which see.

ORONOGO MUTUAL MINING CO.

Property sold September, 1918, to the Athletic Mining & [illegible] which see.

OSAGE MINING CO.

Offices: 306 Commerce Bldg., Kansas City, Mo.; and Dar[illegible]

Officers: L. W. Jefford, pres.; H. B. Williamson, v. p.; H[illegible] sec.; J. F. Cave, treas.; also directors, with W. P. Lewis, A. R. [illegible] E. E. Hernter, trustees. F. E. Small, con. eng.

Inc. "under common law" Oct. 10, 1917. **Cap.**, $500,000; [illegible] issued. Annual meeting, second Tuesday in July. Expenses si[illegible] to March, 1919, were $14,000.

Property: 340 acres, 300 under perpetual lease, 40 own[illegible] Camden county, Mo., 15 miles from Ragnell, the nearest rail po[illegible] receives 10% of net proceeds of all gas, oil, lead, zinc, etc., ext[illegible]

Development: a churn drill hole cut a 14' strata at 174 to [illegible] 12.9% in lead and zinc, ov[illegible] strata rich in iron. At 200 [illegible] a 7' op[illegible] Immediately below this, [illegible] entered [illegible] ton. To a depth o[illegible] rock [illegible] Several other holes [illegible] zinc, [illegible] ...ured [illegible]

appears to be making an honest effort to develop a producing

of lead ore, of milling grade, about 4,000 tons, up to January 1,

G CO. **MISSOURI**
perated by the Consumers Mining Co., which see.

INING CO. **MISSOURI**
H. H. Culver, mgr., 1409 Wall St., Joplin, Mo. The mine is
. Harris, Daniel Fisher, Jas. Fisher, Jr., T. G. Shubert, all of
., and H. H. Culver.
a 10-year lease on 1 claim, 40 acres, on Baker land, Jasper
arrying lead and zinc ore in sheet-ground formation. This is a
the sheet-ground field in Duenweg, between the Lincoln and Coa-

ent: by 2 shafts, deepest 242′ in sheet-ground, with 20′ ore face.
t: includes compressor, 8″x8″ steam hoist, 3 pumps and 200-
ing mill with jigs, crusher, rolls and tables. Plan reconstructing
Duenweg, which will double capacity.
n: begun in Sept., 1915, amounted to 4,240 tons of ore, or
ntrates averaged 58% zinc and 78% lead. No recent informa-

MINING CO. **MISSOURI**
Joplin, Mo.
n: 31 tons of blende per week.

MINING & DEV. SYNDICATE, LTD. **MISSOURI**
epublic Bldg., Kansas City, Mo.
S. S. Ott, pres.; R. W. Street, v. p.; R. M. Sanford, sec.-
.; G. B. Peters, asst. sec., and C. J. Price, cons. eng.
in Arizona. **Cap.**, $5,000,000; $100 par.
organized to acquire and develop mining properties, and then
ies for their operation. 20 acres of ground, secured in Chitwood
oplin, exploration revealed an orebody from 39 to 60′ thick and
ying 10 to 25% blende. A 200-ton mill was to be erected.

KELLY MINE **MISSOURI**
F. Pfaeffle, Joplin, Mo.
ill was erected and started in May, 1919.

INING CO. **MISSOURI**
E. N. Cunningham, mgr., Joplin, Mo. Not incorporated.
40 acres in Jasper county, Mo., carries lead-zinc ore in a soft
ation.
ent: by 176′ vertical shaft and total workings of 600′.
t: includes steam power, hoist, pump and 150-ton concen-

n: in 1913, was 3,222,450 lb. zinc and 1,003,450 lb. lead; in 1914,
c and 428,080 lb. lead.
been idle from October, 1914, save for some diamond-drilling

AD CO. **MISSOURI**
une, 1916, with the Eagle White Lead Co., of Cincinnati, and a
organized called the Eagle Picher Lead Co. (Okla.), which see.

ROS. MINING & REALTY CO. **MISSOURI**
Pearl St., Joplin, Mo. C. C. Playter, pres.; Geo. H. Playter,

in Missouri. **Cap.**, $30,000. Company engages in prospecting
nt and when ore is opened and mining started, operations are
by separate organizations.
re tract and partly-developed mine, 5 miles W. of Baxter,
M. Brannon, of Oklahoma City, for $150,000, and a

PLEASANT VALLEY MINING CO.
Address: W. M. Graves, supt., Carthage, Mo.
Property: [illegible]-acre leases, 3 miles S. W. of Carthage. O[illegible]
[illegible] through 2 shafts.
Equipment: hoist, 400 cu. ft. compressor, 1,200-gal. pu[illegible]
[illegible] mill, employing 90 h. p. gas engine, 30-in. rolls [illegible]
[illegible] and Chester jigs. Concentrate assays 62% zinc, no l[illegible]
[illegible]. Twenty-four men employed in 1919.

POINTO POCO MINING CO.
[illegible] Mining Co.

QUEEN ESTHER MINING CO.
Address: Webb City.
Production: 45 tons of blende per week.

PROSPERITY MILLING CO.
Address: Joplin, Mo.
Property: a lease on 40 acres of mineral-bearing land bei[illegible]
[illegible] Sarcoxie, in Jasper county, Mo.
Development: by 5 shafts to depth of 175'.
Equipment: includes 150-ton concentrating plant, 3 air [illegible]
[illegible] crusher and air compressor. About 25 men employed, at l[illegible]

QUICK SEVEN MINING CO.
Leases unclaimed, 1919, from Alba, Mo.
Inc. in Missouri. Cap., $105,000.
Property: a lease on 78 acres of mineral-bearing land [illegible]
[illegible] in Jasper county, Mo.
Development: by 3 shafts to depth of 150'. Equipped [illegible]
[illegible] pumps, drills, compressor and steam power.

RAMAGE MINES
Address: Frisco Bldg., Joplin, Mo.

RASHGO MINING CO.
Address: W. M. Randell, supt., Joplin, Mo.
A [illegible]-ton mill was to be built at this mine in the Leadvill[illegible]

RED WASP MINING CO.
Address: Aurora, Mo.
Production: 90 tons of blende per week in 1918.

REINDEER LEAD & ZINC CO.
Address: O. B. Munson, supt., Joplin, Mo.
[illegible] mill [illegible]ed in June, 1918.

[illegible] CO.
Address: [illegible] Nevels[illegible]
Property: [illegible]
Development: [illegible]

[illegible] ROCK MIN[illegible]
Address: [illegible]

souri. **Cap.**, $100,000.
0 acres of lead-zinc land near Carterville.
nt: by 3 shafts, average depth 167'. Equipped with 800-ton
oes not reply to requests for information.

NG CO. **MISSOURI**
. L. Argyle, supt., Duenweg, Mo. Haywood Scott, pres.
n Duenweg district. The 500-ton mill was destroyed by fire
ent returns.

NING CO. **MISSOURI**
im Smith, Carterville, Mo.

NING CO. **MISSOURI**
Vebb City, Mo.
7 tons of blende weekly.

K ZINC & LEAD CO. **MISSOURI**
ness. Described Vol. XIII.

D & ZINC CO. **MISSOURI**
rned, 1919, from Joplin, Mo. J. S. Mullen, pres., Ardmore,

the Martha Ball mine, bought for about $30,000; a sheet-
of Chitwood, S. W. of Sparkler mine and E. of La Nora B.
95' deep.

L MINING & ROYALTY CO. **MISSOURI**
S. Dodge, 938 Landers Bldg., Springfield, Mo.
a lease on the Bain land, in Elk Valley, 2 miles S. E. of
opened ore at 25 to 51', and a mill was planned, at last report.

INC MINING CO. **MISSOURI**
Vol. XIII of this work for data.

ING CO. **MISSOURI**
oplin, Mo.

MINING CO. **MISSOURI**
. Longacre, Jr., Alba, Mo.

ZINC & LEAD CO. **MISSOURI**
Miners Bank Bldg., Joplin, Mo. P. H. Corbett, pres.
Missouri. **Cap.**, $100,000. Gross income from Jan. 1, 1917,
917, was $100,426; expenses were $41,325.
52 acres, 8 miles N. W. of Joplin, Mo. Ore carries zinc
o 20%, the average being 7.15%. The deposit is 12' thick, 600'
ed by 92 and 123' shafts.
includes 100-ton mill, using rolls, crusher, jigs, screens and

(1917) 70 to 335 tons of 63% zinc concentrate, with up to
month. Costs were $1.90 for mining, 32.9c for milling, a total
Good profits were made in 1917 and 1918.

BURG MINING CO. **MISSOURI**
rs. George O'Connor, Pittsburg, Kansas; A. Rowe, supt.
lease on the Missouri side of the Waco district, tract carry-
re at depth of 160 to 175'. Three shafts have been sunk, ma-
and a 250-ton mill erected, 1920.

MINING CO. **MISSOURI**
Moore, mgr., Webb City, Mo.
Cap., $50,000. Is a merger of the Laura Alice and
mpanies.
ed from Daugherty & Davey, in Jasper county, on
City and Carterville, using the 175-ton Davey No. 1
steam power being used.

MISSOURI
Frisco Bldg., Joplin, Mo.
aco field, Mo., partly in Kansas, in which

3 expected to be completed by Oct.,

1919, will concentrate 1,000 tons in 20 hours. A mixed-pressu produces power.

U. S. LEAD & ZINC CO.

Promoted by C. L. Glass & Co., Vandergrift Bldg., Fou burgh, Pa.

Directors: P. S. Chambers, D. A. Rees, and W. S. Maxe

Inc. in Delaware. **Cap.**, $600,000; $1 par.

Property: one 20-acre lease in Joplin district, opened by several drifts, and one 24-acre lease opened by two 120' shafts and drifts, all in high-grade ore.

Equipment: each mine has a 150-ton mill for concentr lead ore.

UNITED ZINC SMELTING CORP.

Office: 233 Broadway, New York.

Officers: B. Lissberger, pres.; Otto Proeless, v. p., and treas.

Inc. May 1, 1916, in New York. **Cap.**, 600,000 shares wi but offered for subscription at $12.50 per share in April, 1916; ing. Bonded debt: about $350,000 of 8% serial notes. Bankers York, transfer agent; Equitable Trust Co., New York, regis New York Curb.

Company produces about 60,000,000 lb. of spelter annually.

Controls, through stock ownership, all of the assets of th Inc., which, in turn, owns the Clarksburg Zinc Co., and 98 shares of the Kenefick Zinc Corporation, which see.

The Pearlman Co., Inc., owns a large zinc mill and refining burg, W. Va., comprising 3,648 retorts with capacity of 30,000, per year; a pottery plant with a capacity of 500 retorts per da and a refining plant with a capacity of 15,000,000 lb. of spelter patents, controls brands and trade-marks.

United Zinc has at Moundsville, W. Va., one Hegeler roas pottery, gas producers, nitric acid works, plant producing 50 phuric acid daily, and power plant.

The Kenefick Zinc Corporation is said to be the largest ting perhaps the Connecticut Zinc Corporation, the Ormsgo concentrates in the Joplin, Mo., district, the capacity of its being 25,000 to 30,000 tons of concentrate per year. The Unite tion offered to exchange 1¼ shares of its stock for each comm Kenefick Zinc Corporation until July, 1916, afterwards, share

Properties operated by the Kenefick, Electrical Zinc & Lead Milan M. Co., north of Webb City; the Coyote Mining Co., and Co., west of Joplin, and the Coronet mine at Baxter, Kansas.

At the Media mine, ore occurs in 17 acres of land, and was treating 1,500 tons daily. The Milan produced the highest district, and treated 600 tons daily. The Electrical yielded 600 and since 1904 has not varied 0.25% in its zinc recovery. At th deposit is 18' thick, supplying 800 tons daily. In 8 acres the A ore, yielding 700 tons daily.

No financial statement is available since that of the year 1917, when consolidated income account (including subsidiarie earnings of $817,026; operating expenses, $51,342; depreciati $638,957 net profit. In August, 1919, company wrote that "w [same statement] in justice to our readers we have made u [illegible] year ended [illegible] [illegible] Charles M. [illegible] [illegible] Zinc. Lab [illegible] Base direc

G CO. **MISSOURI**

l Gray, Webb City, Mo. Robert Helm, supt., and C. E.

e Unity, N. of Webb City, and Concord, S. of Carterville, eet-ground mines, yielding high-grade concentrates in 2 mills. in 1917 the total output of concentrate was 5,559 tons. In ielded 43 tons and the Concord 78 tons of blende a week. latter were suspended for some time during 1919.

RI MINES CO. **MISSOURI**

l. Former address, Neck City, near Joplin, Mo.
e Big Four and Lucky Tiger mines, the latter transferred pany early in 1916.
: at Big Four by 2 shafts to 315', yielding sphalerite; and 2 shafts to 276'.
at the Lucky Tiger is a 250-ton mill, etc., which treats ore Property is fully equipped.

NING CO. **MISSOURI**

d Craig, Duenweg, Mo.
40-acre lease 2 miles E. of Duenweg. Seventeen drill-holes o 123' depth, averaging 15% blende and lead. A mill was to accounts.

NING CO. **MISSOURI**

opped and charter surrendered. Described, Vol. XIII.

G CO. **MISSOURI**

of Bamsdell Corporation of New York). **Address:** Box 235,

bert Law, Jr., pres.; P. B. Butler, v. p.; mgr.; J. A. Dunn, Minard, gen. mgr.; R. S. Butler, asst. mgr.; Clarence Mostaugh, ames Henson, mill supt. at No. 1 mine, and C. A. Smith and No. 2 mine.
ouri. **Cap.**, $500,000; shares $1 par.
e details can be best shown by tables.

	No. 1	No. 2
.....	40	66
.....	Waco	Waco
.....	Zinc blende	Zinc blende
.....	5.9	6.3
y, tons.....	300	500
ıt, monthly, tons.....	400	700
te, per cent.....	62	62
18.....	$136,881	$340,945
es.....	74,115	164,445

S. L. Hurlbutt, drilling reveals richer ore at lower depths in The Waco M. Co., in January, 1920, had finished putting down res. In five of them there was continuous mineralization, or an each hole. Assays showed ore to be from 4 to 19% blende in o 35.5% in 28 holes, and from 3 to 15% in others.

G & MILLING CO. **MISSOURI**

Louis, and 620 Joplin St., Joplin, Mo.
E. Brenton, pres.; Frank Boehm, v. p.; St. Louis; and E. , Joplin.
lease formerly held by Gilt Edge Mng. Co., on the Wade miles W. of Diamond and 3 miles E. of Tipton Ford, Mo. The tal in the ore is 33% lead and 66% zinc. Two shafts, drifts, ve been opened. Ore is treated in a 150-ton mill.

MILL **MISSOURI**

0 hours) plant built in 1914 by F. C. Wallower, 100 Neill Bldg., eat lead and zinc ores of Prosperity, Joplin district.

Equipment: includes 100-h. p. electric motor, 16" crush
jigs, classifiers, tables, and slimers. Operated steadily in 1916-

WASHINGTON LAND & MINING CO.

Address: W. Maclay, mgr., Bliss, Mo.

Officers: A. L. Shapleigh, pres.; J. D. Filley, v. p.; I
sec.; the foregoing are directors.

Inc. about 1880, in Missouri. **Cap.**, $50,000; $100 par

Owns 6,250 acres lead and baritic lands in Washington co
royalty basis.

WEBB CITY-CARTERVILLE DEVELOPMENT CO.

Address: G. J. Kusterer, chairman, Webb City, Mo.

Organized March, 1919, by local business and mining men
and drill for new ore deposits in this district. It was proposed
tors. Shares will be issued at $1 par. No work was to be
$50,000 is raised.

WHAT CHEER MINING CO.

Address: Duenweg, Mo.

Production: 32 tons of blende per week.

WINGFIELD MINING CO.

Address: Webb City, Mo.

Inc. in Missouri. **Cap.**, $32,000; investment, $48,222

Operates, under lease, 50 acres sheet-ground lands of S
Ware, workings through 3 shafts. Capacity, 1,000 tons daily. E
cludes crusher and 4 tables.

WINNIE-LAWSON ZINC CO.

Letters returned unanswered. Highly advertised in the Ja
uary, 1916, as an "investment offering of great significance and
company claimed to have under lease, 270 acres of land in the
portions of the southwest lead and zinc district," and that it h
for a 400-ton mill. Edward Lawson was the promoter. No r
dertakings on the part of this company have come from other

YALE MINING CO.

Address: E. C. Hornbrook, Webb City, Mo.

SOUTHEASTERN MISSOURI

The mining district in St. Francois county is the most impo
of the United States and probably of the world. The district
of St. Louis, with Bonne Terre and Flat river as the principa
20,000 tons of ore is treated daily. Deposits consist of ore in d
4% to 6% lead. All concentrating mills employ flotation meth

Production:

	1916	191
Crude ore, tons	5,467,500	5,887,5
Lead, per cent	3.68	3
Lead, in concentrates, per cent	65.66	66
Lead concentrate, value per ton	$67.47	$68

Publications describing the district include:

Subject	Author	Publication
General	H. W. Kitson	Eng. & Min. Jour.
Geology	H. A. Buehler	Bull. 130 of A. I. M. E.
Mining	H. A. Guess	Trans. of A. I. M. E.
Ore treat	A. P. Watt	Bull. 130 of A. I. M. E.

BAKER

Mo.

the St. Francis

carrying 8 to

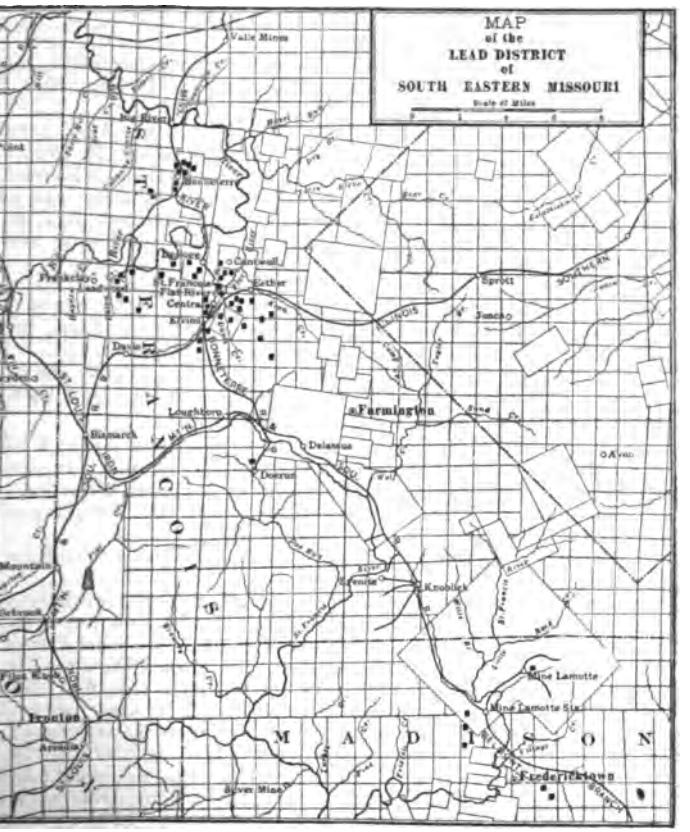
VINS LEAD CO. **MISSOURI**

Elvins, St. Francois county, Mo.

40 acres at Elvins, on Flat river. Main shaft was completed ing has only been carried on for two short periods up to early of water. In 1917, about 10,000 tons of ore was shipped to the Ref. Co.'s plant at St. Francois.

EAD CO. **MISSOURI**

al stock owned by American Smelters Securities Co .



,603 acres in Flat River mining district, Saint Francois

NSOLIDATED LEAD CO. **MISSOURI**

esloge, St. Francois county, Mo.

souri. **Cap.**, $1,000,000, with almost $2,000,000 invested in

704 acres, developed by several shafts, 2 of which are 300' deep. Two of the shafts are near Desloge, but No. 4 is

[redacted] concentrator equipped with Wilfley vanners, [redacted] w. steam turbine; also a smelter equipped with

reverberatory furnaces. Flotation is employed in the mill, and used for dewatering flotation concentrate. Employs about 500

DOE RUN LEAD CO.

Absorbed by the St. Joseph Lead Co., 1916.

FEDERAL LEAD CO.

Address: Flat River, Mo. H. A. Guess, pres.; H. G. V Subsidiary of American Smelters Securities Co.

Inc. in Delaware. **Cap.,** $2,000,000; shares $10 par. Th and refining plant, at Federal, Ill., near Alton, comprises 302.5 a is a custom smelter, and has a daily capacity of 540 tons of ore.

Property: 13,690 acres in the Flat River district, southea containing lead ore in limestone.

Development: mine has 12 shafts, and prospecting is do drills, as no outcrop of disseminated ore occurs. In Dec., 1919, producing 3,000 tons of ore daily.

Equipment: two mills are in operation. No. 3, of 5,000 pacity, is equipped with 12 Hancock jigs, 72 tables, 18 vanner sections each; also regrind rolls, elevators, Esperanza-Federal and a flotation unit. Mill No. 4 of 3,000 daily capacity was pu during January, 1917. It is equipped with 6 Hancock jigs, 40 in 2 sections, regrind rolls, elevators, mills for regrinding and and a flotation plant for slime treatment.

Most of the power is generated at a central plant. This pl battery of 12 boilers, equipped with chain-grate stokers, two 7 turbines, two 2,000-k. w. and one 800-k. w. Allis-Chalmers turb pressors, together with necessary condensing equipment, etc.

Production: 1,163,000 tons of ore in 1913; 1,212,000 tons in in 1915; 1,328,474 tons in 1916; 1,870,000 tons in 1917, and 1,905,

MID-NATION IRON PRODUCTS CO.

Office: 2082 Continental & Commercial Bank Bldg., Chic

Officers: E. A. Clemons, pres.; W. R. Leeper, sec.-trea Groetzinger, J. F. Lindsay, E. Abby and F. J. Quinn, directors.

Inc. Jan., 1917, in Missouri. **Cap.,** $2,000,000; $10 par; all authorized $1,000,000; $160,000 outstanding.

Property: 88,000 acres in Wayne and Butler counties, S. of St. Louis, owned in fee simple.

The Missouri Ore Co., 14 Wall St., New York, presumably Midvale Steel Co., has a 99-year lease to mine iron ore only, retaining rights to mine other than iron ore. Missouri Ore C to explore and take up one lease on not less than 5,000 acres; to and a royalty of 25c. per ton on all ore removed, regardless of a year called for lease on 10,000 acres additional at same price; a lease remainder at same figure. Not less than 300,000 tons p extracted. All ore that will concentrate 48% or over can be

Mine contains brown hematite and limonite, assaying 53.48 Estimated that 50,000,000 tons are available. Four drills at wo be by steam-shovel. Output in last 15 years was 1,500 carloads 1917-19. The old Iron Mountain mine, 80 miles S. of St. Lou to have been sold to people connected with this company for $ is being sunk on a drill-hole that revealed an extensive depo hematite.

MINE LA MOTTE CO.

Name changed Nov. 1, 1916, to Missouri Metals Corp., wh

MISSOURI COBALT CO.

[illegible] Fredericktown, Mo.
[illegible] O'Brien, Pres. & G
[illegible] Taylor, Asst. Mgr.

one and contains sulphides of copper, iron, cobalt, nickel, and
by shafts.
includes 500-ton mill completed in August, 1917, employing

duces lead concentrates and a copper cobalt nickel product.
lb. of copper produced in Missouri during 1918 almost all came

ETALS CORPORATION **MISSOURI**
ıe, as the Mine La Motte Co., 1914; name changed, 1916.
5 Railway Exchange Bldg., St. Louis, Mo.; 52 Vanderbilt
. **Mine office:** Wm. G. Dooley, asst. treas., Mine La Motte,

J. Meier, pres.; A. W. McLimont, v. p.; F. E. Butcher, sec.;
all, G. G. Moore, A. J. Drexel, Jr., Hamilton Fish, and J. E.
; R. Morrison, Jr., treas.
, 1916, in Missouri. **Cap.**, $5,000,000; shares $100 par; all
Transfer & Registrar Co., New York, transfer agent. Equi-
New York, registrar.
00,000 1st refunding gold 6s, due Nov. 1, 1926. Coupon,
Trust Co., New York and S. H. West, St. Louis, Mo., trustees.
ject to $330,000 prior lien, retired by this issue. Offered Feb.,

(applicable to interest) $169,432 for year ended June 30, 1916;
pt. 30, 1916, $53,438.
7,614 acres of mineral and farm lands in Madison and St.
, Mo. Lands have produced since 1723, over $20,000,000, mostly
gy, see Kemp's "Ore Deposits," p. 228, also Mo. Geol. Survey,
4, p. 48.
t: by a number of shafts, average depth 125'. The shallow
which were first worked, were followed down 100-125' and
he ore has been coming that for 50 years has supplied the mill
recent years the copper and nickel cobalt sulphide ores, which
and masses in the lead ore, have not been mined, owing to the
ing them. In 1915 four shafts were operated, and much of the
orked with steam-shovels, the only mine in S. E. Missouri to
luch carbonate of lead is recovered.
reported to be equal to 3,000,000 tons yearly for 60 years, half
mined by open-cut methods.
19 miles of railway. 1,000-ton ore concentrator with 350-ton
00-ton tailing plant, Diesel engine power-plant, etc.
sed during 1919, and company is in litigation.

OIS LEAD CO. **MISSOURI**
l to the Baker Lead Co., which see.

EAD CO. **MISSOURI**
Broadway, New York, and Bonne Terre, Mo.
nton H. Crane, pres. and chairman ex. comm.; Hugh N.
nd treas.; Irwin H. Cornell, v. p. and sales mgr.; L. H. Besson,
K. Catlin, Firmin Desloge, Max Kotany, M. F. Watts, all of
Setz, San Antonio, Charles M. Chapin, F. W. Shibley, New
Smith, Vermont, directors. C. J. Adami, gen. mgr.; L. A.
.; W. A. Smith, mgr.; E. C. Hickman, asst. mgr. of Hercu-

25, 1864, in New York. **Cap.**, $20,000,000; shares $10 par;
,798. Annual meeting, third Monday in Feb. Transfer office:
egistrar: New York Trust Co. Stock traded in on New York
ed Jan. 1, 1916.
. River & Bonne Terre Ry. 1st M. 5%, sinking
1931, $1,806,000.
up an amortization reserve, based on a capital
of 20 years; an annual ore production of

2,000,000 tons; and an annual lead production of 80,000 tons company's monthly average sale price of lead exceeds $60 per a charge of 2c. per ton of milled ore for each dollar of such e to profit and loss surplus and credited to reserve for amortiza

In 1918 this plant was revised to agree with that of the Department in allowing depletion as a deduction from income in and excess profits taxes, and the company's books were revise with this change of plan.

Comparative general balance sheet (including subsidia

Assets.

Year	Capital Stock	Miss. & R. T. Iron	Current	Reserves	Sun
1918.....	$14,000,750	$1,800,000	$777,222	$2,697,020	$19,2
1917.....	14,696,050	1,850,000	967,883	92,848	11,6
1916.....	14,694,600	2,032,000	1,700,310	4,810	4,1
1915.....	14,694,600	2,250,109	773,530	.....	3,0

Liabilities.

Year	Property & equip.	Current	Deferred deb
1918.....	$23,729,705	$7,690,482	6043,111
1917.....	19,671,900	8,334,372	670,893
1916.....	22,760,727	4,266,378	1,427,027

Financial results in 1919 were: income, $2,295,256; deple Federal taxes, $117,844; net profit, $1,060,596; and dividends, $1,5 deficit of $489,882.

Dividends: 1885-1912, 6%; 1913, 5%; 1914, 2½%; 1915, 1917, 35%; 1918, 20%, and 6% in 1919. The total is over $21,0 of stock distributions. On March 20, 1920, paid 5%, or 50c. a sh

The company is the largest independent lead producer in A second largest after the A. S. & R. Co.

Property: 13,400 acres of lead-bearing land in southeaste St. Francois and Jefferson counties, power plants, mill, smel entire $3,000,000 capital stock and $323,000 par value addition Miss. River & Bonne Terre Railway; also $483,940 of the $500,0 of the Bonne Terre Farming & Cattle Co. and all of the capi Doe Run Lead Co.; the Miss. & Bonne Terre Ry. owns the S R. R. Co. Company owns 1,000 houses tenanted by employee mercantile stores.

The holdings are in the disseminated lead ore region of where production from ores in the lower Bonne Terre dolomite The producing area is within 5 miles of the towns of St. Franc There are six companies operating and seven concentrating mills those of the St. Joe Co. and its subsidiary handling 8,600 tons o 20,000 tons daily output.

Six [illegible] were operated [illegible]. A new orebody was 16 sha[illegible] covered to 660

The [illegible] mated t[illegible] 153,000 tons of develope tons of [illegible]

Mill[illegible] Cent. Eng." of Sep July 15, [illegible] Wm. in Bull of the A[illegible] in the "En[illegible] of June 29, [illegible]

Flotation [illegible] Minerals Sep[illegible]

Equipmen[illegible] of 2,000 tons [illegible] at Herculane[illegible] 12,000 [illegible]

n:

	Ore, tons	Concentrates, tons	Lead, tons
.....	1,978,922	114,449 (approx.)	68,000
.....	2,999,490	133,099	79,620
.....	2,485,431	157,767	94,820
.....	2,431,939	169,302	91,073
.....	2,127,333	136,379	90,120
.....	1,989,047	120,710	81,716

MELTING & REFINING WORKS **MISSOURI**

(Formerly St. Louis Smelting & Refining Co.)
National Lead Co. E. J. Cornish, pres.
. A. Caselton, asst. mgr., 722 Chestnut St., St. Louis, Mo.
1,895 acres at St. Francois, southeastern Missouri. **Ore:** lphide in dolomite. Six shafts are in operation, deepest 565'. on each of 3 levels, and brought to the main entry by electric ere it is dumped into a 500-ton storage bin.
: complete with a 3,000-ton concentrating plant. Flotation h gravity concentration. Besides treating its own ore, company the Baker Lead Co. at Leadwood and the Boston-Elvins Lead

f conveyors takes ore to the crushers, after which it passes rolls, bles, and finally to the flotation department.
is its own power-plant, consisting of 32,000 h. p. in steam boilers, ines and generators of 2,161 k. w. capacity, two large air-com- or-generator sets for the underground haulage system, electric d fans in the mines, hoists, mill, and other works. One of the ble-drum type, driven by a 225-h. p. motor, provided with control se or at 365' down in the mine. Five-ton skips are hoisted 425'

MONTANA

essentially a copper and silver State, the 1918 output of these 3,174,850 lb. copper, and 16,797,489 oz. silver, both an increase e previous year. Gold declined to 150,193 oz., a decrease of increased to 37,135,875 lb. or 65%, while the zinc output of was also an increase. Dividends totaled over $20,000,000. In decrease in production of all metals, partly due to labor strikes, ortage. Production in 1919 was 180,246,000 lb. copper; $2,272,000 lb. lead; 13,281,000 oz. silver, and 176,432,000 lb. zinc. Dividends 00,000.
e one great mining center of Montana, and the companies of se official title is still the Summit mining district, are grouped All others are arranged alphabetically.

INING CO. **MONTANA**

. Buchanan, supt., Martina, Missoula county, Mont.
small gold mine sufficient to keep 5 light stamps and a ll employed, the latter machine being added in May, 1919.

PPER MINING CO. **MONTANA**

ace, Idaho. **Mine office:** Saltese, Mineral county, Mont.
W. Beale, pres.; A. H. Featherstone, sec.-treas.; preceding nd A. P. Cochrane, directors.
ce district, near the Monitor, and 2 miles from Adair ailroad.
ong tunnels and shaft, showing a 2' vein of quartz account face was 400' from projection of ore-shoot
eral buildings. No recent data available.

CO. **MONTANA**

L. E. Whicher, 25 Broad St. **Mine address:** Helena, Mont. Raymond Guyer, cons. engr.
par.

Property: an old silver-lead mine with large production ously up to $4,000,000) in the Corbin district of Jefferson count for 23 years, but workings reported open.

Development: by 8 tunnels, from the lowest of which a is down 682'. The lowest point of development is 1,300' below ap

New York interests have spent over $110,000 in past three y 300' shaft and endeavoring to find a body of commercial ore in t part of the ground.

AMALGAMATED SILVER MINES CO.

Address: 34 Union Bank Bldg., Helena, Mont. **Mine ad** Mont.

Officers: M. E. Weston, pres.; A. A. Trego, v. p.; Emil L. A. Weisner, sec.-treas., with A. R. Hall, R. L. Varney, J. S. Scott, R. L. McCray, directors.

Inc. in Montana. **Cap.**, $1,000,000; $1 par; 800,000 issue property and development. The Banking Corp. of Montana, transfer agents, Helena, Mont.

Property: 35 claims, including the Free Coinage mine, at in Jefferson county, 2 miles from rail at Clancy.

Development: to depth of 350' in the Free Coinage an Muskegon. Stoping under way at 180 and 250'. Shipments named have averaged 115 oz. of silver per ton, shipments varying a week in 1919.

Curtis, Packer & Co., 14 Kilby Street, Boston, Mass., with the & Reduction Co., have an option on 200,000 shares, and were o 60c. in December, 1919.

AMAZON DIXIE MINING CO.

Property: at Sildix, Missoula county Mont., on the I boundary is really a Coeur d'Alene corporation, and is describe

AMERICAN COPPER MINING CO.

Office: St. Regis, Mont. William Lintner, mgr.

Cap., $10,000; 10c par.

Property: 120 acres between St. Regis and De Borgia, in M Mont. Ore occurs in a limestone and quartzite formation, an copper, and 4 oz. silver. Development is by tunnels.

ANGELICA MINING & DEVELOPMENT CO.

Address: Wickes, Mont.

Officers: C. d'Autremont, Jr., Duluth., pres.; Chas. D. C. K. Tibbetts, sec.-treas., with T. T. Hudson and C. M. d'Aut directors. Chas. D. Horton, supt.

Inc. Jan., 1915, in Montana. **Cap.**, $200,000; $10 par; 14,32 nual meeting, last Monday in June.

Earnings: gross income from ore sales, $164,652 in 1918 expenses, not allowing for depletion of ore, compared with 19 $49,556, and operating expenses, $64,714.

Property: the Mt. Washington mine, 6 claims, 110 acre mining district, 2 miles west of Wickes, Jefferson county.

Geology: a contact vein in andesite and rhyolite, with dip strike of N. 83° W. The ore, a sulphide below the 400' level, silver and gold, occurring in shoots 2 to 10' wide and 50 to 300' assays are 0.2 oz. gold, and 26 oz. silver, and some lead.

Property has been reported on by E. J. Collins, T. F. Field, a

Development: 3,300' tunnel and 100' levels down to 800'; 10,500'. Mining is by square-set system. Reserves are 13,915 to

Equipment: Franklin air-compressor and electric power.

Production: ore is sent to smelter at East Helena.

Year	Tons	Gold, oz.	Silver, oz.	Lead, lb.
1919 (July)				
1918				
1917				

)ILLON MINING CO. **MONTANA**
)erty taken over by Montana Mines Co., which see.

LVER MINING CO. **MONTANA**
J. B. Leggatt, Salt Lake City, Utah.
)er, 1919, in Montana. **Cap.**, $100,000.
that of the Benton M. & M. Co., in the Vipond district of
unty, last operated in 1908.

COPPER CO. **MONTANA**
on Ten Mile creek, near Helena, Mont., and about 2 miles W.
of Mt. Helena, shows a 30′ vein in diorite, traceable 800′, carrying
e with small gold and silver value.
ent: by 200′ shaft. Was in hands of lessees early in 1915, but
advice.

N MINING CO. **MONTANA**
ice: Wallace, Idaho. Mine near Thompson, Sanders county.
, pres.; M. J. Mahoney, sec.
)0,000; shares $1 par.
20 claims, well timbered in the Mountain House (unorgan-
istrict, near the Idaho-Montana divide.
aid to be traced 6,000′ by surface cuts, 30 to 100′ in width, carrying,
th, galena of concentrating grade, with some ore assaying up to
e 175′ upper tunnel shows 3′ of concentrating ore, and the 900′
tunnel shows a 10″ stringer assaying 8% copper, 15% lead and
r ton. No recent returns secured.

LD MINING CO. **MONTANA**
Landusky, Phillips county, Mont.
a well-known producing gold mine. Ore is a porphyry dike.
-grade gold values. Ore is mined by glory-holing and treated by

TTE COPPER MINING CO. **MONTANA**
N. Wyoming St., Butte, Mont. Idle.
Chas. Steele, pres.; Thos. Tomich, sec.-treas.
26, 1907, in Montana. **Cap.**, $450,000; shares $1 par.
4 patented claims, 80 acres, in Elk Park, Jefferson county,
old, silver, copper, lead ore.

: COPPER MINING CO. **MONTANA**
W. Park St., Butte, Mont.
R. L. Clinton, pres.; J. Maher, v. p.; T. J. Fenlon, sec.-treas.,
kins, D. J. Charles, and E. H. Renisch, directors.
ontana. **Cap.**, $2,500,000; shares $5 par; assessable; 197,520
ing. No bonds.
five patented claims in Boomerang Gulch, near Boulder,
an ore zone 40 wide, with silver-lead ore in lenticular shoots.
tain about 3% copper, 20 oz. silver, 12% lead, and $2 gold.
ent: by 5 tunnels, 100′ vertically apart, longest 700′. Property
to the estate of M. W. Atwater, former manager of the Davis-
vho began operations late in 1918.
: 7 to 8 cars of ore monthly in early part of 1919.

PER CO. **MONTANA**
)r. M. J. Scott, Butte, Mont.
)r. M. J. Scott, pres.; F. H. Butler, v. p.; J. B. Frisbee, sec.;
treas.
24, 1910, in Montana. **Cap.**, $1,500,000; $1 par. Annual meet-
y in June.
claims, 230 acres, in the Summit Mountain district, near
in the foothills of Fleecer mountain, 13 miles S. W. of Butte.
ght of Butte & Buxton Copper Mining Co. for 150,000 shares of
Country rock is granite, with a mineralized zone one-half mile
veins, with a diorite dike to the northward. Shallow pits and

trenches show continuity of the veins, which are leached at su little lead and copper carbonate ore.

Development: by 180′ two-compartment Linda shaft, the 700′ tunnel, on a ledge, carrying a 10′ streak, mainly pyrite, tiferous chalcopyrite. Property has yielded ore carrying 1 to 43 oz. silver per ton, with up to $2.50 gold, also galena assaying silver and $1 gold per ton.

Equipment: includes a 40-h. p. boiler, 20-h. p. hoist good air compressor and several mine buildings. Idle, but company shaft, drifting, and crosscutting.

BANNACK GOLD MINING CO.

Reorganized, 1918, as the New York-Montana Mines Co., wh of old company are in Vol. XIII of this work.

BANNER & BANGLE MINING CO.

Address: W. J. C. Wakefield, pres., Spokane, Wash. mgr., Spokane.

Cap., $600,000; par $1.

Property worked for many years by T. L. Greenough, is and bond to Snowstorm Mines Consolidated, which see.

BARNES-KING DEVELOPMENT CO.

Address: Butte, Mont. **Mine office:** Kendall, Ferg Marysville, Lewis & Clark county, Mont.

Officers: C. W. Goodale, pres.; A. J. Davis, v. p.; J. C. C. Swinborne, treas., with C. R. Leonard, F. L. Melcher, T. T. A. Marlow, directors. W. B. Roll, asst. sec.

Operating officials: G. T. McGee, gen. mgr., At the T. W. Heatherley, in the mine; A. E. Worsdell, in the mill; the office; E. G. R. Manwaring, mining engineer, and W. A. At the Piegan-Gloster: J. H. McCormick, in the mill; J. W. Jo William McClean, mechanical engineer; F. E. Eccles, in the Cole, assaying. At the Shannon: J. W. Johns, in the mine, an the office. At the Kendall: A. B. Fox, in the power-plant.

Inc. 1907, in Montana. **Cap.,** $2,000,000; $5 par; all issu Box 1375, Butte, Mont., transfer agent. Annual meeting, fir March. Stock listed on Butte Exchange.

Financial Statement—Years ending December 31:

Assets

Year	Property and Equipment	Deferred	Current (Cash, Bullion, Li Bonds, Investmen
1919	$1,980,516	$68,196	$193,351
1918	2,103,463	98,024	198,246
1917	2,433,433	68,462	3[illegible],669
1916	2,299,707	54,802	109,783

Liabilities.

	Capital Stock	Current (Accounts and Wages, etc.)	Surplus
1919	$2,000,000	$47,816	$194,247
1918	2,000,000	42,228	149,903
1917	2,000,000	35,747	731,818
1916	2,000,000	139,467	324,123

Profit and Loss.

	Operating Profit	Taxes, Depreciation, Losses, etc.
1919	[illegible]	[illegible]
1918	[illegible]	[illegible]
1917	[illegible]	[illegible]
1916	[illegible]	[illegible]

tial on March 1, 1916, total of 15c per share in 1916; 10c
3; 30c. in 1919; 5c. on February 15, 1920; total, $400,000.
ee mines known as the (1) **North Mocassin** property, (2)
operty, (3) **Shannon** property. The company originally
es-King mine.
pending considerable money in an unsuccessful search for new
was closed down, with about $300,000 left in the treasury.
Mocassin property, covering about 2,000′ in length along the
ion adjoining the Barnes-King on the north and the Kendall
purchased for $150,000; $5,000 cash, and the remainder to be
rking profits as made. The Piegan-Gloster property, near
Clark county, Mont, was obtained in 1913 for $100,000, with
f $8,200 for 5 adjoining claims. The Gloster mine had been
to 1888 and is credited with a production of several million

mpany paid $100,000 for all the property of the Kendall Gold
nnon mine, 2½ miles southwest of Marysville, was purchased
, payable from mine profits. Final payment was made dur-
1917.
pursued an energetic search for new properties, and in addi-
ned, has had under option 3 claims, 1½ miles N. of the Gloster,
indications were good, but at 50′ depth results were disap-
1918, the Mount Pleasant group of 2 claims, 3,000′ E. of the
n under option at $30,000, but after doing 1,000′ of work, no
was deemed justified. In February, 1919, a $70,000 option
Silver Bullion group in the Judith mountains, 10 miles from
a shaft was down 200′, but 50′ of work had revealed no ore.
orebodies at Kendall are irregular replacement deposits
g 25°. The ore are mostly soft and well oxidized.
total footage was 4,008 in 1916; 10,013 in 1917; 10,633 in
uring 1919. These figures are exclusive of work in prop-

ocassin group was first worked through the Barnes-King
tiago shaft was completed to the 500′ level and it is now the
. Orebodies have been opened up on different levels to a
. Exploration in 1919 on the 600′ level has disclosed a new
rage $11 a ton. The Kendall mine has been under lease for
the B. K. Co. a royalty of up to $3,700 per year for ore
sed. Development keeps up with ore extraction.
mine had been opened by a vertical shaft to a depth of 500′,
00′ below the 500′ level. The Piegan claim had been devel-
e B.-K. Co. unwatered the Gloster mine to the 800′ level and
orebody above water-level. The Norman tunnel, connects
nel and Gloster workings with the tram to the mill. In 1918,
0′ level, 937′ west, cut four ore-shoots with a combined length
t appear to extend far above the level. Reserves were 2,835
Vest end of 500′ level is promising.
ine, previous to the time of its being taken over by the
d by a tunnel with 2,000′ of workings, chiefly on the vein
was 300′ long, from 4 to 10′ wide, worth $15 gold per ton.
nk a shaft 450′ below the tunnel on the vein, dip 70°. The
here crosscut on the 100′ level is said to have a width of 15′.
oot, 400′ long, was opened on the 500′ level, but on the 650′
only 100′ long. The Shannon is 13,400′ from the Gloster
connected by aerial tram.
he North Mocassin there is a double-drum electric
a 1,400′ electric tramway from mine to mill, which is on
ip, and has a nominal daily capacity of 200 tons, allowing
d. There is also a small oil-fired roaster for treating the

black unoxidized ore found in the eastern ore-shoot. There is plant on the Kendall.

The *Piegan-Gloster* equipment includes a double-drum elect motor and compressor at the Gloster shaft. The old Gloster remodeled with a No. 5 Symons disc-crusher, three 10' Chilea tables, and a cyanide plant. The Shannon mine has a 75 h. compressor.

Operations and costs at the Piegan-Gloster mill are descri Cormick in the September, 1918, Bulletin of the A. I. M. E.

Power: purchase of the Kendall property included a electric plant on Warm Springs creek, 6 miles from the mine, nishes power for the Kendall properties, and also supplies the and Kendall with lighting facilities. The Piegan-Gloster and ties obtain power from the Montana Power Co.

Production:

	North Mocassin			Piegan-Gloster		
Year	Tons	Value	Bullion Sales	Tons	Value	Bullion Sales
1919	25,843	$6.56	$178,191	11,917	$6.27	$78,426
1918	21,378	$8.19	178,230	15,338	$9.21	141,227
1917	26,790	8.53	227,925	20,525	10.43	210,311
1916	33,715	8.65	253,788	22,144	6.15	133,588
1915	47,038	9.80	418,569	14,956	7.22	85,533
1914	51,471	8.44	424,411	.....	.....	.....
1913	49,726	8.89	400,854	.....	.....	.....

The grand total from March 1, 1911, to December 31, 1919,

Costs per ton:

Year	North Mocassin	Piegan-Gloste
1919	$8.194	$14.066
1918	7.558	10.197
1917	6.006	7.991
1916	6.307	6.998
1915	4.653	6.940

The Barnes-King Development Co. is a well-managed c issues a complete report. Development work is said to be dis enough ore continues to be opened up for the mills and t dividends. Details of properties taken on option show that com ing to prolong its life, and it shows conclusively that most of th in the district are worthless.

BARTON GULCH MINING CO.

Address: A. H. Jones, mgr., Virginia City, Mont.

Property: in Hungry Hollow, at Summit, near Virgin county. Mine is opened by tunnels, and is said to show $16 go Living quarters and shops have been erected, and a mill was 1919.

BASIN-MONTANA MINES CO.

Office: Room 1012 Little Bldg., 80 Boylston St., Bost

Officers: Melvin A. Houser, pres.-gen. mgr.; Francis Wm. A. Fotch, treas.; K. F. Baker, sec., pro tem.; E. J. Strad R. W. Clinton, counsel.

Inc. May 22, 1919, in Montana. **Cap.**, $500,000; $5 par $350,000 issued. Annual meeting in July.

Property: 22 claims, 400 acres, at Basin, Jefferson co vail N. E. of Butte. The claims were formerly held by the R Mines Co., but forfeited. Sixteen claims, covered by [illegible] stock, are said to contain ore to value of $300,000. [illegible] under bond and lease. The [illegible] the property. Equipped by [illegible] of U. S. Geological Survey. [illegible]

d traversed by two veins containing shoots of complex gold-silver-
ic ore, difficult of treatment. The group covers 6,000′ along the
Custer vein.
ent: on six claims, 2,250′ tunnel on Custer vein and 8 tun-
lson, 750′; Custer No. 2, 500′; Powder House, 100′; Confidence,
ter tunnel No. 1, 100′; Old Custer No. 2, 200′, and Bergman, 500′.
t: electric power, air-compressor, drills, etc.
n: shipments made some years ago carried 40 oz. silver and
on. Management expects to resume shipments at an early date.
l report states "The future of this enterprise can hardly be esti-
ou take into consideration the orebodies in sight, and with proper
. . The company can pay a dividend or disbursement of more
are, or 40 per cent. . . . Take into consideration that the mine
developed to the 100-foot level and already produced $100,000 and
ft $1,700,000 in sight in the mine." We hope so, but, in our opinion,
d do not warrant the conclusions given, and such statements are

K PLACER CO. **MONTANA**

dead, as letters sent to last address, E. G. Mellander, agent, Libby,
, Mont., were returned unclaimed.
company paid $150,000 for Libby Placer Mining Co. and
met Placer Co.'s properties ,covering 10 miles of gravel flats along
eginning 18 miles above the town.
was being erected in 1917 and ground was to be prospected thor-
beginning operations.

CH MINING CO. **MONTANA**

are of Alex. Johnston, Clark Brothers' Bank, Butte, Mont.
n Bridges, Madison county, Mont.
the Montana View group, carrying auriferous and argentifer-
s, opened by tunnel about 3,000′ long. Has steam power and air-
Property has little ore and is not on the contact zone; its chief
tunnel-site for the Moffat claims, which adjoin it, and were being
by Charles J. Stone, former manager of the Alex Scott mine at
loffat mine has developed a granite lime contact with basic ore
etite, that varies from 5′ wide for 1,000′ along the tunnel, to 100′
face. This ore, averaging 2.1% copper, was shipped, in 1916, to
smelter. Tramming to rail cost $2; freight, $1.75, and smelting,

REEK MINING CO. **MONTANA**

Whitcomb, Phillips county, Mont.
in the Little Rocky Mountains. Carries low-grade gold ore
dike, mined by glory-holing and treated by cyanidation.

REEK MINING CO. **MONTANA**

Philipsburg, Granite county, Mont.
a manganese mine on which a concentrating plant was

INING CO. **MONTANA**

lead, as letters were returned unclaimed, 1919, from Duluth, Minn.,
e.
M. H. Gannon, pres.; W. L. Harnan, Butte, Mont., v. p.;
ttison, Duluth, v. p.; Dr. J. B. Sullivan, Butte, Mont., treas.; J. W.
th, sec.
Cap., $950,000. Treasury stock being offered, 1917, at 40c

320 acres, 7 miles from Brown, on Oregon Short Line, in
unty, about 50 miles from Butte, said to show several copper-
A shipment of about 1,200 tons is reported to have averaged 4%
r .5 oz. in silver.
ent: work has only been done on 2 veins, and management

in 1917, planned to drive 650' tunnel with raises, winzes, etc., to body at a depth of 400' from surface.

BEAVERHEAD MONTANA COPPER MNG. CO.

Argenta, Beaverhead county, Mont. Property taken over Mines Co., which see.

BELL BOY MINE

Address: Dr. O. M. Lanstrum, Helena, Mont.

Property: near Marysville, operated by lessees. A wid silver-lead ore was opened, and ore was sent to the Bald Bu Helena smelter in 1918.

BEN HUR MINING CO., LTD.

Address: Saltese Supply Co., Saltese, Mineral county,

Officers: D. S. Dickson, pres.; Frank H. Bell, v. p. Chas. J. Luedke, sec.; C. A. Keating, treas., with Peter Peterson essen, directors.

Cap., $1,500,000; shares $1 par. Annual meeting, last S

Property: 9 claims, adjoining the Last Chance mine, 3 tese, showing a fissure vein, in quartzite, of 10' to 60' width at

Development: by 3 crosscut tunnels, the lower, of 1,10 carrying silver lead and gray copper ores. Property consid prospect. No recent returns secured.

BEN THOMAS MINING CO.

Address: B. M. Thomas, Libby, Mont.

Property: 10 claims in Rainy Creek district of Linc under bond to F. J. Doland, of New York.

Development: by 9 short tunnels, ore carrying gold, si with molybdenite and vanadium.

BERNICE RED ROCK MINING CO.

Address: Bernice, via Basin, Mont.

Officers: H. D. Fagon, v. p.; N. B. Lewis, sec.-treas.; agent, 1924 Thirteenth St., Washington, D. C.

Property: 4 claims located 3 miles from Bernice statio ern Ry., 26 miles from Butte.

A large vein shows scattered mineralization of lead carbo ore, but of low average value, containing gold, $0.40 to $1.60, 0.5% copper, lead 2%, and zinc 5%. Course of vein is N. 70° S., and where exposed has a width of 8' in the upper tunnel, tunnel.

Development: 2 tunnels, upper one 150' long, the oth below the upper, cut the vein at a distance of 200' from t winze was sunk on the vein from the lower level. The ore can and is capable of flotation, but value is low. Company officers are all colored men. No recent data available.

BETTY ALDEN MINING CO.

Closed down and company probably dissolved. Fully de XII.

B. & H. MINES & MILLING CO (not inc.)

Owners: N. J. Bielenberg and W. I. Higgins, Deer L

Property: known as the Bielenberg-Higgins, consists patented, 360 acres, 3 patented millsites and 1 unpatented tu Gulch, 14 miles from Twin Bridges, Madison county, Mont., o the N. P. R. R.

Geology: ore is a complex sulphide, occurring in porp granite. There are 9 known veins, said to be traceable for 4,0 gold, silver, lead, iron and copper. Veins strike E.-W. with dip flatter as work progresses; 4 veins have been extensively dev to be from 2' to 105' wide and continuous at depth, containing value, said to average $4 per ton. Ores are treated by [illegible] a recovery of 90%. Concentrates run $5 to $30 gold. [illegible]

copper. Ore reserves are estimated at 200,000 tons of $4 to

a 7'x7' crosscut tunnel, 900' long, drifts, raises and
d workings totaling 2,000'.
00-ton mill, 2 air hoists, pumps, wet-concentration plant,
640 cu. ft. capacity.
gement planned adding electric power, driving the tunnel to
ng daily capacity of mill to 300 tons. In 1918, mill was closed,
on of a transmission line from Twin Bridges to the mine, 14
919.

NE **MONTANA**

vard McCaffrey, Troy, Mont.; or H. L. Day, Wallace,

oins the Snowstorm Mines Cons. near Troy. About 2,000'
done and mine has shipped a good deal of zinc-lead ore. In
vas heard at Missoula by E. McCaffrey against H. L. Day to
cinded for the purchase of the mine by the latter.

NG CO. **MONTANA**

ce, Idaho. **Mine office:** Saltese, Mineral county, Mont.
r Peterson, pres. and gen. mgr.; Carlton Fox, v. p.; A.
ec.-treas., with Geo. K. Garrett and W. S. Brown, directors.
ng. eng.
09, in Idaho. **Cap.,** $2,000,000; shares $1 par; assessable;
assessment, 1 mill per share, July 22, 1914.
claims, 300 acres, unpatented, on Bald mountain, in the
r Adair, showing 3 fissure veins in St. Regis quartzite, various
veins with 4' thickness carrying streaks of chalcopyrite and
ar and quartzite. A carload shipment to Helena from an 18'
rned 28.7% copper, 28.9% iron, 15% sulphur, and 2 oz. silver
pper tunnel and a 200' lower diagonal crosscut tunnel show
rnite, carrying small values in gold. The C. M. & St. P. R. R.

control passed to S. B. Holbert, of Pittsburgh, Pa., who
5,000 in development and plant in consideration for an option
y shares at 2½ cents, and 500,000 issued shares at 5 cents.
dered promising.

ING CO. **MONTANA**

lder, Mont.
17, in Montana. **Cap.,** $3,000,000; shares $5 par.
roup of 7 claims in the Big Foot district, Jefferson county,
n Boulder. Claims said to show ore carrying silver, lead, and

by several shafts from 50' to 200' deep, all under water.
n closed down for many years, and was unwatered and re-

NING CO. **MONTANA**

nart, Mont.
. S. Neihart, pres., treas., mgr.; Violet Barker, v. p.; L.
h John Clover, directors.
p., $3,000; shares $2 par; assessable; all outstanding. An-
ch 10th. Gross earnings for 1916 amounted to $12,497, and
$19,259.
Big Seven mine, an old-time producer, near Neihart,
ont., which shows a fissure vein, 2" to 2' wide, in granite-
arry high value in gold and silver.
3,600' tunnel.
ncludes compressor and steam power. Total production
Management planned advancing tunnel and further develop-
ts.

BLACK FRIDAY GOLD MINING CO.

Office: Helena, Mont.

Officers: Willard Bennett, pres.-treas.-mgr.; A. J. Gale O'Hearn, sec., with J. L. Templeman, directors.

Inc. 1910, in Montana. **Cap.,** $2,000,000; par $5; issued; authorized and issued, $75,000.

Property: 10 patented claims, 128 acres, in the Radersb trict, carrying a vein in andesite, that runs N.-S. and dips 45 iron pyrite, with gold and silver values.

Development: by 700' inclined shaft and 3,500' of workin includes 150 h. p. electric hoist, compressor, 15-ton concentrator.

Production: reported as $261,000 to date. Concentrat per ton.

Latest reports are that E. N. Breitung & Co. relinquished thei foreclosure proceedings were to be started by J. L. Templema holders.

BLACK TRAVELER COPPER MINING CO.

Address: J. R. Bean, sec., Mullan, Idaho.

Officers: O. S. Roof, pres., Mullan, with R. E. Sisler, V and F. Lendtke, Saltese, Mont., directors.

Cap., $1,500,000; par $1; assessable. Annual meeting, November.

Property: 6 unpatented claims in St. Regis district, u lease to Saltese Consolidated Mining Co., which see.

BLUEBIRD-CORBIN GOLD, SILVER & COP'R M. CO.

Address: Wickes, Jefferson county, Mont.

Officers: Wm. Q. Ranft, owner and mgr.; John W. John

Property: 4 miles west of Wickes. One of the old m trict, taken over in 1911 together with the Penn Yan claim. Cla of 4' to 14' in width, carrying ore-shoots averaging 5% copper, silver, and $1.50 gold per ton. Ore occurs in a tourmalinized tuffs and diorite along a contact with a 50' wide dacite dike that wall.

Development: by 2,248' tunnel and 225' shaft, with lev 200'. Equipped with electric power. Mine was working in Sept

BLUEBIRD LODE

Address: C. T. Young, Getaway, Mont.; Gus. Peterson tin, owners.

Property: 6 claims, 1 patented, 14 miles from Getaway silver-copper ore occurs in quartz vein, course N.-S. Tunnel An undeveloped prospect.

BLUE BIRD NELLIE MINE INC.

Address: A. W. Paterson, E. C. Paterson, kane; H. Brown, Butte.

Ca[illegible]; 10c par.

Pro[illegible] 6 [illegible] Missoula. Mine p producer [illegible] 3 years. Total p reported [illegible]

Deve[illegible]

open one [illegible]

BLUE VEI[illegible]

Office: [illegible]

Officers: [illegible]

Inc. [illegible]

Prop[illegible]

ALTA COPPER CO. **MONTANA**

care Geo. H. Hill, Helena, Mont. **Mine:** near Corbin, Jefferont.

John Joyce, pres.; Marcus L. Hewett, v. p. and gen. mgr.; s, sec.-treas., with Walter Callender, Warren Curtis, Sr., Jas. G. ald S. Spriggs, Wm. Tatham and Chas. B. Van Nostrand, direc- M. Atwater, Jr., cons. engr.

, 1909, in West Virginia. **Cap.**, $3,000,000; shares $10 par; as Alta-Montana Copper Co. to take over and work the Alta mine, of $32,000,000, made it one of the big mines of the world.

mine, passing from the original owners to the Hudson Mining & , was shut down in 1903. The Alta Montana Co., Kelly Mining & , Alta-Montana Copper Co., and Boston & Alta Copper Co., owned essively. The New Mexican holdings of the Kelly Smelting & were segregated, holdings of present company being exclusively in

: 640 acres, including the Alta group of 8 claims, carrying f Alta or mother lode of the Corbin camp. Mine was unwatered Water being pumped to surface through Hewett shaft by means en from the shaft beneath the old workings and the water drawn nd-drill holes.

OLBY COPPER MINING CO. **MONTANA**

O.: Saltese, Mineral county, Mont.

Peter Peterson, pres.; Hon. Andrew Flaig, 208 E. Lake St., linn., sec., gen. mgr. and principal owner.

ember 16, 1903, in Montana. **Cap.**, $1,500,000; $1 par; 1,300,000 ch 1,075,000 is held by Andrew Flaig.

9 claims, unpatented, 180 acres, and a 5-acre millsite, lying he Butte-Coeur d'Alene Copper Mining Co., immediately west of East Coeur d'Alene, formerly known as St. Regis district. Lands -bearing veins, No. 1 of about 40′ width, showing a great iron No. 2, to the south, of about 3′ width, carrying mainly chalcopyrite, nite, of good average grade.

ent: by 2 crosscut tunnels, upper of 400′, lower of 900′ length ′ of drifting in both tunnels, said to show chalcopyrite streaks in ore. Property crossed by C., M. & St. Paul railroad. Wood and ndant. Assessment work only has been done for several years of funds, but owners wish to sink the shaft 500′ deeper and to do

CORBIN MINING CO. **MONTANA**

R. Jeffers, treas., 67 Milk St., Boston, Mass.

is in process of liquidation. Development work at the mine was nd the plant burned down. A distribution representing receipts and sale of remaining equipment was made in August, 1918, equal are. This is probably the final distribution, unless property is sold. , see Vol. XIII.

MONTANA DEVELOPMENT CO. **MONTANA**

08 Daly Bank Bldg., Butte, Mont., and 63 Devonshire St.,

W. R. Allen, pres.; W. C. Siderfin, v. p.; with J. D. Pope (gen. E. E. Esselstyn, J. G. Brown, Geo. Gallup and O. S. Heater, Gallup, sec.; P. B. Goodwin, treas.; S. W. Hall, mine supt.; metallurgist.

in Montana. **Cap.**, $25,000,000; $5 par; 3,000,000 issued d from $15,000,000 in August, 1918. Bonds amounting to in 1919. U. S. Corporation Co., New York, transfer Co., New York and Boston, registrars. Stock listed Curbs. Annual meeting, first Monday in February.

December 31, 1918, showed cash and accounts re- and notes payable, $54,624. Expenditures during

1918 were $193,140 at the mine, $237,994 on the railway, and $1
ern office, a total of $449,988.

Property: is extensive, covering two entire mining dis
27 lode claims and 6 placer claims in the French Gulch distr
county, Mont., and 89 lode claims in the Elkhorn district. Be
Mont. Company will practically control all these districts.

Both French Gulch and Elkhorn mines were opened in
which followed the discovery of gold at Bannack, a few miles
1862.

The *Elkhorn property* consists of the Central and other
the Idanha, Park, Aspen, Blue Eyed Annie and other mines, abo
adjacent, either owned or held under bond and lease. This tr
numerous big, strong quartz veins, cutting quartz monzonite and
zones of alteration adjacent to the veins. In the western part
veins are silver bearing, and high-grade ore was extracted
The ore contains gray copper and high-grade silver sulphide
shoots whose size and extent is as yet undetermined, since t
are shallow, seldom exceeding 100' in shafts or tunnel backs.
to belong to two distinct systems, one E. W., the other N. E.-
having a southerly and flatter dip and being the larger veins.

The eastern claims include the Park, a large N. E.-S. W. vei
and dipping 75° N. W., traceable across four claims. It is form
brecciated quartz with altered granite streaks and carries sh
copper and lead sulphides, having gold-silver values. Samples
of open cuts for a distance of 250' along the vein average 1.7%
oz. silver, and the lead ore from these cuts carries 7.5% lead,
11 oz. silver for 4' across, the full width of the vein not being d
grade ore has also been found in several shallow shafts and cu
but the development does not permit a definite estimate of amo

Copper ore occurs in the Idanha or Mono vein, a great lode
with a dip of 55° to the south. This vein is parallel to the Pa
mile N. W. of it. It is a copper-bearing quartz pyrite vein, whi
old veins of the Butte district. It is developed by a 900' tunn
back at the face. This tunnel cuts the ore at a point 600' from
crosses the vein at a slight angle, crosscuts exposing its full wid
ples show an average of 2.9% copper and 6 oz. silver per ton for
a persistent hanging wall band and two other bands of sulphide

The Aspen is an E.-W. cross vein, and is said to be fault
system. It is 2' to 5' thick and has been exposed for 600' by a dri
ing for this distance a 12" pay streak of siliceous ore carryin
copyrite and gray copper. This ore shows values of 0.9% copp
silver and $10 gold per ton.

The Mary-Montreal vein, developed by a 250' tunnel; the
opened by a 100' shaft and long drift tunnel, and the Elkhorn v
dozen shallow shafts close together, all show high-grade oxid
The Blue Eyed Annie vein is said to carry 15' of $15 ore on the 2
are also half dozen other veins of promising outcrop, but slig

Development: officially stated in June, 1919, that $2,50
spent in exploration of the various properties.

The main working tunnel intersects the veins from 1,000' b
their outcrops. This tunnel is 2,065' long with branches east and
its face that intercept the Park and Idanha veins, the total tunn
gregating 11,000'. The Idanha vein above the tunnel is estim
600,000 tons of mill [illegible] of a $5.00 [illegible] through this
main haulage [illegible]

High grade [illegible]

ber, 1919, a raise from 1,000′ level of the Idanha holed through el, 640′ above, showing continuous ore.

t tests made by the General Engineering Co. and O. B. Hoffake City, on two separate 100-ton lots show a ratio of concen- 27.77 and 100 into 32.6 with a recovery in concentrate of—

.....	$8.20	$14.60
.....	48.21	44.33
.....	7.25	14.63
.....	14.70	7.20
alue of concentrate per ton.....	$78.36	$80.78

ll, under construction, will be completed in July, 1920, and an unit added thereafter.

Gulch group of claims includes 1,100 acres, patented, water ns and 15 miles of ditches and flumes. About $750,000 is said to in development. Claims have been opened up by shafts and ly upon the Spain, Lucky Strike, Golden Crown and Leo. The in consists of a 900′ tunnel and 200′ shaft, with 800′ of drifting The drift tunnel is about 350′ below the apex and shows the m a few inches to 4′ of sulphide ore, averaging $17 a ton, ac- ates made by James E. Beveridge. Ore is said to be blocked out 500,000.

Strike has a 200′ tunnel following a contact vein reported to be nd 100′ shaft with 300′ of drifting on the vein whose thickness 35′, with a paystreak of ore running from $41.50 to $80 gold, and 2½% copper.

s been opened to the west by another 100′ shaft, with 600′ of an orebody 12′ wide averaging $18 a ton, according to the man- hundred feet of tunneling on the Golden Crown claims shows a to carry $8 to $20 ore.

e there are numerous smaller shafts and tunnels on the various nch Gulch group.

ower line was built from the Montana Power Co.'s line to the es, in 1919.

y's plans are bold and ambitious, but seem justified by the facts. ave long been known as promising, though hitherto unworkable oad transportation. The management is competent, and deserv- se for its energy and ability in continuing work throughout the

Montana Southern Railway.

ntrols the Southern Montana Railway, a narrow gage line from regon Short Line (Union Pacific system) to the mine on Wise in October, 1919. Three locomotives are employed and the line tons of ore daily. This road will handle all freight for the set- Big Hole valley, and should derive a considerable revenue from n of lumber, milled along the road on Forest reserve ground utte and nearby Utah and Wyoming points.

Boston & Montana Milling & Power Co.

on & Montana Dev. Co.

1916. Cap., $250,000; $25 par; divided into 5,000 shares outstanding, and 5,000 shares common.

ntana Dev. Co. holds B. & M. Co. stock in treasury, agreeing erred stock at $27.50 a share, and to give one share of B. & M. s.

1919, $300,000 first mortgage 3-year, 6% convertible bonds holders.

formed to provide money for the erection of a concentration- loped in the big haulage tunnel.

The results of recent development work in the mine in mill will have to be enlarged to 1,000-ton daily capacity in

BOULDER MINING CO.

Address: E. M. Cooper, Box 1136, Helena, Mont.

Property: the Evening Star silver-lead claims of 20 a Andrew Lavich.

BROADWATER COUNTY MINING CO.

Officers: J. J. Fisher, pres., Harlowton, Mont.; Len J A. Matthews, treas.

Inc. 1910. **Cap.,** $225,000; $1 par.

Property: 7 claims, includes the Evening Star, Copper G hard, about 5 miles west of Townsend, on the Radersburg roa promising outcrops and development is said to disclose veins 4' chalcocite ore assaying up to 60% copper, 6 oz. silver, with go 1918, management planned having property prospected and rep view to resumption of operations in near future, but nothing re

BUENA VISTA MINES CO.

Officers: G. F. Russell, bus. mgr., 1303 Dean St., Spok L. Magney, opr. mgr. Identified with the organization are W. Chickering, F. Leslie, J. Millspaugh, G. P. Larson, J. P. Boyd, K. McDonald, V. Rapp, Wm. Coleman.

Property: 3 patented claims, known as Buena Vista Granite county. Idle for 20 years until present company se lease. Principal values in silver.

BUTTE CONSOLIDATED COPPER MINING CO.

Mine at Corbin, Mont. Idle and apparently waiting for dev Bertha mine of the Boston-Corbin Co. to prove this property. S per Handbook.

BUTTE-JARDINE METAL MINES CO.

Offices: 50 Broad St., New York City, and 33 W. Gra Mont.

Officers: W. H. Nichols, pres.; M. W. Acklemire, v. p. sec.; D. E. Nichols, treas., with H. W. Barry, directors.

Inc. Jan. 10, 1917, in Montana. **Cap.,** $250,000; shares shares issued.

Property: 11 claims, at Jardine, Park county, said to hav workings exposing gold-bearing veins that vary from 2' to 36' in pre-Cambrian schistose rocks.

The company was promoted and stock sold by W. H. Nic York.

BUTTE-KNICKERBOCKER MINING CO.

Address: G. B. Conway, Helena, Mont.

No [illegible] since 1907, as [illegible] reported to origin count of [illegible] deferred pay

BUTTE & [illegible] MINE

See Shield[illegible] Mining

BUTTE & [illegible] GOLD & [illegible] MINING CO.

Merged [illegible]

Describe[illegible]

BUTTE & GE[illegible] [illegible] CO.

Office: [illegible]

Officers: [illegible] sec.-treas., with [illegible]

Inc. 1916, [illegible] standing.

Property: [illegible] be worked [illegible]

BUTTE REPOR[illegible]

s. M. Hinkle, pres.; Wm. Worth, v. p.; Wm. E. Carroll, ey, treas.; also directors.
4, 1910, in Montana. **Cap.**, $600,000; $1 par; all issued. third Tuesday in May.
claims, unpatented, at Vipond Park, Beaverhead county, f Melrose. Carries a fissure vein, 4 to 8′ wide in granite, ore nd copper of an average value of $18 per ton. Ore is oxidized to sulphide below that depth.
t: 200′ vertical shaft and 940′ tunnel.
includes boiler and pump. Little work has been done on me.

NGE MINING CORPORATION **MONTANA**

A. Whiting, Libby, Mont. J. C. Langley, pres., Seattle,

claims, 40 miles S. of Libby, Lincoln county, between st Fisher creeks. A stamp-mill of 100-ton capacity to be erected.

OLIDATED MINING CO. **MONTANA**

Silver Bow Blk., Butte, Mont. **Mine office:** Cable, Deer ont.
M. Fickeisen, H. Terheyden and S. Robinson, directors;

00 acres, 15 miles west of Anaconda, includes the Cable gold of the Southern Cross mine. Worked with varying success has produced about $4,000,000 worth of ore, with value mainly auriferous copper ore on the tunnel level.
includes steam power, air-compressor and a 30-stamp mill. as Cable Mining Corp'n was planned, at last accounts.

COPPER CO. **MONTANA**

Norris, Madison county, Mont.
alter V. Harrington, pres.; Wm. F. Davis, v. p.; Mark E. g director; Hugh J. Leonard, sec.; Thos. F. Hogan, treas.; rs, Jas. Keller and F. G. Crist, directors.
1909, in Arizona. **Cap.**, $5,000,000; shares $10 par; non- parently is connected in management with the Montana- o.
2 claims, 380 acres, include the Old Colony group, adjoin- ıa-Hecla, 5 miles southeast of Norris, carrying auriferous ıs copper ore.
ıt: includes several shallow shafts, with an old 100′ 2-com- on the Big Jack claim, and a 160′ tunnel, with about 900′ ot regarded favorably by late H. J. Stevens. A report on ade by Reeves Davis, 1911, recommended development of ps. Mark Davis, former manager, reported to be protecting h a view to re-financing the company, at last accounts.

COPPER MINING CO. **MONTANA**

con Bldg., Missoula, Mont. Mine office: Clinton, Mont.
lw. Donlan, pres.; F. H. Woody, v. p.; H. T. Wilkinson, ngr.; with A. L. Coffey, directors.
1906, in Montana. **Cap.**, $1,000,000; shares $1 par; issued, meeting, first Monday in June.
claims, patented, 40 acres, adjoining the Aladdin Mining ore veins in granite 1 of 8′ average width, traceable 800′, 00′ double compartment, vertical shaft, and 4 crosscut and 750′ of workings.
two 60-h. p. boilers, a 40-h. p. hoist and a 12-drill ore 6 buildings.
romising, though idle for several years, but ef- to resume operations.

MILLING CO. **MONTANA**

L, chief owner.

Property: 9 claims, in the Grass Valley section, 1 mil of Fort Harrison, Helena, shows a vein for 2,300'.

Development: by 250' incline shaft, to be sunk to 400' showing 5½' of carbonate ore and galena, said to assay $4 is chiefly in the gold content. A 15' shaft with 20' drift, of carbonate ore said to assay from $23 to $111 per ton. Has hoist.

Two carload shipments yielded $23 and $11 per ton re

CASCADE SILVER MINES & MILLS.

Address: Neihart, Mont.

Officers: G. Hale Brabrook, pres.; Lowndes Maury, v Lure, sec.; W. P. Wren, treas.; with J. C. Fairchild, W Paul A. Gow, directors. Thomas Westgard, supt.

Inc. Jan., 1918, in Montana. **Cap.**, $1,000,000; $1 pa Annual meeting in January. Cash on hand, April 1, 1919,

Property: 9 patented claims, include both the old M the Broadwater group at Neihart, Mont.; examined by W Paul A. Gow. Mining geology of district described by U. S. Geological Survey report on Little Belt Mountains.

Geology: ores occur in fissure veins in gneiss; the v wide, dipping 78° and run N. 18° E. Shoots are from 150 t is a complex sulphide, but easily milled, carrying 20 oz. sil 3% zinc.

Development: by 500' vertical shaft and 3,000' tunnel, o ton to depth of 500' and Broadwater to 1,200'. Undergrou 15,000'. The Moulton was unwatered by April, 1919, an milling ore and considerable smelting ore exposed, the from $1,500 to $2,500 per carload. Ore is mined by back fil serves comprise 100,000 tons blocked out and 300,000 to The Broadwater tunnel was cleaned out and exploration 1919.

Equipment: 350-h. p. steam hoist, boilers, 1,000 cu. ft. gal. electric pump, 2 aerial trams, and 200-ton mill with Separation flotation plant, started February, 1919.

Production: from May 1 to Dec. 31, 1918, 174 oz. gold, and 470,000 lb. lead. Ore averaged 75 oz. silver per to realized $95,002, and in first 2 months of 1919, $77,045. W the possibilities of profitably working these old properti

In June, 1919, a suit was started by Paul A. Gow a directors to compel them to return the 150,000 shares ille selves for alleged services.

CASTLETON COPPER CO.

Company probably dissolved as property was sold in to Furnace Creek Oxide Copper Co. See Vol. XIII f Castleton Copper Co.

CAYUGA DEVELOPMENT CO.

Office: 616 Lyceum Bldg., Duluth, Minn. **Mine offic** Bow county, Mont.

Officers: C. T. Fitzsimmons, pres.; Nels Anderson, v. p sec.; Max P. Shapiro, treas.; John Helehan, gen. mgr., Jacob Stein and Jas. L. Norman, directors.

Inc. April 4, 1910, in Minnesota. **Cap.**, $150,000; $1 pa

Property: 4 claims, 80 acres, in the Fleecer district, 1 of Butte, near the Oregon Short Line railway.

Geology: property shows granite with dikes of and quartzite, carrying veins with a generally E. W. strike estimated to range 50 to 125' in width, workable for [illegible] melaconite, malachite, azurite, cuprosonella, chalcopyrite, bornite.

by 100′ tunnel, and shafts of 45′, 125′ and 150′, showing
o 30% copper, and from a trace to 70 oz silver per ton.
crosscuts of 150′ and 180′, cutting the vein for an appar-
The vein at this depth is nearly vertical. Idle, and no
ne for many years.

TA EXTENSION MINING CO. **MONTANA**

Skiles, pres.; 22 N. State St., Chicago, Ill. F. I. Foote,
nt., and Corbin, Mont.

H. P. Skiles, pres.; H. H. Ebert, sec., Helena, Mont.;
treas.; with F. I. Foote, J. E. Smith, E. F. Rinear and
ctors.

′, in Montana. **Cap.**, $600,000; $1 par; $10,000 in treasury.
aims, 36 acres, at Corbin, Jefferson county, adjoining the
Mng. Co. property on the E., shows fissure veins in
s are from 1′ to 10′ thick, averaging about 4′, and carry
of copper, silver and lead ore, reported to assay $48 per

by 900′ shaft with crosscuts and drifts cutting 4 ledges
o has a 1,200′ tunnel. Underground workings total 2,000′.
)-h. p. electric hoist and compressor.
s done through the Boston & Corbin shaft, crosscut-
im and reported to have cut 5 veins. Ore was milled in
ntrator, which was burned,.

E PACIFIC MINES CO. **MONTANA**

al years. See Vol. XIII of this work.

G & MILLING CO. **MONTANA**

d'Alene, Idaho. **Mine:** near Whitefish, Flathead county,

Max A. Dorland, pres.; Fred Eppinger, v. p.; J. H. Wig-
accounts.
p., 1,000,000 shares.
ped by a short tunnel, but is presumably idle.

D CENTRAL BUTTE COPPER CO. **MONTANA**

M. Cobban, sec., Butte, Mont.
Jones, pres.; R. H. Wearing, v. p.; D. J. Charles, treas.,
y, directors.
906, in Montana. **Cap.**, $1,200,000; shares $1 par; assess-
0 shares. At last report had levied 3 assessments, ag-
per share, or about $28,000. Annual meeting, second
ary.
ird interest in the North Star, South Star and January
and mineral and mining rights on 110 acres of patented
e claims are developed by a 225′ shaft, said to show an
de. Idle several years for want of working capital.

ER MINING CO. **MONTANA**

Mont.
Adams, 50 State St., Boston, Mass., pres.; F. F. Stanley,
secretary-treasurer; G. H. Edmunds, Ruby, Mont, business
weeney, Ruby, Mont., dredge superintendent.

nsive placer claims in the Alder Gulch district, Madison
out 80 miles by rail from Butte. Described in detail in
Bureau of Mines, 1916.
to 1916 has cost $1,200,000, advanced largely by the
ay and a few shareholders. There are 4 electric dredges,
only 2 have been in operation. A few details of the
of interest.

	No. 1	No. 2	
Year built	1908	1908	
Monthly returns, cubic yards	96,270	62,709	
Power consumed, h p	380	380	
Depth of digging below water, feet	30	35	
Capacity of buckets, cubic ft	7½	7½	
Gold-saving area, square ft	1,231	1,231	
Cost of boat	$108,000	$128,000	$

No. 4 boat has dug as much as 411,000 yards in a m 2,000 tons.

Power is supplied by the Madison River power plant Over $50,000 has been spent on a machine-shop, and over and supplies are kept on hand. On the dredges 36 men ployed; and 49 in other departments.

Production: from 1899 to 1916 a total of 37,000,000 yar yielding 16c per yard, or $5,920,000. From 1906 to July 31 tity moved was 31,379,890 yards, at a total cost of 6.96c pe

This has been one of the most profitable dredgin America, but will soon be worked out. Many dredge im generally in use, have been devised by the Conrey Compa of Gordon MacKay, Harvard University benefits largely made at Alder Gulch.

COOKE MINING & REDUCTION CO.

Property: near Cooke, Park county.

Developed: by tunnels, showing auriferous and arge ores. Has a small steam plant. District is remote fro being on N. E. border of the Yellowstone Park.

Idle at last accounts.

COPPER AGE & EDISON MINING CO.

Idle. **Officers:** Chas. J. Heidenreich, Spokane, Wash Webster, Wallace, Idaho, sec.-treas.; L. N. Hyde, supt.

Inc. 1906, in Washington. **Cap.,** $250,000.

Property: 12 claims, 4 miles south of Saltese, is an e of the Richmond mines, carrying extension of copper-he that mine, the vein paralleling the Monitor. The vein is ex the tunnel just east of the divide; it averages 10' thick, is n carries a very little chalcopyrite and chalcocite in a siderit

Development: includes a main 1,160' crosscut tunnel, v showing sulphide ore assaying up to 30% copper, and $14 g work has been done since 1916, but company contemplated tions at last report.

COPPER MILL MINING CO., LTD.

Office: Wallace, Idaho.

Officers: Morton Webster, pres.; A. T. Ryan, v. p.; sec.-treas.; preceding, with Howard K. Welch and Jas. He

Inc. March, 1908, in Montana. **Cap.,** $250,000; share assessable.

Property: 6 claims, 125 acres, in the Sunrise district, n ...ults c... on the Montana side of th... Montana-Idaho ... [illegible] siliceous ... 25' to 50' wi ... [illegible] ... Mine ... [illegible] ... mat of the

UNTAIN MINING & DEVELOPMENT CO. MONTANA
llan, Idaho.
ohn Hendricksen, pres.; A. B. Willard, v. p.; D. Flynn and
ectors.
n Idaho. **Cap.**, $1,500,000; shares $1 par. Annual meeting,
n December.
5 claims, one fractional, 95 acres, with 3 adjoining claims, at
opper creek, near Thompson, Sanders county. Mont. Mine
the upper a crosscut, deflected for 56′ along the vein, said to
rrying pockets and seams of copper carbonates, with gold and
last account.

TH MINING & MILLING CO. MONTANA
Lothrop, Mont.
3, 1909, in Idaho. **Cap.**, $3,000,000; $1 par; issued, 2,200,000.
8 claims, unpatented, 160 acres, the Coppersmith group of 6
Inverness group of 2 claims, also a water right and millsite,
up Petty Creek from Lothrop. Property carries some good
Coppersmith claim shows limestone and quartzite for an
n of about 400′, and length of about one-half mile, with out-
3 to 20% copper ore.
nt: by prospect shaft and crosscut tunnel, said by manage-
erely 300′ of silicified limestone averaging 1% copper. Prop-
number of open cuts and pits, and a 50′ shaft, bottomed in
o average better than 6% copper, with small gold and silver
oppersmith was formerly reported to show 3 main veins, one
over 100′ wide at surface, with ore assaying 2 to 3% cop-
vein, parallel with and 500′ from the Coppersmith, is re-
ide.
ness group, 3 miles from Lothrop, has a vein of 3′ to 4′
zite and slate, carrying malachite, chalcopyrite and chalco-
ays of 15 to 17% copper and $10 to $12 per ton in combined
values. Property has 4 buildings.
for annual assessment work.

PER CO. MONTANA
Congress St., Boston, Mass. **Mine office:** Butte, Mont.
M. Edwards, pres. and gen. mgr.; Henry Tolman, treas.;
; with S. L. Powers, Jos. C. Walker and T. S. Woods, direc-
man, sec.
4, 1908, in Michigan. **Cap.**, $3,750,000; shares $25 par; assess-
issued, 130,000 shares; amount outstanding, 26,000 shares;
sury, 124,000 shares; $8 per share paid in. Company sold
f treasury stock, early 1910, at $10. Federal Trust Co.,
ar; American Trust Co., Boston, transfer agt. Stock is
oston Curb. Annual meeting, third Tuesday in April.
sments levied: $65,000 due February 11, $65,000 due April 22,
vember 14, 1913. Poor response was made to these and the
orced to borrow $95,000 on its notes, giving, as guarantee,
ssments. Owing to lack of funds all work was stopped on
early in 1914.
led in May, 1919, with County Clerk at Butte showed prop-
ets of $672,665, and liabilities of $86,596, all unsecured.
ny owns 57 mining claims, 45 patented, near Corbin,
The 3 claims at Butte were sold to the Anaconda

es at the head of Clancy Creek, a few miles west
side of an andesite hill across from the Boston
operty carries several strong fissure veins in
ble exploration work has been done with dis-

appointing results. A vein opened for 800' in the Rosal
up to 20 oz. silver and 7% copper, but is only 18" wide.

The Montana tunnel shows a pyritized conglomerat
dacite and aplite cobbles, the matrix containing small silv
upper tunnel, while the winze in the lower tunnel shows co
The Bonanza tunnel is driven on a tourmalinized granite
and in places the tourmaline rock carries galena and c
small amounts of zinc-blende and pyrite.

CORBIN-COPPER KING MINING CO.

Office: State Savings Bank, Butte, Mont. **Mine addre**
ferson county, Mont.

Officers: W. H. Hall, pres.; W. D. Gibson, v. p.; R.
treas.; preceding officers, I. A. Heilbronner, Wm. Genn
Schultze, directors.

Inc. 1911, in Montana, as successor to the Montana-Co
Cap., $1,000,000; shares $5 par; issued, 199,994 shares. Sto
Montana-Corbin Co. received a new share for old on pay
a share.

Property: 2 claims, 26 acres, about 1 mile from Corbin,
shows 4 well-defined veins carrying bornite and chalcop
about 10% copper, 20 oz. silver and 50 cts. gold per ton.

Development: consists of a 2-compartment shaft, 400'
500' of workings on the Hidden King claim. There are al
tunnels.

Equipment: includes two 60-h. p. boilers, a 15-h. p. hoi
tric air compressor.

A full report on this property was made, 1911, by Alfre
meuting earlier reports by E. P. Jennings, and L. S. Ropes.

Idle since organization.

CORBIN METAL MINING CO.

Office: Pittston, Pa. **Mine office:** Corbin, Jefferson cou

Officers: J. H. Foye, pres.; John Hoy, v. p.; Thos. M
M. W. O'Boyle, treas.; at last accounts.

Inc. 1907, in Montana, as Corbin-Montana Copper Co.,
Jan., 1910, to present title. **Cap.**, $1,000,000; $1 par; issued
pany apparently is a twin of the Jefferson-Montana Copper
nual meeting, second Tuesday in April.

Property: 11 claims, 176 acres, known formerly as the
2 miles S. E. of Corbin, in the Colorado district, shows
ranging from a few inches to about 8' in width, cutting gran
chalcopyrite, bornite and galena, estimated by company
copper, 8% lead, 5 oz. silver, and $2 gold per ton.

Development: by 500' 2-compartment incline shaft wi
drifting on 500' level, cutting a small orebody carrying
sulphides, and by several short tunnels.

Equipment: includes electric hoist, good for 1,000' depth
air compressor. There are 6 buildings, including carpenter s
change house.

Idle several years.

CORBIN-VALPARAISO COPPER MINING CO.

Presumably defunct. See Vol. VI, Copper Handbook.

CRUSE CONSOLIDATED MINING CO.

Property transferred to Thomas Cruse M. & D. Co., which

CUPRITE COPPER MINING CO.

Office: Helena, Mont.

Officers: [illegible] L. Reeds, pres. and gen. Helena, Mont.; J.
F. J. Ri[illegible] Moore, Geo. M. Sedley, dir
Ca[illegible]
P[illegible] midway between

nt. Two well-defined veins on property; one, a gold-silver-
20′ wide, the other, a gold vein of promise.
nt: by 200′ shaft, 100′ of drifting on this level, and a winze
340′ of drifting on the 300′ level, which will cut the quartz
f 340′.
: includes a steam hoist and air compressor.

NE **MONTANA**

are A. M. Holter, owner, Helena, Mont.
t Victor, Ravalli county, Mont. Was formerly a silver pro-
ains zinc ore, and a vein claimed to be 12′ wide, is said to
ing 10% copper, with some lead, silver and gold. A con-
with flotation unit to treat 85,000 tons of tailings was worked
17. Financed by Los Angeles capitalists.

PER MINING & SMELTING CO. **MONTANA**

Vickes, Mont. Wm. W. Dailey, pres.; A. R. Robertson, v.
, sec.
1907, in Montana. **Cap.**, $1,500,000; $1 par; issued, 870,000,
t 800,000 shares paid for the property, is held intact.
he Atlas group of 4 claims, patented, 25 acres in town of
on county, said to show well-defined fissure vein in andesite.
V and is of 12′ estimated average width, carrying lenses of
alcopyrite, bornite and chalcocite, estimated by management
copper, 12 oz. silver, and $1 gold per ton, 20% iron, 18% sul-
ilica, without lead or zinc.
nt: a 340′ shaft, with 2,000′ of workings on vein, said to show
re blocked out.
ners shipped about $30,000 worth of ore. An independent
s ore to average about 3% copper, 7 oz. silver and 80 cts.

de and property endorsed by F. L. Sizer, and Potter, Dick-
ie.
veral years, owing to inability to finance the erection of a

NG AND MILLING CO. **MONTANA**

lan, Idaho.
. J. McHugh, pres.; C. D. Miller, v. p.; S. C. Bean, sec.-
eridan, mgr., with J. A. Ghormley, directors.
, 1907, in Idaho. **Cap.**, $1,000,000; shares $1 par; 400,000

10 unpatented claims, 200 acres, near Keystone, Sanders
4½ miles from a railroad, said to show a fissure vein in
ng lead and silver.
nt: by 3 tunnels 175, 375 and 670′ long, opening vein at depth
50′, respectively. Mine is a prospect.

GOLD & COPPER MINING CO., LTD. **MONTANA**

lead and copper claims, one-half mile from N. P. R. R.,
ral county, Mont. Described Vol. X.
to Oscar Nordquist, manager, operations were resumed in
in has been opened for 600′, and a 200′ shaft put down, at
l with a crosscut to the vein.

INING CO. **MONTANA**

xistence lapsed.

NG & SMELTING CO. **MONTANA**

Gulch, via Martinsdale, Mont. C. M. Durant, supt.
from Martinsdale, Meagher county, shows fissure-
hide ore with gold.
compartment shaft. No recent returns secured.

MINING CO. **MONTANA**

Mullan, Idaho.

Officers: H. P. Hogan, pres.; W. J. Hughes, v. p.-m Westervelt, sec.-treas.; with T. A. Westervelt, directors.

Cap., $150,000; 10c par.

Property: 14 claims, 3½ miles N. of Haugan, Mineral c **ment:** tunnels totaling 1,324' have opened some 8% copper, 3 oz. silver ore.

EAST PACIFIC MINING CO.

Address: Box 122, Helena, Mont.

Officers: R. A. Bell, pres.; O. N. Kessler, v. p.; W. A. A. L. Smith, treas.; with N. Gage, directors.

Inc. in Arizona. **Cap.,** $1,000,000; $1 par; 556,118 shares meeting 1st Saturday in April.

Property: 8 patented claims, 139 acres, and a millsite, Winston, Broadwater county, and 20 miles S. E. of Hel show a fissure vein in andesite, carrying gold, silver, lead to run $7-10 a ton.

Development: by 4 tunnels, longest 3,300', and by a 13 ment includes 75-ton mill, pump and compressor.

Property: worked by lessees only for several years, bu option to D. M. Adams, of Spokane, in 1918.

No recent returns.

EASTERN BELLE MINING CO.

Address: Helena, Mont.

Officers: Geo. Huffaker, pres.; S. T. Hill, v. p.; Geo. H

Inc. 1916. **Cap.,** $100,000; shares $1 par. Bought th mine from Helena Bureau of Mines.

Property: 2 claims, 40 acres, in the Scratch Gravel ca Claims show quartz, carrying free gold.

Management planned to sink incline shaft several last accounts.

EAST SPRING HILL MINING CO.

Address: 630 Munroe Ave., Helena, Mont.

Officers: A. H. Kleinschmidt, pres.-treas.; M. Kuphal, F. H. Hillehecht, directors.

Inc. Jan. 20, 1914, in Montana. **Cap.,** $40,000; 10c par Annual meeting first Monday after first Tuesday in Januar

Property: 7 claims, 140 acres, between Grizzley and O 4 miles S. of Helena. Ore occurs in contact vein with carries $4 or $5 per ton in gold.

Development: by shaft to depth of 180', and 1,500' of 2,000' of workings. The president writes that over $40,000 and property is for sale. The same owners are operating at as the American Mining Co., Ltd.

ECLIPSE ARGO MINING CO.

Defunct—property lost. **Address:** E. G. Hoffman, Britain, Conn. Eclipse Argo mine near Argo, Broadwate was lost by bondholders foreclosing and in April, 1913, d to trustee for entire property. In 1918 the Furnace Cree Co., bought 51% interest in this mine, for $150,000.

ECONOMY GOLD MINES CO.

Address: East Helena, Mont.

Officers: J. L. Kessner, pres.; S. Rosenfield, v. p.; I. S. L. Joseph, treas.; directors. C. E. Freyberger, supt.

Inc. in Montana. **Cap.,** $1,500,000; shares $1 par; 280,0

Property: 180 acres, patented, 6 miles from East H fissure veins in diorite, andesite and granite. Chief vei strike, with 75° dip. Ore, containing gold, silver and c shoots said to average 3' in width and from 35' to 150' in le

Development: by 2 shafts about 300' deep. Ore develo

high-grade ore stoped on the 100', but wider and varying
per ton.
ncludes boilers, 3 gasoline hoists, two 75-h. p. compressors,
equipment and a 150-ton concentrator built during 1918-

EEN MINING CO. MONTANA
orn, Jefferson county, Mont., was idle many years.
st report were stoping ore, said to be 30' wide, from the
nts made to East Helena smelter.

E MONTANA
Was owned by Betty Alden Mng. Co., now dead.

R DEVELOPING CO. MONTANA
C. Cooney, Butte, Mont.
M. Joyce, pres.; R. E. Strasberger, v. p. and supt.; H. C.
s.; also directors.
1918, in Montana. Cap., $50,000; $1 par; none issued.
ore sold netted $924 and operating expenses were $6,200,
laims, 1 patented, in Nigger Hill, Elliston district, Mont.,
by the Butte & Elliston G. & C. M. Co. Examined by
E. J. Strasberger.
ms contain a fissure vein in diorite as well as a "blanket"
eak is 8" wide, and consists of a complex sulphide assay-
zinc, 1 oz. gold, and 26 oz. silver per ton.
: by 300' vertical shaft, and 1,200' tunnel. Greatest depth
ngs total 1,350'. Ore is mined by underhand stoping.
team hoist and compressor. A one-mile aerial tram is to

rted work in June, 1918, and shipped 26 tons of $35 ore to

PER CO. MONTANA
Mont.
Donald Campbell, pres.; I. A. Heilbronner, v.
A. T. Morgan, sec.; with W. C. Lewis, W. H.
rectors.
1906, in Montana. Cap., $1,000,000; shares $2.50
acres, in the S. E. part of the Butte district,
y with the Alliance Copper Co. Crosscut on the
e carrying copper, lead, zinc, and silver. Inactive

EVELOPMENT CO. MO
n. Chas. S. Warren, 73 Hirbour Blk., Butte,

S. Warren, pres., with L. O. Evans and John M.
liver and V. D. Williamson, of Spokane, and
Ingraham of Kalispell, directors.
g Copper, Nos. 1, 2, 3 and 4 and Noble Copper
to 20' wide, on Felix Creek, a tributary of South
uth of Coram, a station on the G. N. R. R.
d in 1917, because of the great distance from rail
ing the property.

NING CO. MO
lume XIII.
ed to Thomas Cruse M. & D. Co., which see.

EK OXIDE COPPER CO. MO
E. Corrette, sec., Hennessy Blk., Butte, Mont.
go mine, Cany
wis & Clark counties,
upt., Corbin,
W. Goodal
; with A. H.
906, in Arizo
5,500 in notes

Company was organized to operate a mine in the D trict, Inyo county, Cal., but which proved of little value.

In 1918 paid $150,215 for a 51% interest in the Eclip Hell Gate canyon, about 30 miles E. of Helena, Mont., a p owned by the Eclipse-Argo Co., producing 2,000,000 lb. of 1916, and later (1916) was owned by the Castleton Coppe 1919, the control of the Legal Tender silver mine at Clanc by the Furnace Creek company. It is an old and once mine.

Property: the Argo group consists of 5 claims, 2 patent a well-defined fissure vein, up to 18" thick, cutting through stone, at an angle of 75 to 80°. Ore is massive chalcopyri copper. Reported on in 1916 by F. A. Linforth.

Mine shut down December, 1918.

Development: by 200' Argo shaft, to be sunk another tunnels, workings totaling over 3,000', opening the mine t The vein probably extends through the Argo and Lamont c of 2,750', but only 500' has been explored.

Equipment: 8½-mile electric transmission-line from Mo at Canyon Ferry, has reduced power costs as much as $ ton of ore; mine has hoist and other machinery; the mill, equipped for fine crushing and flotation, is to be remodelled.

Production:

Period	Ore and Concts. tons	Copper %	Copper
Jan., 1917-Dec. 31, 1918.... (Furnace Creek O. C. Co.)	2,498	25.49	1,273,0
Mar., 1916-Jan., 1917..... (Castleton Copper Co.)	1,307	26.03	680,4
Oct., 1902-May, 1909..... (Former owners)	2,018	27.57	1,112,0
Total	5,823	26.33	3,066,7

Up to October 1, 1918, costs of the Furnace Creek $11.92 per ton of ore, or 18.997 cents per lb. of copper.

Tailing dumps at the mill amount to 12,000 tons averag which will be leached.

Property though small is considered good, and well m

GIRARD COPPER CO.

Officers: George J. Kirby, pres., Willimantic, Conn.; Ge sec., Kimball Bldg., Boston, Mass.; E. C. Denton, supt., Mont.

Inc. 1912, in South Dakota. **Cap.,** $10,000,000; shares issued; 501,000 shares pooled. Admitted to quotation on B 91,020 shares; January, 1913. Annual meeting in Janua Bank, Boston, registrar; Ex. Trust Co., Boston, transfer ag

Property: 20 claims, partly patented, 400 acres, 5 mi Springs and 10 miles N. W. of Butte. Ore occurs as a sulph quartz vein, between monzonite and aplite, assaying 4-8% co and 2 oz. gold.

Development: by 60' Jack Pot shaft and 150' tunnel. A only done.

GISH CHROME MINE

Address: W. D. Marlow, Bigtimber, or O. V. Miller, Financed by Shelby Gish.

Property: 13 claims, 250 acres, 34 miles up the Boulder timber, Sweet Grass county. Ore consists of chromite to 12' wide, opened by 140' and 160' tunnels to depth of 90',

10-stamp mill with concentrators erected in 1919; $13,000
ty in 1918. O. V. Miller, superintendent, places reserves at
absurd figure for a chromite deposit. The Bonanza group
sold to Barker & Purdy of Great Falls for $50,000, and the
d group to Gish and Marlow of Colorado, for $75,000. The
over the Bonanza group later on. Two carloads of ore
nver in 1918.

MINES & REDUCTION CO. **MONTANA**

F. Dow & Co., 10 State St., Boston, Mass.
arles Stoddart, pres.; L. R. Davidson, v. p.; Dr. F. J. Carr,
W. F. Sikes, J. H. Carr, W. M. Decker, and E. H. Hechler,

ona. **Cap.**, $1,000,000; $1 par.
patented claims, 12 miles from Sheridan, Madison county.
t: on the Gladstone claim consists of four tunnels, known
650 and 570'; levels are connected by raises, said to block
alue of $200,000. The vein is from 12 to 60" wide, and ore
silver in proportion of 9 to 1. Ore assays from $8.65 to
the average being from $15 to $20.
includes a 10-mile electric transmission-line bringing power
ity; two 150 h. p. and several small motors; 12 drill com-
y and a complete 125-ton mill consisting of crusher, Har-
Dorr classifiers, etc., cyanide plant, filter, and dwellings.
ctus and accompanying letters indicate that most of the
ysicians or druggists of Buffalo, N. Y., who appear to have
ally. The circular states: "This ore is actual gold value,
heat in an elevator waiting to be ground into flour," and
ative statement that our mines will not be exhausted in 50
ion." "As a rule there is more value below than above."
ulation we should be able to divide $700 per day among the
ore than 30% per year." "We have a clean financial slate."
rts of this company to make a profitable mine seem to be
use suspicion by the publication of such absurd statements
hich are not at all likely to be fulfilled.

N MINING CO., LTD. **MONTANA**

ad. Described Vol. XII.

MINE **MONTANA**

ank Eichelberger, supt., Melrose, Mont.
J. Edson, Jr., 2206 First Natl. Bank Bldg., Pittsburgh, Pa.
0 claims, 3 patented, in "Highland" section, Moose Creek
south of Butte, shows gold-quartz vein averaging $6.50 per
ot 20' thick and 300' long in granite.
t: by 500' incline shaft, at 10° dip with total of 1,400' of
0 tons of ore developed. Has steam power and 50-ton mill.
ata available.

RY CONSOLIDATED MINING CO. **MONTANA**

ne Sour Dough group, 9 claims, 162 acres, near Elkhorn,
, Mont. Orebody 100' wide is oxidized, lying between lime-
e and dipping at 45°. Claims said to show 5 orebodies, 2
Ore is iron oxide carrying low values in gold and copper.
copyrite and tenorite, such ore assaying 1.9% copper, 4 oz.
. gold per ton, with 48% excess iron. Geology and history
n in Bull. No. 527, U. S. G. S., Helena Mining Region, pp.

t: by open cuts and tunnels; total workings said to be

ease May 1, 1917 to the A. S. & R. Co., which gave it up
7, owing to depletion of orebody. During 1918, lessees
of ore assaying 0.75 oz. gold, trace of silver, and copper,
% insoluble, sold as a flux to the East Helena smelter.

GOLDEN EAGLE MINING & MILLING CO.

Address: Mullan, Idaho. J. L. Martin, sec.

Officers: Emil Lennarson, pres.-mgr.; Frederick Hart
Martin, sec.-treas.; with John Rolin and W. Hutchinson,

Inc. Feb. 14, 1919, in Idaho. **Cap.**, $1,000,000; par $1; a
issued. Annual meeting February 14.

Property: 9 claims, 180 acres, at Keystone, Mineral c
ries lead and silver, and has been opened by 75 and
prospect.

GRAND VIEW MINING & DEVELOPING CO.

Probably dead as letters sent to Twin Bridges, Madison
are returned unclaimed.

Property: molybdenum-bearing claims, 11 miles E. of
said to show a vein of porous and well-crystallized cerus
pregnated with iron oxide, containing ½ to 1% crystal
(molybdate of lead). Ore also carries gold and silver.

Development: little work done to date and commercia
posit not known. Concentration may be complicated.

GRANITE BI-METALLIC CONSOLIDATED MNG. CO.

Office: 821 Security Bldg., St. Louis, Mo. **Mine office**
Mont.

Officers: J. P. Meyer, pres.; E. S. Orr, 1st v. p.; J. P. Hart
F. D. Fusz, sec.; G. J. Tansey, treas., with C. G. Ewing, L. S.
Rumsey, Jr.; A. L. Shapleigh, W. C. Uhri, and J. H. Dieckman
S. Blitz, act. supt. and Charles Bielenberg.

Inc. April 6, 1898, in Montana. **Cap.**, $10,000,000; $10 p

Property: over 2,500 acres at Phillipsburg, Granite cou
a merger of Granite Mountain and Bi-Metallic properties, whic
4,000,000 oz. silver per annum in early days, total output bel
of which $14,000,000 was distributed as dividends. Decline in
resulted in practical suspension of work.

Geology: fissure veins in granite, adjoining a large area
Best ore-shoot is said to be 4,400' long. Ore is mostly sulph
silver with accessory gold and copper values.

Development: by 3 shafts to 1,800' depth, and 2 tunnels,
Greatest depth of workings, 2,250'.

Equipment: old mill partly dismantled and full mining e

Recent work being done is by 60 lessees, although in 1919,
sunk to 1,000' to prospect for the manganese area, where zin
expected. In October, 1918, the new hoist bought for one of
was sold to the Jib Mining Co., of Basin.

Present company has made a courageous attempt to open
in the hope of developing new orebodies comparable with tho
the district famous. Despite a large expenditure for machine
ment work, results to [illegible] are unsatisfactory.

GREAT FALLS-BA[illegible] MINING CO

[illegible] H. H. Roberts, sec. and
Jo[illegible]
[illegible] district, C
Mon[illegible]
Ore [illegible] equipped p
erected [illegible]

GREAT [illegible]

ERN MINING & MILLING CO. **MONTANA**
bably dead as letters sent former address, Chico., Mont.,
n 1919. H. F. Lawrence, mgr. at last accounts.
½ miles from Chico Hot Springs, Park county, Mont., at
Nearest railroad is at Emigrant, 10 miles away.
: tunnel reveals a brecciated and somewhat altered, fine-
y porphyry in which fine-grained molybdenite intimately
yrite forms the matrix and permeates the individual frag-
ted material. Ore contains 5% molybdenite, and deposit

flotation was erected, 1917, but no recent news is available.
ONTANA GOLD MINING CO. **MONTANA**
Richard Daxon, mgr., Hamilton, Mont., at last reports, but
nclaimed 1919.
mpany owns group of claims in Mineral county, Mont.
: by 400′ crosscut, driven to intercept a vein of copper and

MONTANA
ndale, Beaverhead county, Mont.
e Atlantic, Cleves and other mines, formerly owned by
lidated Mining Co., which for 20 years was a large pro-
nd lead, with considerable gold and copper, latter reaching
copper yearly. Property paid dividends of $2,250,000 on
tment of $40,000, but was bought, 1906, at sheriff's sale,
ut 65 men employed for a year or two, but the little ore
ade, and the mine was again closed down, and abandoned,
00 had been spent.
l by lessees until 1912, when it was taken over by the
of Helena, who installed electric power.
3. Conway of Helena had an option on the property and
umps and re-open mine.
NG BUREAU, INC. **MONTANA**
M. Rheem, sec.-treas. and mgr., Helena, Mont.
. Balliet, pres.; M. H. Gerry, Jr., v. p., with E. N. Bran-
h, J. P. Bahnsen, C. E. Dalton, and T. O. Hammond, all of

4, in Montana. **Cap.**, $100,000; shares $5 par; 8,000 shares
nual meeting 2nd Monday in January.
formed for the purpose of advertising and creating a
n mining industries in the Helena district. Each citizen,
o so, subscribed $5 a month, receiving a share of stock
ion for the term of three years or longer. This public
en most beneficial to the mining industry of the Helena
newcomers have taken advantage of the mining oppor-

917, the Helena Mining Bureau took over the operation
ne, located in Grass Valley district. This mine is fully
00′ shaft and made regular shipments of lead-silver-gold
19. Now owned by the Thomas Cruse M. & D. Co., which

VER-LEAD MINING CO. **MONTANA**
ese, Mont. Walter J. Hughes, pres.; Peter Peterson, v.
H. C. Thomas, sec.; with W. W. Lee and G. H. Lawrence,

ontana. **Cap.**, $150,000; 10c par; assessable.
on Packer Creek, 1½ miles from Saltese, Mineral

tunnels, a 150′ shaft with crosscut 220′ to the
0′ wide and to carry silver and lead ore.

Friction in the company is said to have delayed oper
the mine was worked and shipments made.

HIDDEN TREASURE GROUP

Address: W. J. Stephens, owner, Missoula, Mont.

Property: 9 patented claims in the Wallace district, n
soula county, said to show 5 veins with gray copper and b
aging 2 to 20% copper, $2 to $4 gold, and 2 to 20 oz si
sorted for shipments.

Development: mainly on Hidden Treasure and Cascade
2 tunnels in a steep mountain side, uppermost 558' un ve
50' wide. Ore cut 80' from portal and extends to face.
1,400' long, follows the east vein, said to be 50' wide. C
1 other vein of 13' width and drifts have opened up some
several hundred feet of concentrating ore. Total work 3,
began 1899 and ceased in 1907, and property has had but li
since.

HIGGINS & BIELENBERG MINE (H. & B.)

See B. & H. Mines & Mill.

HIGHLAND COPPER CO., LTD.

Out of existence. Described in Vol. XIII.

HIGHLAND CONSOLIDATED MINING CO.

Office: 414 Daly Bank Bldg., Butte, Mont.

Officers: C. A. Hanswirth, pres.; J. T. Bluff, v. p.; W.
treas.; with Dr. T. J. B. Shanley and R. S. Booth, directors.

Inc. June 27, 1919, in Montana. **Cap.,** $500,000; par $1
for payment of property. Annual meeting 1st Tuesday afte
October.

Property: company owns the Gold Run and 5 other qu
has an option on 11 others, 22 miles S. of Butte. The Highl
first opened in 1865 and produced much gold. The Only Ch
option, is said to have yielded $1,000,000 from workings onl
Three Ply claim also under option is equipped with a 5-stam

Development: a 2,000' tunnel is being driven to cut vei
at depths of 300 and 800'. Face is said to be in a highly-min

Company is banking on past records which it is to b
equalled.

HOMESTAKE MINING CO.

Address: H. V. Edwards, Wallace, Idaho.

Cap., $1,000,000.

Property: on Trout creek, 22 miles W. of Thompson F
copper ore. A hoist, compressor, and other equipment is re
working at last accounts.

HORSE SHOE MINE

Address: John McMillan, Superior, Mont.

Property: 70 acres, patented, 12 miles S. W. of Iron
This is a placer project equipped for hydraulicking and p
gold.

HUGO GOLD & COPPER MINING CO.

Address: Saltese, Mineral county, Mont.

Officers: Richard W. Seidensaal, pres.; A. [illegible], v.
man, sec.-treas., with A. B. Atwater and Peter [illegible]

Inc., 1907, in Idaho. **Cap.,** $1,[illegible]0; par $[illegible]

Property: 3 claims, carrying the [illegible] E.
system, next E. of the New York & [illegible]
of Saltese. Claims carry 2 parallel [illegible]
to show copper carbonates, [illegible]
selected specimens [illegible]
ing, is said to [illegible]
copper, 6 oz [illegible]

by 195′ drift tunnel, 50′ winze, 60′ shaft and a 750′ cross-
0′ farther to go to reach the first vein.
ter turbine with 14′ head of water, and 2-drill compressor.
ct, in which Eastern capital was reported interested,

NA MINING CO., LTD. IDAHO-MONTANA

er H. Hanson, pres.; E. H. McConnell, v. p.; Harry Har-
P. Miller, directors; Harlan L. Heward, sec., at last

905, in Idaho. **Cap.,** 1,000,000 shares; 10 cts. par; assess-
es outstanding. Annual meeting 1st Saturday in Sep-

laims, unpatented, 200 acres in Shoshone county, Idaho,
y, Mont., showing lead-copper-silver ore in quartz veins.
′ tunnel to depth of 540′.
19, work was resumed in the Monitor tunnel, a crosscut
ut the westerly extension of the Richmond vein at a
npany is to do this jointly with the Richmond company.

MINING & MILLING CO. MONTANA

McAnulty, sec., Carthage, Ill.
McAnulty, pres.; E. G. McAnulty, sec.-treas., with Dr.
allace, and J. F. Williams, directors.
; par $1.
acres, patented, in West Fisher district, Lincoln county,
d silver. Only assessment work being done.

E COPPER GROUP MONTANA

Stannard, Kalispell, Mont.
ims, 1 patented, 8 miles N. E. of Eureka, Lincoln county.
Ore contains 3.5% copper, $1 gold, and 3 to 6 oz. sil-
in operation at last accounts.

E COPPER-GOLD-SILVER MNG. CO MONT.

Lodge, Powell county, Mont.
Eldred, pres. and gen. mgr.; C. H. Williams, v. p.; E.
E. Larabie, treas.
Montana. **Cap.,** $900,000; shares $1 par. Assessments to
hare.
res in the Oro Fino district, 12 miles S. of Deer Lodge
2 railways, include the old Independence mine located
ented tract of 102 by 2,200′. Examined in March, 1917, by

includes shafts and tunnels, one being 550′ long, and
e length, from 2 to 4′ wide, carrying gold and silver. The
d assayed $20 gold. Ore can be concentrated 3½ into 1
with excess of iron.
r sale or lease and bond, 1919.

N MINING & SMELTING CO. MONTANA

ed at office, Butte, Mont. Mine near Apex, Beaverhead

F. Stephens, pres., treas. and gen. mgr.; Wm. Robert-
Ellis sec.; A. H. Stephens and T. J. Ellis, directors, at last

, in Montana. **Cap.,** $450,000; shares $1.50 par; non-
$225,000.
Indian Queen mine, 2 claims, 40 acres, and a 3-acre mill-
d mines, Beaverhead county, owned jointly by this company
Copper Mining Co. The mine shows granite, intrusive in
ite, [illegible] between granite and limestone.
wide [illegible] and chalcocite, estimated
[illegible] and $1 to $4 gold per
[illegible].

Development: by shafts of 150' and 220', and 820' tun
1,600' of workings. Idle at last accounts.

INTER-MOUNTAIN COMPANY

Office: 26 Pittsburgh Bldg., Helena, Mont.

Company is a mining exploration and exploitation organiza
in 1909, to develop a large silver mine somewhere in Montana,
that it has gold mines to sell.

INTERMOUNTAIN COPPER MINING CO.

Address: Wallace, Idaho. **Mine office:** Iron Mountain,

Officers: Edward Evans, pres.; R. G. McIntosh, v. p.;
sec.-treas., with James Neilson and J. F. Callahan, directors
ger, supt.

Inc. 1915, in Montana, to take over the holdings of th
per & Gold Mining Co. **Cap.,** $2,000,000; $1 par; assessa
sued. An assessment of 1c was levied in November, 1918, othe
June, 1919.

Property: 6 patented and 9 unpatented claims on Cedar
S. of Iron Mountain, Mont., said to show a vein of copper
quartzite, dipping 60° with E.-W. course. Shoots are from
Average assay of sorted ore is 15% copper.

Development: by tunnels, shaft, etc., totaling over 8,0
orebody was opened on the 400' level for 250', carrying good
100' winze sunk on this shoot in July, 1919. Reserves are given
tons.

Equipment: includes a 2-mile flume and pipe-line,
under a 310' head, steam power, with 2 hoists, compressor, pum
about 15 mine buildings. A 100-ton concentrator, employing a
unit, treats the ore.

Production: $100,022 in 1917, making $212,714 in all,
worth $2,000 or over per carload at intervals in 1918 and 1919.

Future outlook is considered good.

INTERNATIONAL MINING CO.

Office: Bozeman, Gallatin county, Mont.

Officers: J. W. Wilcox, pres.; S. J. V. B. Henders
Samuel F. Walker, sec.-gen. mgr., with Harvey M. Farriss an
rectors, all of Bozeman, Mont.

Inc. Oct. 2, 1902, in Montana. **Cap.,** $600,000; shares
paid and non-assessable.

Property: 12 claims, 240 acres, well timbered, in S
district, Gallatin county, Mont., said to show gneiss, quartzite
and contact veins, opened by 380' to 1,800' tunnels, and 5 sha
showing sulphide ores.

Company developing an ore shoot, at last accounts, said t
8 oz. silver, and $8 to $67 gold per ton. The Lone Star an
International is practically under the same ownership. Letter
answered.

IOWA-MONTANA DEVELOPMENT CO.

Probably dead: letters sent former address, Fraser, Iowa,
Jefferson Island, Madison county, Mont., returned

Officers: at last accounts, T. J. McGinnis,
E. H. Daniels, treas.; all of Fraser, Iowa, and
Wood, directors, J. D. Morrison, mgr., Jefferson Island, Mont.

Inc. June, 1915, in Iowa. **Cap.**
company. Company obtained a
Montana-Illinois Copper
Montana Mines Co.

IRON MASK LEA

Address: Troy

Officers: G.

Cap., $150,0

claims, 10 miles S. of Troy, showing veins carrying zinc, , also manganese. Development by tunnels. Leased to G. L. a, at last accounts.

AIN TUNNEL CO. **MONTANA**

July, 1915, by Federal Mining and Smelting Co., which see.

NE **MONTANA**

ils & Ironside Mining & Milling Co., which see.

D MNG. & MLG. CO. **MONTANA**

ver Bow Block, Butte, Mont.

S. Hunnewell, pres.-treas.; H. C. Bacorn, v. p.-gen. mgr.; son and F. W. Bacorn, S. D. Bacorn (sec.), directors.

Arizona. **Cap.**, $2,000,000; $1 par. The company has no ts and is financed for all current needs.

claims, 23 patented, containing 353 acres, at Jardine, Park tle was obtained by present company in 1917, workings cleaned d, and new development work done adding largely to ore re-

artz veins in schist, with general north and south strike Ore is partly oxidized and partly arsenopyrite.

: over 3 miles of underground workings including 21 cross-rifts on veins.

includes belt-driven compressor, 150-ton stamp-mill and gold ore, 20-ton concentrator for tungsten ore, hydro-electric ing 325 h. p., all machinery at mines and mills being operated ; offices, residences, boarding-house and bunk-houses for em-

the 20-ton concentrator was operated for the first six roducing tungsten concentrates, together with crude tungsten $52,000. During the latter half of 1918 the concentrator treated ore that ran from $10.03 to $12.98 per ton. Employs 60 men, omising property.

IONTANA COPPER MINES CO. **MONTANA**

rbin, Jefferson county, Mont. C. K. McCormick, pres.; P.

patented claims, in Colorado mining district, 3 miles from sure veins, 3-5' wide in granite. The course of the orebody is dip of 60-70°. Developed to depth of 540' by vertical shaft. r installed.

ormation available.

G & MILLING CO., LTD. **MONTANA**

eyton Bldg., Spokane, Wash.

E. Morby, pres.; C. C. Baldwin, v. p.; J. A. Powers, sec. ; 25c par; non-assessable.

claims and millsite, 1½ miles from Eddy, and 36 miles E. Examined by F. C. Calkins and D. F. McDonald. **Geol-** quartzite and shale. Three shoots of silver-lead ore have **evelopment:** is by tunnels, one 1,300' long. **Equipment:** oil engine, jackhammers, pump and living quarters for 25

D. **MONTANA**

county, Mont.

M. L. Hewett, v. p. and mgr.; C. G. th J. F. Cowan, and A. E. Spriggs,

$1,000,000; $3 par; 600,000 and registrar. An-

ated at Basin, Reported ve vein in

granite, 30' wide, with ore that assays 1½% copper, $2 to $4 go silver. Examined by A. A. Blow, A. L. Pierce, R. M. Atwater W. G. Nebeker and J. C. Adams.

Development: by vertical shaft 600' deep, and 6,000' of rich ore was opened on the hanging wall, August, 1919, ne tons yielding $13,374, and 620 pounds, $6,200. The average said to be $150 per ton, but this rich ore is irregular in occurre

Equipment: includes electric power obtained from the Co.; two 600-gal. centrifugal mine pumps, 250-h. p. hoist, Granite Bi-Metallic Company, and two 2,300 cu. ft. compress is to be re-built and modernized by adding a flotation plant daily capacity of 600 tons.

Company has been financed by Utah capital. Ore was shipment in October, 1919.

KALISPELL-TROY MINING CO.

Address: Kalispell, Mont.

Officers: D. R. Peeler, pres.; G. F. Stannard, v. p.; A. treas., with T. S. Hand, J. W. Carey, J. Brinkhauser, W. H Wood, directors.

Cap., $60,000; 20 cents par.

Property: 21 claims, 13 miles W. of Troy, 1 mile fro Ore carries lead, silver, and zinc. No recent data available.

KEATING GOLD MINING CO.

Address: J. A. Murray, Butte, Mont.

All the property was sold under mortgage foreclosure in July, 1918, the statutory year for redemption had expired, in by J. A. Murray, Butte, Mont., who was the holder of con company is entirely without cash or assets of any kind, but solved. Thus ends the life of a company that spent six year vein with good values, producing several million dollars worth out a profit to the company. See description in Vol. XIII.

KING & QUEEN MINING CO.

Address: Keystone (formerly known as Carter), Mont.

Officers: G. T. McCullough, v. p.; John F. Hinckley, se ler, treas.; C. H. McHeffry, supt. in charge.

Inc. Feb. 22, 1905, in Montana, practically as a reco Montana Mining & Development Co. **Cap.,** $1,000,000; sha

Property: 15 claims, partly patented, 188 acres and a well timbered, 3½ miles from Keystone, the nearest rail po Gulch district, 9 miles N. W. of Superior. Property carries l and shale with contact deposits between quartzite and limest under development, of 8' estimated average width, shows copp ore with malachite, chalcocite, chalcopyrite and galena, reporte copper and 12 oz. silver per ton with gold content ranging up

Development: by 1,200' crosscut tunnel opening up 4 ore that carries 9 oz. silver and 11% lead. This tunnel, planned has cut the vein 460' below the old workings and intersects sev raise gives ventilation with the upper workings now aband workings total 5,000'.

Equipment: includes an 80-h. p. boiler, 25-h. p. hoist, compressor and 125-ton mill. There are several small mine ho mill.

Production: in 1913 was 40 to 50 tons daily, shipped Development work was in progress, 1916-17. No recent repor

KING SOLOMON MINING CO.

Company dead for 3 years, but recently reported reopen scription, Vol. XIII.

COPPER MINING CO. **MONTANA**
ssolved. Fully described Vol. XII. Formerly operated near
county, Mont.

E COPPER MINING CO. **MONTANA**
d; letters sent officials returned unclaimed.
o. Champagne, pres.; Dr. T. C. Witherspoon, treas., Mur-
te, Mont., at last accounts.
00; shares $1 par.
claims, patented, adjoining the Ben Hur mine. 4 miles
Mineral county, Mont.
shallow shafts and a 2,300′ tunnel, the workings said to show
d in the tunnel, but a winze shows an 18″ streak of ore said to
per ton in values. Company reported past shipments of about
oad giving returns of 13.6% copper, 394 oz. silver and $12 gold
was driven in 1915-16 to reach the rich oreshoots from which
nade.

IN MINE **MONTANA**
. Lee Heidenrich, Rimini, Mont.
patented claims at Rimini, under lease to Morton Webber.
enrich, in September, 1918.
quartz vein in quartz-monzonite, dipping 70° with course
s a sulphide carrying 0.15 oz. gold, 12 oz. silver, 6% lead, and

t: by 1,200′ tunnel to depth of 660′, and 3,000′ of work-
t: steam power, compressor, pump, etc.
$1,500,000 in past 40 years. Lessees, in 1918, found small
ped $15,000 worth of ore in July and August.

ER MINING CO. **MONTANA**
r option to Furnace Creek Oxide Copper Co.
niel Courtney, supt., Clancey, Jefferson county, Mont.; or
, v. p., Butte, Mont.
famous old silver producer near Clancey. This is now
leveloped and fully equipped with electrically-driven mine ma-
rich ore in 1919 to Anaconda.

& COPPER MINING CO. **MONTANA**
lace, Idaho. **Mine office:** Saltese. Mineral county, Mont.
n. Herman J. Rossi, pres.; G. F. Dann, v. p.; C. E. Clark,
m. Fissenger and Chas. Bollinger, directors.
ljoins the Monitor mine, and survey for the extension of
el runs through this property. Assessment of 2 mills per share
15, and development resumed after several years of idleness.

GOLD MINING CO. **MONTANA**
nes A. Flint, sec., Pony, Madison county, Mont.
nder $70,000 bond and lease, on which payments were made as

patented claims, 105 acres, at Mammoth, Madison county,
vein with 45° dip, cutting through gneiss. Vein shows 4′ to 20′
re with gold values.
t: by 700′ tunnel and 2,000′ of workings giving depth of

includes hydro-electric power plant, compressor, and 100-

e another name for Leviathan Copper Mining Co., controlled
a. A report by W. H. Winchell estimated reserves at 12,000
on dump and twice that amount blocked out in mine. His
content as 2.7% copper, 4.1 oz. silver and $17.20 gold per ton.
ne located 1864. Company is developing property as well as
ng ore.

LIBERTY COPPER CO.

Office: J. F. Ferguson, Wallace, Idaho.

Officers: F. J. Luedke, pres.; Charles Luedke, v. p.; J sec.-treas., with C. B. Spear, directors.

Cap., $150,000; 10 cents par; assessable; 800,000 issued. ing, third Monday in June.

Property: 8 claims, 160 acres, near the Amazon-Dixie county, Mont., shows quartzite cut by a fissure vein with aurife Worked by tunnels. A prospect that was closed down in 1919.

LIBERTY METALS CO.

Address: Troy, Mont.

Officers: G. M. McKenna, pres.; J. T. Sugars, v. p.; J. I treas.; also directors.

Inc. May 10, 1919, in Montana. **Cap.,** $500,000; $1 par; Annual meeting, third Tuesday in August.

Property: 8 claims, 150 acres, 51 patented, 5 miles south About $6,000 has been spent on property to date.

Geology: main vein is a contact between a diabase d quartzite, and has been traced on surface for 2,200'. Ore car copper, lead and manganese. Ten other veins are said to be exp from 6 to 48" wide.

Development: by 3 tunnels totaling 250' in length. A ste pressor, and drills are to be installed.

A prospect in which some rich ore was reported opened up i

LIBERTY MINING CO.

Formerly Mike Horse Mining Co., reorganized May, 1919.

Address: J. O. Hamilton, Peyton Bldg., Spokane, Was

Property: the Mike Horse mine, 9 claims, at Silver Ca Clarke county, 40 miles N. of Helena, Mont., containing lead-z ore. Mine worked 40 years ago for high-grade silver ore, bu cause ore became base.

Development: by 3,400' of tunnel work on 5 veins, Horse vein, reputed to have 55,000 tons of proven ore assaying silver, 12.5% zinc, 1% copper and 60c gold per ton. A new tu the old workings, was being driven at last report.

Equipment: 100-ton concentrator, etc. Mine is a consid from rail, teaming supplies costing $14 per ton.

Production: in 1916 was 325 tons silver lead ore nettin reported since. See O. & M. Mines Co., Vol. XIII of this publ

LIBERTY-MONTANA MINES CO.

Address: B. W. Wilson, Box 510, Butte, Mont.

Inc. 1918, in Montana. **Cap.,** $3,000,000; $1 par.

Company was organized to buy, develop, and operate mi absorb the White Chief Copper Co., and Montana-Illinois Cop the property of latter company was under lease to the Iowa-M ment Co. until June, 1918.

Property: (1) lease and option on Mammoth gold-c miles from Jefferson Island, Madison county; (2) the Bismarck millsites, and placer ground, 20 miles from Jefferson Island, an Chief mine, 8 claims, near the Bismarck. Water and timber are try is [illegible]

[illegible] ore worked by tunnel [illegible] free milling gold [illegible] with gold and si

tunnels of 400′, 200′, 500′ and 1,900′, with over 3,000′ of

f claims, in the Whitehall district, show veins developed by a lower tunnel carrying copper, silver, lead and gold ore. A disclosed a 5′ ore streak assaying 13% lead and $14 gold. electric transmission-line from the Madison Power Co.'s Mammoth mine, 7 miles distant, and will be extended 4 miles d White Chief, the cost of power being $35 per h. p. a year. planned to carry ore from the two mines to the Mammoth

has 6-drill compressor, and 100-ton mill, with flotation unit, s into one.
fair mines, but is rather too optimistic as to returns from

E MINE **MONTANA**

. Ostronick, Twin Bridges, Mont., owner and mgr.
aims, 54 acres, in Goodrich Gulch, Madison county, Mont., 8" fissure veins, running E.-W., and assaying as high as $114 lead. Ore occurs in gneiss and limestone formation.
by 200′ tunnel, several drifts, and raises.
h compressor.
1915, reported to have averaged $80 per ton, amounted estimated 6,000 tons of ore blocked out, at last report.

LVER MINES CO. **MONTANA**

1 Montana Bldg., Helena, Mont.; and 27 State St., Bos-
Murray, supt.
. Brien, pres.; J. F. Quinn, v. p.; J. E. Simpson, treas.; gs, C. E. Fryberger, cons. eng.; H. M. Ferry, P. E. Wagner, Potter, C. J. Trauerman, Joseph Reinham, H. S. Hirschman, H. G. Gallagher and Frank Eichelberger, directors. W. J.

919, in Delaware. **Cap.**, $250,000; par 10c; non-assessable; letropolitan Trust Co., Boston, transfer agents and registrar. ese Corporation owns 50% of the shares, paid for by 8%

Liverpool mine, 7 patented claims, 80 acres, in the Lump miles from Clancey, Jefferson county, and 15 miles S. of uction stated to be $1,250,000. Examined by W. F. Word, of

ssure-vein in granite, 4 to 7′ wide, dipping 85° N. and Oreshoots are reported to be 300 and 600′ long, with ore ad and 40 oz. silver. Shipments by former owners averaged silver.
by 750′ vertical shaft and 5,000′ of workings. Reserves ated at 40,000 tons. Shaft is to be re-timbered and sunk to

eared air hoist, 600 cu. ft. compressor, pump, electric quarters for employees.
re resumed in June, 1919, and ore mined from 400 to 750′ ber, the old dumps, said to contain 10,000 tons of 9 oz. silver rted for shipment to smelter at East Helena. A prospectus owley & Co. of Boston, shows that the directorate includes f the U. S. Manganese Corp.

& TUNNELSITE MINE **MONTANA**

ery Sullivan, Grant, Beaverhead county, Mont.
laims in the Bloody Dick sections, in Upper Horse Prairie, ner, shows gold, silver, lead copper ore in narrow fissure porphyry. The ore carries brittle silver, argentite and mixed to 12" thick, the ore as shipped carrying 44 to 1,300 oz. lead.

Development: totals 1,200', including 420' tunnel, with ing out 100 tons of ore with 39 tons stoped. No recent retur

LUKENS-HAZEL MINING CO.

Address: Libby, Mont.

Officers: C. E. Lukens, pres.-treas.; J. H. Town, v. sec., with H. L. Faust and Oscar Nordquist, directors.

Cap., $1,600,000; $1 par; assessable.

Property: 17 claims, 280 acres, all patented, with mil rights, on Shaughnessy hill, 8 miles S. of Libby, Mont.; is an o re-opened. Formation is quartzite, cut by veins whose ore car lerite, and pyrite.

Development: over 8,500' of workings. The main to average 5' in width for a length of 1,130'. Reserves are offic worth $1,200,000.

Equipment: water-power brought 2 miles will run a contain rolls, jigs, tables and flotation unit.

LUMP GULCH MINING CO.

Address: T. J. Chestnut, Clancey, Mont.

Officers: T. J. Chestnut, pres.; G. S. Haynes, v. p.; C. with A. Munson and R. Wanderer, directors.

Inc. 1906, in Montana. **Cap.,** $500,000; $1 par.

Property: a tract of 37 patented acres in Lump gulch Mont. The vein is an easterly extension of that at the Live contains silver bearing galena and zinc sulphide. Shaft is 25

LUMP GULCH SILVER MINES CO.

Address: R. A. McCray, R. A. Weisner, John Meagh kins, or L. H. Weisner, incorporators, Helena, Mont.

Inc. 1919, in Montana. **Cap.,** $1,000,000.

Property: claims in the Lump Gulch district, near Cl county.

LUPFER MINING CO.

Address: Whitefish, Flathead county, Mont.

Officers: George Hoffman, pres. and mgr.; Mike Sull Hoffman, sec., with E. Boettcher and John Roeder, directors.

Inc. 1906, in Montana. **Cap.,** 500,000 shares; par va issued.

Property: 160 acres, about 14 miles W. of Whitefish 150' shaft, showing a well defined vein of copper ore, 3' wide limestone, said to assay 2% copper, 3 oz. silver with a trace small steam hoist and air compressor. Idle, owing to lack of

MADDEN SCRATCH GRAVEL MINES CO.

Idle. **Address:** Helena, Mont.

Officers: Jas. Madden, pres.; Peter Scharenbroich, v. sec.-treas., above, with Theo. Sarter, L. P. Wells and E. Edwa

Inc March 16, 1916, in Montana. **Cap.,** $300,000, $1 170,000. Annual meeting, third Monday in June.

Property: 3 patented claims, 50 acres known as the J in the Scratch Gravel Hills, 8 miles from Helena, said to fissure veins in granite. The claims are said to have been harard manner by Jacquemin.

Development: 160' incline shaft, and 340' tunnel. Pres intends to develop the property. Fair results were reported news since.

MAMMOTH MINING CO.

Address: care John Ferguson, Spokane, Wash.

Officers: A. H. Featherstone, pres.; G. J. Hayden, v. sec.-treas.; [illegible]

ented claims, 7 miles N. E. of Bonita, Missoula county, m which ore was shipped that returned 28 to 37% lead and

y 124′ shaft, tunnel, etc. Is still a prospect of promise.

OLD MINING CO. **MONTANA**

Wolvin, Duluth, Minn. **Mine office:** Marysville, Mont. O. Freeman, pres.; Ted E. Collins, sec.-treas.; L. S. g.

ontana. **Cap.,** $1,000,000; shares, $1 par; 527,000 issued. ear, 8%, authorized up to October, 1917. Taken off New 1918.

laims, 430 acres, in Marysville district, 20 miles from s region was practically dead for years, but given a new forts of the Barnes-King, St. Louis, and other companies. s principal mine is the Blue Bird-Hickey.

mainly by tunnels. About $120,000 said to have been

estimated by company at 200,000 tons of $10 ore. Be- of the Shannon mine of the Barnes-King Co., adjacent to mine, shows gold ore, the Marysville Co. claims indicated millions, which is an unsafe assumption.

pected to commence at end of 1917, but nothing has been

INING CO. **MONTANA**

y, 1919, as Liberty Mining Co., which see.

D'ALENES MINING CO. **MONTANA**

Tutt, Kansas City, Mo.

Burnham, pres.; Stella Resium, v. p.; R. N. Tutt, sec.- t. sec.

; $1 par. Annual meeting January 10.

ims on Swamp creek, Sanders county, 18 miles E. of eins of lead-silver ore of usual Coeur d'Alène type.

by 232′ tunnel. No recent work reported.

PMENT CO. **MONTANA**

Had bond and lease 1915-16 on Moffit Group, which see. ol. XII, Mines Handbook.

MONTANA

Pankey, via Virginia City, Madison county, Mont.

miles N. E. of Virginia City, is said to have shipped ore for years. In Nov., 1918, a 10-stamp cyanide mill was

MONTANA

Moffit, Box 6, Butte, Mont.

rom Twin Bridges, Madison county, Mont., was under 6 to Mines Development Co., now out of business.

erage 2% copper. Over 600 tons have been shipped.

G & POWER CO. MONTANA

St., Boston, Mass., and C. E. Fryberger, Montana

MacDonald, pres.; J. E. Burgess, v. p.-treas.; Dr. C. E. R. M. Davy, C. E. Fryberger, Frank Eichelberger, and ctors. Charles Anderson, supt., Elliston, Mont. Frank Trauerman, cons. engs.

8, in Delaware. **Cap.,** $100,000; 10c par; all issued. Boston, transfer agents and registrar. The U. S. Man- e 51%.

ns. 320 acres, 14 miles S. of Elliston, Mont., on W. n-

-vein in granite, 8 to 10′ wide, with 80° N. dip and

S. 82° E. course. Ore-shoots are 310 and 600' long, and ca
oz. silver, 10% lead, and 1.3% copper.

Development: by 400' and 1,400' tunnels, to be extend
workings, opening mine to depth of 1,200'. Reserves blocked
38,000 tons, and a total of 62,000 tons, averaging $16 per ton.

Equipment: steam power plant, 600 cu. ft. compresse
plant, and jig-back aerial tram. A 200-ton flotation mill was b

Production: smelter returns from previous owners tota
shipments of 25 tons daily resumed in October, 1919.

Company is connected with the Liverpool Silver Mines C
re-opening old mines. The public is offered stock by Bost
publicity agent is a busy and hard worker, with a lively imagi

MONITOR TUNNEL CO.

Company defunct. Property bought by Dr. Hall and C
the Schweitzer estate, and sold to North Butte company for $1

MONTANA-CLINTON COPPER CO.

Company forfeited bond on claims and the property w
original owner, C. L. Friederichs of Helena, Mont. Compan
loads of ore netting $140,000 at smelter up to October, 1914.
in Vol. XIII.

MONTANA CONSOLIDATED COPPER CO.

Office: 51 Wall St., New York.

Officers: E. P. J. Burgess, pres.; E. P. Haas, v. p.; W
T. F. Lee, treas.

Inc. 1906, in Maine. **Cap.**, $1,000,000; shares $1 par; al

Property: includes the Comet and Grey Eagle mine
various placers, millsites, etc., comprising 699.73 acres, about
Boulder, Jefferson county, Mont.

Ores: are mainly galena and sphalerite with assoc
chalcopyrite, and the Comet is popularly credited with
gross output of $13,000,000. **Ore reserves:** said to be 1,350
ing $20 per ton.

In 1915 M. K. Rogers, of Los Angeles, Cal., took an
the capital stock and began an active rehabilitation of the mi
afterwards the New York brokerage firm of Baruch & C
(bankrupt), acquired minority holdings and began advertising
succeeded in [illegible] the stock up to [illegible] $2 a share, in the
stock was [illegible] narrowed, when [illegible] a large block of
on the mar[illegible]ations drop[illegible]sible levels.

The C[illegible] was unwatered [illegible] and company
pared to s[illegible] in mine[illegible] Crossents f
have never [illegible] the enemy [illegible] main vein o
The ve[illegible] and [illegible] promising enou
development [illegible] interested
have publicly [illegible] the stock
The com[illegible]
on the repor[illegible]
to paying q[illegible]
the glamour[illegible]
[illegible] of the

quartz veins in quartz-monzonite, carrying ores with pyrite and d gold-silver values.
ent: by shaft and drills. Equipped with hoist. Is not favor-

t accounts.

GOLD HILL MINING CO. **MONTANA**
509 First Ave., Spokane, Wash.
E. V. Lambert, pres.; A. G. Benson, v. p.; J. W. Sarginson,

,000; 10c par.
7 mining claims and a millsite 138 acres, in the Deep Creek es from Iron Mountain and Superior, Mineral county. Surface said to be encouraging.
ent: by tunnels aggregating several hundred feet, opening ore.
t: includes smithy, sawmill, dwellings, and 50-ton mill com- ember, 1919.

LLINOIS COPPER MINING CO. **MONTANA**
y Liberty-Montana Mines Co., which see.

MANGANESE CO. **MONTANA**
Earl Greenough, mgr., Philipsburg, Mont.
eported to have mined 65,00 tons of manganese during 1917, and ,000 tons monthly in 1918.

MINES CO. **MONTANA**
the Beaverhead Montana Copper Mining Co., whose holdings r, share for share.
are Ray A. Cobban, Butte, Mont., sec.-treas., at last accounts. 000; shares $1 par. Company obtained a lease and bond on abbit mine at Argenta, Beaverhead county.
ent: by a 3,025′ tunnel driven to cut a mineralized diorite dike npany shipped ore that returned 10% copper and 12 oz. silver.

MORNING MINING CO. **MONTANA**
Hyde Block, Spokane, Wash.
os. Rosslow, pres.; H. Rosslow, v. p.-sec.; S. T. Wood, treas.; rington, E. S. Williamson and D. T. Wood, directors.
000; shares 20c par.
12 claims at Troy, Lincoln county, Mont., reported to show veins, partly developed by shafts. Ore opened assays high in silver. Last work consisted of driving on the contact veins. alled.

OREWAY MINING CO. **MONTANA**
Postal Telegraph Bldg., Chicago. Mine office: Briston, nty., Mont.
V. P. Jahnke, pres.; J. B. Scott, v. p.; Fred W. Scott, sec.; eas.; preceding, with Frank Kimball, B. F. White and Thos. Fay,

n Arizona. Cap., $1.000,000; shares $1 par; issued, 950,000.
7 claims, 5 patented, 100 acres, and a 25-acre millsite, known Tip group, in the Big Hole basin. Claims show several fissure 10′ thick in quartzite and contact deposits between quartzite

nt: by a 3,025′ tunnel driven to cut a mineralized diorite dike ores, with lead and small values in silver and gold. Also 100′ and another 130′ deep, showing ore 8 to 36″ thick, gold, silver, lead and copper.
a 35-h. p. steam plant, with 1-drill air compressor. Mill to be erected, at last accounts.

G MINING CO. **MONTANA**
adwater county, Mont.
pres.; Helena; Fred Allen, v. p. and supt.,

S. 82° E. course. Ore-shoots are 310 and 600' oz. silver, 10% lead, and 1.3% copper.

Development: by 400' and 1,400' tunnels workings, opening mine to depth of 1,200'. . 38,000 tons, and a total of 62,000 tons, averag

Equipment: steam power plant, 60 plant, and jig-back aerial tram. A 200-to

Production: smelter returns from shipments of 25 tons daily resumed in

Company is connected with the Liv re-opening old mines. The public i publicity agent is a busy and hard wo

MONITOR TUNNEL CO.

Company defunct. Property the Schweitzer estate, and sold to

MONTANA-CLINTON COP

Company forfeited bond original owner, C. L. Friederi loads of ore netting $140,000 in Vol. XIII.

MONTANA CONSOLID

Office: 51 Wall St.,

Officers: E. P. J. Be T. F. Lee, treas.

Inc. 1906, in Main

Property: includ various placers, mill Boulder, Jefferson co

Ores: are ma chalcopyrite, and gross output of ing $20 per ton.

In 1915 M. K the capital stock an afterwards the New (bankrupt), acquire succeeded in driving stock was securely c on the market and go

The Comet mine pared to spend $100,0 have never been driven

The vein is a large development. Clark, D have publicly disclaime

The company's hol on the report of A. A. in paying quantity woul the abnormal price of zinc content. Th ment of the 100,000

The property and 500' levels of daily; in 1919, de 20 to 25 tons daily 150-ton mill is planned.

MONTANA COPPER-SILVER

Address: E. R. Parnell, supt. Mine in Scratch Gravel Hills,

cut veins at depth late in 1917.

MONTANA

, Conn.
d.
les east of Deer Lodge, adjoining
ing from a streak to 7', average width

much antimony. Said to have 20,000
$20 per ton, including zinc.
ist, 300-cu. ft. compressor, and all neces-
ine is idle, needing money for a mill and

...NING & MILLING CO. MONTANA
...y, Butte, Mont., care Western Mining Sup-
unclaimed in 1919.
...rt, pres.; John W. Franks, v. p.; C. L. Franks,
and Jos. Hunter, directors.
ap., $1,000,000; $1 par.
n tract 6,000' long, situated on Cataract Creek,
he Great Northern R. R., Jefferson county, Mont.
nplex mixture of galena, pyrite, some chalcopyrite,
small shoots in an E.-W. fissure vein in granite. The
o 25' wide, almost vertical and is a typical quartz-tour-

...,000' Copper Hill tunnel, with 35' crosscut 300' in,
... gasoline engine, small compressor, etc.
...,000 tons of ore blocked out that samples $32 for 500'.
... 1917-18, run by water power. Not favorably regarded
...ies small.

...OR JOHNSTON GROUP MONTANA
..., Butte, Mont.
... in Bear gulch, near Twin Bridges, Madi-
... between limestone and granite. Ore is a
... some gold and silver.
... and 2400' tunnel, opening ore to

...CO. MONTANA
... Row, New York. Mine office:
...lalk, J. O. Delamater and
... Bellows, treas.
... $1 par; all issued. On
... for $23 the lot.
... of the Nancy Hanks
... at Garnet, Granite
... to carry an
... and is
...oride of
Ore
...
...
...

milling, with the imperfect methods of that period. After an 18
a new company secured a lease, and option on a large block o
shaft to depth of 400', and mined ore yielding between $150
The present company purchased control, completing payment
100' deeper and extracted about $120,000 of shipping ore. Du
of labor and materials the mine was shut-down in March, 1918.

A mill ½ mile away from mine was secured early in 191
In April, the mine was unwatered and milling begun on a
Mine fully described in U. S. Geological Survey, Bull. 660-F
costs were about $15 per ton, but this is expected to be greatly
milling of both high and low-grade ore.

NATIONAL TUNGSTEN & SILVER MINING CO.

Supposedly operating near Butte, Mont., but no informatio
Butte Chamber of Commerce, or other sources.

NEIHART CONSOLIDATED SILVER MINING CO.

Address: Dan Tracy, Pearce Coal Co., Great Falls, M

Officers: Dan Tracy, pres.; J. E. Dawson, v. p.; W. A
L. M. McDonnell, sec., with William Thornton and F. R. Van d

Property: 7 claims, including the Hartley, in the Ne
Cascade county. This mine is said to have yielded 150 cars of
silver was 50 cents an ounce. A 4' shoot of ore reported o
level in October, 1919, containing an 18" streak assaying 100 oz

NEW COPPER SILVER CO.

Address: Helena, Mont.

Officers: W. C. Bardon, pres.; Z. B. Melborn, v. p.; J
treas. Company acquired the holdings of the defunct Coppe
Mining Company at receiver's sale in 1914.

Property: 7 claims, 130 acres, adjoining the Lexington
in the Scratch Gravel district, 1 mile from Great Northern rail
north of Helena.

Geology: claims show granite and monzonite, reported
ous fissure veins, dipping N. W. and S. E. All veins are rep
at surface, carrying melaconite, azurite and malachite. Mine
cutting at 300' a vein estimated to average 4.5% copper, 12 to
$1 to $55 gold per ton.

Equipment: includes a 30-h. p. steam hoist and a
Operations were stopped during the war, but company hopes t

NEW VICTOR EMPIRE M. & M. CO.

Address: S. R. Boyer, Moscow, Idaho.

Directors: S. R. Boyer, I. L. Collins, P. S. Rose (sec
son, and R. H. Wing, three latter of Spokane, Washington.

Cap., $60,000; 10c par; assessable.

Property: 5 claims, 12 miles from Libby, Lincoln coun
in slate that contain silver-lead ore. **Development:** by tun
Air-compressor is driven by water-power. Idle at last accounts

NEW VULCAN MINING CO.

Officers: H. A. Arnold, pres., 716 S. Arthur St.; G. M.
Hugh Monroe, sec.-treas., with O. L. Jones, C. B. Etnier, J. L.
Vaill, directors.

Cap., $150,000.

Property: 7 claims, 7 miles from Superior on C. M. &
railroads, Mineral county. Ore carries gold, silver, and copper
by 2,000' of tunnels, etc. No recent returns secured.

NEW YORK-MONTANA MINES CO.

Address: Bannack, Beaverhead county, Mont.

Officers: F. B. Howell, pres.; C. H. Smith, v. p.; P.
treas., with Samuel Barker, Jr., and W. C. Ebaugh, directors.
supt.

Is a reorganization of the Bannack Gold Mining Co., wh
was in financial difficulties owing to local farmers shutting

Title and Guaranty Trust Co., New York, transfer agent and

liscovery of gold in Montana was made in the Bannack district
that year the placers are reported to have produced $600,000 in
mining began very shortly after. In 1863 a 6-stamp mill was in
easonable estimate from available data puts the total production
to 1905 at not less than $4,000,000. From 1905 to 1913 the pro-
d is approximately $2,000,000. The ores have been of value almost
ount of their gold, but they contain also some silver, lead and
istrict has been comparatively inactive during the last twelve years.
property has been operated in the past in a desultory manner by
sees.

the Golden Leaf group of 8 patented claims, adjacent to
annack, at an altitude of 5,935′ a part interest in 2 claims, the
te, with underground rights, also an additional area of 200 acres,
nderground rights in Excelsior and Horace Placer millsites.
ng point is at Grant, 12 miles from Bannack, on the Pittsburgh-
ad, which connects with the Oregon Short Line at Armstead.

the rocks of the Bannack district consist of Paleozoic lime-
by a nearly circular shaped area of syenite about 1¼ miles in
contact deposit on which the company's claims are located ex-
the border of the syenite intrusion. The orebodies are irregular
imestone, and vary in width from 1′ to 30′ and even 40′, averaging
e high-grade bodies vary in length from 50′ to 100′; the milling
of much greater extent. The best ore is usually in the widest
ein, and is for the most part very soft, requiring little blasting,
ound stands well without timbering. A large tonnage of shipping
at over $1,300,000, has been removed from the property, leaving
rge reserves of milling grades of ore. See U. S. G. S. Bull. 574,

ent: approximately 17,000′ of underground workings to a
The Priscilla tunnel, the main working adit, was driven 800′ to
an elevation of 90′ above creek level, and cuts the contact 250′
though the highest point of contact on the surface will be 800′
cilla tunnel.

ves: were estimated Feb. 1, 1917, as 130,700 tons, averaging
with a net realizable value of $632,750. There were also 100,000
le low-grade ore at $6; 5,000 tons medium grade at $20, and 1,000
de at $100 per ton, a total of 106,000 tons of a net value of
value is principally in gold, the silver contributing 50c. to $1 per
unt has been taken in above estimate of ore below the Priscilla
In May, 1918, a winze was said to be down over 160′ in rich ore.

t: a well-equipped surface plant, also a reduction plant; the
e cyanide plant has a daily capacity of 150 tons. The plant, which
ons May 5, 1917, uses the continuous counter-current decantation
er for mine and mill is furnished by a hydro-electric plant at the
ing obtained from Grasshopper creek, 2½ miles above the mill,
et working head of 39′. During the winter, when water is not
esel oil engine will furnish the power.

sts were estimated not to exceed $2 per ton; mine and overhead
xceed $1 per ton. Average mill-heads were estimated at $10 per
xtraction of over 90%.

ant of 9,000 tons (yearly) capacity was reported under erection

ell developed and ore reserves, as estimated, are sufficient for 4
on. The possibility of developing new orebodies seems good.
1 ⅛ of the mineralized contact area owned by the company has
d, and no work goes below the water-level. Using modern methods
efficient management, the Bannack mine should have a large pro-
[illegible] a profit.

NEW YORK & MONTANA COPPER MINING CO.

Address: care E. J. Mathews, 1007 Hoge Bldg., Seattle
near Corbin, Jefferson county, Mont.

Inc. 1903, in Delaware. **Cap.**, $1,000,000; shares $1 par.

Lands: about 250 acres, including the Erickson, Scio
Gulch groups, opened by 3 two-compartment shafts, said to have
of medium-grade ore. A plant costing $30,000 was to be erect
and custom ores, at last accounts.

NEW YORK-MONTANA TESTING & ENGINEERING

Office: Montana Bldg., Helena, Mont.

Officers: and directors: Charles E. Fryberger, pres.; F
ger, v. p.; Ralph T. Hopkins, sec.-treas.

Inc. Jan., 1917, in Montana. **Cap.**, $100,000; $1 par; fully
assessable; 91,000 issued, all owned by U. S. Manganese Corp.
first mortgage 7½, due Jan. 1, 1922. U. S. Manganese Corp.
bond issue and $8,000 of issue is still in treasury of New York
pany. Transfer agent and registrar—company office at Hele

Dividend: 7% each on April 20 and July 20, 1919.

Transfer agent and registrar—company office at Helena.

Property: consists of a concentration mill, and lands
suburb of Helena. This concentrator was operated as a custo
the war, treating manganese ore from the mines of the Clark-
Co. of Butte, the concentrates being shipped to the U. S. Steel
Miami Metals Co. at South Chicago. The company also ma
chemical manganese concentrate used in electric dry cells. The
to develop a market for this class of ore and compete with forei

Concentrator remodelled in 1919 to work on sulphide ores
district, and will treat other custom ore from the various districts
including a second-class product of the Liverpool Silver Mines
a mine at Clancey. The New York-Montana company also
testing laboratory, testing ores on both a laboratory and a comm

NORTHERN VALLEY MINING CO.

Officers: S. F. Mallette, pres.; Godfrey, Ill.; Walter K.
Anaconda, Mont.; H. W. Wilson, sec.-treas., Twin Falls, Idaho.

Inc. 1912, in Arizona. **Cap.**, $1,000,000; shares $1 par;
issued. Controlled by the American Metal Mining Ass'n of Ariz

Property: consists of the holdings of the defunct An
Development Co. in Amazon district, Jefferson county, Mont. Id
contemplated in near future, according to last advice.

NORTHWESTERN METALS CO.

Bankrupt. Entire property reported sold by court for $22
Fully described in Vol. XI, Copper Handbook.

OHIO KEATING GOLD MINING CO.

Address: P. O. Box 1711, Butte, Mont. Mine at Radel
water county, Mont.

Officers: J. E. Oppenheimer, pres.; J. S. Cohen, v. p.;
sec.-treas., with B. E. Calkins and W. M. Tuohy, directors.

Cap., $800,000, increased Dec., 1910, from $500,000
$113,924 debts, July, 1914, and stockholders changed stock from
to assessable, with an initial assessment of 15 cts. per share.

Property: a promising, though small gold mine, producin
from pyrite ores found as shoots in strong fissure veins in igneous
ing to Fred. T. Green, who examined the property in 1914, the
mine is valued at $486,151, with $116,914 worth of ore blocked o
and $90,000 worth of $4 ore on the dump.

Development: to 500' level, with about 3,800' of drifts

Equipment: includes electric and steam pumps, electric
cars and tools. No recent news.

OLYMPIA MINING CO.

Office: Princeton, Granite county, Mont.

llian and Banner claims in the Philipsburg district. Tun-
ins, one 20′ wide, carrying galena, silver and gold values.
nent was being done in 1917.

CO. **MONTANA**

ve. Fully described in Volume XIII. See Liberty Mining Co.

NNACK MINING CO. **MONTANA**

F. Walker Bldg., Salt Lake City.
enzo Price, Jr., pres.; A. J. Bruneau, v. p.; E. F. Mobley,
L. Smith and Ambrose Nord, directors.
Cap., $1,000,000; shares $1 par; assessable; 600,000 shares
d on Salt Lake City Exchange.
patented claims in the Bannack mining district, Bannack,
, Mont., adjoining the Bannack Gold Mining Co., and said to
n of the latter's ore zone. Credited with a production of
nent claims there is an ore-shoot 1,800′ long and from 50 to
ntaining "hundreds of thousands of tons of ore, that will
n," value mainly in gold, with some copper, a statement that is
gross exaggeration. Developed by 300′ shaft.
ncluded a 325 cu. ft. compressor and a 25-h. p. gasoline

17, that the U. S. S. R. & M. Co. had an option to purchase the

MINING CO. **MONTANA**

ecurity Bldg., St. Louis, Mo. **Mine office:** Philipsburg,
ont.
P. Meyer, pres.; John H. Dieckman, v. p.; G. J. Tansey,
reas., with John J. Taussig, Max Kotany, L. M. Rumsey, Jr.,
Orr, A. L. Shapleigh, Edward Barklage, directors. R. S. Beitz,

Missouri. **Cap.**, $50,000; shares $1 par; all outstanding.
urth Friday in March.
acres at Philipsburg, said to show ore in contact deposit
eins between limestone and granite. Ore carries gold, silver,
nd manganese. Company was the largest producer of man-
tana. Manganese ore is of the nodular variety of pyrolusite

ccessor to Hope Mining Co., one of the earliest companies
a. Mine is credited with past production of $4,000,000 in
deposit of copper ore, but faulted segment has not yet been

by several shafts, deepest 500′, and a number of tunnels.
0-ton mill with grizzlies, gyratory crusher, trommel with
ich the ore is washed, sorting-belt, rolls, elevators and trom-
bles, thickeners and bins. Crude ore assays 32% Mn. and
re, 41% Mn. and 18% SiO_2; and concentrate, 49% Mn. and

ipped about 100 tons of manganese ore daily in 1917, and
ns in 1918.

MONTANA

Mercer, supt., Dillon, Beaverhead county, Mont.
of the old gold-silver mines of the district reported to
ntity of ore. A cyanide mill was erected in 1919.

& MILLING CO. **MONTANA**

et Gold Mining Co. Ole Peterson, owner, St. Louis, Missouri.
laims at Pony, Madison county; idle at last accounts. Is
l over $700,000. Development is by tunnels.
ater power, compressor, 20-stamp mill, etc.

KE GOLD MINING CO. **MONTANA**

es Breen, gen. mgr., Helena, Mont. S. R. Brown, supt.;
foreman.

Cap., $650,000; $1 par.

Property: 19 claims, 18 patented, 7 miles S. W. of Rin from Basin, the nearest rail point. The formation is peculia lava flow containing numerous egg-shaped masses, technically netted with quartz threads carrying gold; the rock itself also and quartz films, containing gold. A large quantity of this posed by surface workings and tunnels. Over 20,000 tons of a 10-stamp mill in former years gave a recovery of $2.45 gold p ball-mill plant, driven by electric power, was erected late in 1 are low, probably not over 75c., and ore mills easily and cheap ought to pay if a large enough tonnage were handled.

POTOMAC COPPER CO.

Office: Hirbour Bldg., Butte, Mont.

Officers: Wm. P. Jahn, pres.; Paul A. Gow, v. p.; J. J. George E. Palmer, treas., with N. J. Bielenberg, John Harr Higgins, directors.

Inc. Nov. 30, 1918, in Montana. **Cap.**, $1,500,000; $1 standing. Application made for listing on New York Curb. and Registrar Co., 66 Broadway, New York, transfer agent and meeting, second Tuesday in March.

Property: 20 claims, about 300 acres, in the Copper Cli county, Montana, 12 miles north of Bonita, Mont., on N. P. from Potomac, terminus of a branch line of the C. M. & St. amined by W. H. Weed and P. A. Gow, 1919.

Discovered in 1881, the property was desultorily operate by an English syndicate in 1900, when selected ore was sorte

Geology: ore occurs in six well-defined fissure veins and in faults between this and an impure limestone. The ve in a zone of sheeting, 1,200' or more wide, and a mile long. enargite, accompanied by famatinite, pyrite and some copper outcrop of mineralized brecciated quartzite, 100' high, 400' lo thick, and known as the "Copper Cliff," is estimated to contain of 2½% copper ore, with $2.50 per ton in gold. The report the ore in this "Cliff" is $5,000,000. A second ore zone, cut b tunnel, shows 40' of 2¾% ore with $2 gold.

Development: by several tunnels, the two lower ones the veins. The lowest is a crosscut, 500' long, to be extended to cut the veins at depth of 400'. This will be the main ha extraction from all veins of the property. At the Leonard exposes a 10' vein with 60° N.-W. dip and good average value

Company has electric power, a new and excellent wagon and an old logging railway grade much of the way which railroad. An 11-mile transmission-line, compressor, and dwel late in 1919.

Company estimates that with 90% recovery, milling 10 t 90% of value of concentrate paid for by smelters, the ore value of $9.42 per ton and a net profit of $3.65 per ton.

Property covers an entire mining district, showing vein amounts of profitable concentrating ore and a promise of se tonnages by development work. It is a very promising prop

PRICKLY PEAR MINING CO.

Office: care J. C. Murray, pres., Helena, Mont. M City, Jefferson county, Mont.

Officers: J. C. Murray, pres., [illegible]

Property: [illegible] 350' tunnel, [illegible] ment. Produc[illegible]

PRINCE[illegible]

Prop[illegible]

A[illegible]

NING & MILLING CO. **MONTANA**
M. Adams, pres.; Box 386, Butte, Mont.; Frank Eichel-
F. Barnes, sec., with J. C. Lane and J. W. Higgins, directors.
7, 1913, in Montana. **Cap.**, $150,000; shares 10c par; non-
000 issued. Control reported in hands of D. M. Adams and

ne Reliance and Sunnyside group of claims, in the Moose
ilver Bow county, 18 miles south of Butte, showing veins of
l-zinc ore in carboniferous limestone. The new property—the
e ore carries silver principally, is considered to have much

t: by shaft and crosscuts, in which water has been trouble-
917, $12,415 was spent and more money is needed for further

ONSOLIDATED MINING CO. **MONTANA**
D. B. Turner, Norris, Mont.
ear Norris, Madison county, closed in 1917 on account of
r and lack of power, since obtained from the Montana
d yield from depth of 200′ said to be $2,500,000. Four ore-
sed. Four winzes are in ore below 200′ depth. Sinking was
ebruary, 1920.
700 cu. ft. compressor, 100-h. p. electric hoist, etc. Mine
to De Forest Condee and others of New York.

EK MINING & POWER CO. **MONTANA**
e near Dixon, Sanders county, Mont.; fully described in Vol.
dbook.

MINING, MILLING & REDUCTION CO. **MONTANA**
Sherwood Bldg., Spokane, Wash., and Delage, Idaho.
E. Codd, pres. and treas.; H. W. Claussen, v. p.; C. H.
N. Sharp (mgr.), and P. W. Peterson, directors.
shington. **Cap.**, $1,000,000; $1 par; 840,000 issued, increased
February, 1920; 1,340,000 issued. Profit in 1917 was $93,360,
918. **Dividends:** 2c per month, equal to $16,800. Total to
92,400. None since.
n Idaho-Montana line, 6 miles from Saltese, Mineral county,
niles from Adair, Idaho, connected with C., M. & St. P. R. R.
ram. Company owns 7 claims, 6 patented, and millsite, total

t: 2,200′ of tunnels, 500′ of shafts, 2,000′ of drifts, and 600′
st depth is 570′, and total workings are 6,000′. Vein shows on
′, of which 400′ is being developed. Reserves are estimated as
tons daily for a year. New work in 1918, amounted to 1,685′.
the mine is the presence of small but persistent stringers of
n each level, indicating the existence of rich ore lodes below
rt.
2-h. p. gasoline hoist, 80-h. p. compressor, 8,800′ aerial tram
capacity, etc.
4,600 tons in 1917 worth $292,117; and 3,912 tons in 1918,
pper, 0.189 oz. gold and 0.64 oz. silver, or $23 per ton, totaling

, regular shipments were made to Anaconda, but in November
sed down as developments at 500 and 600′ levels were unsatis-
ased treatment charges, together with low metal market absorbed

OLIDATED MINING CO. **MONTANA**
ihart, Mont.
H. Rowe, pres.; J. A. Canty, v. p., and H. A. Frank, sec.-

claims, 6 miles from Neihart, Cascade county. Ore car-

ST. JOE GOLD-COPPER M. & M. CO.

Probably dead, as letters sent former office, Wallace, unclaimed.

Property: 9 claims, well timbered, on Kelly Creek, n west of the Monitor mine, and one-half mile from a railroa veins.

ST. LAWRENCE COPPER MINING CO.

Office: Saltese, Mineral county, Mont.

Officers: Henry M. Lancaster, pres.; S. B. Holbert, v sec.; N. P. Hyndman, treas., with John Sloan, H. F. McL directors.

Inc. Oct. 19, 1917, in Montana. **Cap.**, $1,000,000; $1 increased to $1,500,000 in January, 1920. Annual meeting, ating expenses during 1918 were $81,184.

Property: 8 claims, 1 patented, 160 acres, 5 miles S. nearest rail point.

Geology: claims show quartzite cut by a vertical 6 carrying gold and copper. Ore-shoots are from 85 to 100' sulphide and oxide ore, assaying 8% copper and $3 gold.

Development: by 2,500' of work including tunnels 7 connected by raise and opening mine to depth of 480'. Shrin

Equipment: includes a small compressor.

Production: 1,250 tons in 1917, and 1,500 tons to Ma men were employed at last report.

ST. LOUIS MINING & MILLING CO.

Address: Marysville, Mont.

Property: the famous Drumlummon mine. In 1918 tracted from a lower tunnel.

Equipment: 25-stamp mill and cyanide plant.

ST. PAUL MONTANA MINING CO.

Probably dead, as letters sent to company's office, Mai Mont., are returned.

Officers: O. L. Taylor, pres.; Chas. W. Ames, v. sec.; W. K. Braden, treas., with L. P. Ordway and E. B. directors.

Inc. in Arizona. **Cap.**, $50,000; shares $100 par; 500

Property: 2 patented claims, at Maiden, said to sho tact deposits between porphyry and limestone. Developed shaft, with 5,000' of workings. Ore claimed to assay $4 property is said to have produced $4,000,000.

Equipment: includes hoist, air-compressor, and 50 Operated under lease at last accounts.

ST. REGIS COPPER MINING & MILLING CO.

Probably dead, as letters [illegible] unclaimed fro Missoula, [illegible] St. Regis [illegible], Mont.

Office [illegible] Wilson, pr[illegible]dam, sec.-tre

Inc. M[illegible] shares ferred au[illegible]

Proper[illegible] mine acres, on the [illegible] and s of 6' estimated [illegible] assays of 8% [illegible]

Developme[illegible]

SALTESE CON[illegible]

Office: J[illegible]

Officers: [illegible] Smith and H[illegible]

Inc. in 19[illegible]

Property[illegible]

lining ... in December, 1917, for $10,000. Shows 2 parallel veins, 6' width having a strong gossan.
ment: by 2 crosscut tunnels, the upper cutting a vein of 12' lth, carrying copper ore, mainly chalcopyrite, giving assays of about er streaks assaying up to 32.4% copper and 15.8 oz. silver, with traces Dec., 1917, an orebody was cut that carried 4' of ore averaging 4.5% 5 oz. silver, and $6 gold per ton. Shipments were to have started

ent: includes engine, compressor, drills, shops, and living quar-

MINING & MILLING CO. **MONTANA**

22 Symons Blk., Spokane, Wash. **Mine:** near Saltese, Mineral t.
: J. C. Johnson, pres.; Wm. Dixon, v. p.; O. V. Manring, sec.-'. B. Ward and G. A. Turner, directors.
rch, 1911, as the successor of the Saltese Cons. Copper Mng. & Cap., $1,500,000; shares $1 par; assessable. Levied an assess- per share, Jan. 12, 1914.
y: 12 claims, 240 acres, east of Mullan, near the National mine gis district, about 8 miles N. W. of Saltese.
ment: by 2 tunnels aggregating 1,400'. The lower one, 655' in s a 13' vein, probably the Black Traveler vein, at 460' from the is said to show 5' of high-grade copper ore. The tunnel is being cut the big iron-capped vein seen on the surface.
ng with a small force, 1915-16, but nothing heard of operations erty considered promising.

GRAVEL GOLD MINING CO. **MONTANA**

: Sidney Norman, Spokane, Wash.
v. 5, 1915, in Montana. Cap., $1,000,000; $1 par. Reorganized 920, in Washington. Capital increased to $1,500,000; $1 par.
Transfer & Registrar Co., New York, transfer office and registrar.
ew York Curb.
g statement for period Oct. 1, 1915, to August 31, 1916, shows: ore sales, $119,947 net, from 2,847 tons. On Dec. 31, 1918, cash ounted to $11,496; supplies, $1,030; and due from Kootenay Gold 011.
has a 25% interest in the Kootenay Gold Exploration Co., Ltd., ar Nelson, British Columbia, whose property was sold in July, nd Mining Co., B. C.
y: known as the Head property, 34.7 acres, lies 2 miles N. W. n same fissure vein as the Franklin mine belonging to the Cruse

ment: to 500' depth, by 3 incline shafts, 90', 50' and 500', with ing. Only high-grade ore is shipped, the low-grade being stored for h was constructed from a plant erected by another company nearby. erves were estimated in Jan., 1917, by C. E. Fryburger, as $944,509 ed out and $1,939,311 probable above 500' and down to 600' depth. s sent to the smelter occasionally during 1917 and 1918. Produc- 320,000.

OND COPPER GROUP **MONTANA**

Herbert B. Selway, or H. A. Bond, Armstead, Beaverhead

240 acres, situated 1½ miles from Armstead, Mont. ourse of several E.-W. fissure veins, 3' to 3½' wide schist and limestone. The ore carries 3 to 9%

nd several shallow openings, all said to show 3½ to 10% ore. An open-cut has secured.

SHEILS & IRONSIDE MINING & MILLING CO. MONTA

Office: Dr. F. A. Ironside, 16 North Main St., Butte, Mont.

Officers: John Sheils, pres.; Stanley Ironside, v. p; F. A. Ironside, treas.

Inc. 1913, in Montana. **Cap.,** $500,000; shares $1 par; 446,000 issued.

Property: 6 claims, 2 patented, 120 acres, situated 13 miles N. E. Butte, and an equal distance from Boulder, Jefferson county, show a fissure with ore shoots 250' and 90' long occurring in granite. This granite is an almost vertical dike, greatly altered and mineralized, having a maxi width of over 50'. The ore occurs entirely in the dike, not as a segregation in quartz veins running with the dike, within it or at its margin. Orebo 3' to 5' wide and carries silver, lead, copper, zinc and some gold.

Reported on by W. L. Creden, H. D. Morse, C. J. Stone; also by Morris.

Development: by 3 tunnels, main one 1,850' long, with several stu and a 50' winze with 200' of drifting at the bottom.

Equipment: includes hoist, 3 drills, electric power, and a 100-ton centrating mill.

Production: for 1915-16 amounted to 476 tons averaging 4.5% cop 26.6 oz. silver, and $4.40 gold. Shipped about 40 tons of concentrates mon in 1917, and until mine was closed, February 1, 1918.

SILVER CABLE MINING CO. MONTA

Address: Box 1403, Missoula, Mont.

Officers: J. D. Corbett, pres.; George Falligan, v. p.; C. C. Mott, treas., with J. W. Kennedy, H. E. Chaney, and W. J. Rhoades, directors.

Cap., $1,250,000; shares $1 par; assessable. Listed on Butte Excha Annual meeting, first Saturday in July.

Property: 7 claims in east Coeur d'Alene district, just over the Mo tana line on the eastern slope of Bitter Root Mts., 5 miles from the Nort Pacific R. R.; part of the land lies in Idaho. Said to have a high body of s lead and zinc ore, from 500' to 700' high, proved for over 200' in length, and f 4' to 6' wide. Ore is said to average better than 15% zinc.

Development: by 1,500' tunnel, raises and drift in ore. Reported veloping in 1919.

SILVER FISSURE MINING CO. MONTA

Address: A. W. S. Cochrane, sec., 30 Broad St., New York.

Property: near Polaris, Beaverhead county, Mont., known as the P laris mine, formerly operated by F. Aug. Heinze, carries silver and gold.

Shut down 1915, but leased to and operated by Silver Fissure Silver Min Co. (which see), since 1918.

SILVER FISSURE SILVER MINING CO. MONTA

Address: Seligman & Meyer, 61 Broadway, New York.

Officers: A. J. Seligman, pres.-treas.; J. Blamner, v. p.; D. J. Verge sec., with J. F. Mercer and P. Mangone, directors. H. W. Chadwick, asst. Glenn Anderson, mgr., Butte, Mont.

Inc. in Delaware. **Cap.,** $1,000,000; par $1; all issued. Annual me first Monday in November.

Property: the Polaris mine, 6 patented claims, 180 acres, in Beaver county, owned by the Silver Fissure M. Co. Ore reserves, July, 1918, re 69,620 tons containing 1,507,300 oz. silver and 1,300 oz. gold. A 50-to employing chloridizing roasting and hypo-sulphite leaching was erected 1918. Property is a good one, but its operation is greatly hampered by situation.

SILVER KING MINING CO. MONT

Address: Thomas Price, Kalispell, Idaho, and Thomas Price, Mo

Officers: D. W. Price, pres.; D. W. Frazier, v. p.; Thomas Price treas., with A. J. [illegible] and [illegible]

Inc. 1919, [illegible]

Property [illegible]

AIL MINING CO. **MONTANA**
Basin, Mont. M. L. Hewitt, pres.; J. A. Cowan, v. p.-mgr., , Utah.
in Montana. **Cap.**, $500,000; par $1.
3 miles S. of Basin, Jefferson county.
ent: by tunnel, one nearly 400′ long being driven to cut the in, which assays high in silver on the surface.

M MINES CONSOLIDATED **MONTANA**
ld National Bank Bldg., Spokane, Wash.
Leo Greenough, pres. and gen. mgr.; J. W. Greenough, v. p.; sec.-treas., with M. D. Hall, James Broad, H. P. Greenough, and asst. gen. mgr., directors.
16. **Cap.**, $625,000; 25c par. Annual meeting third Tuesday in

ing profit of $129,792 was made in 1918, but this was reduced to axes, insurance, interest, exploration, etc., was deducted. Current $42,562, and liabilities, $101,581.
was organized to take over the Snowstorm Mining Co. and to bond and lease the Banner and Bangle claims, at Troy, Lincoln Of the capital stock, 1,500,000 shares were issued to Snowstorm ckholders in full payment for the corporation's assets. Proceeds),000 shares not transferred to the former Snowstorm holders has to developing and equipping the Banner and Bangle property. his mine are $100,000 on Nov. 20, 1920; and $125,000 a year later, of 10%.
the Banner & Bangle mine. Also owns the old Snowstorm rson, Idaho; and 25 claims, 7 millsites, 2 power-sites, 5 water- er holdings about 6 miles S. of Troy, Mont. Ore contains lead,

ent: at the Banner and Bangle property includes 6 long tun- ver 1,900′ long in 1919, is to be the main working adit, and is t the vein at 2,500′ from the portal. Ore reserves are said to be

t: includes a 6-mile railroad, 1,500-h. p. hydro-electric plant, d 300-ton concentrating plant, mine change-house, boarding house, c.

n:

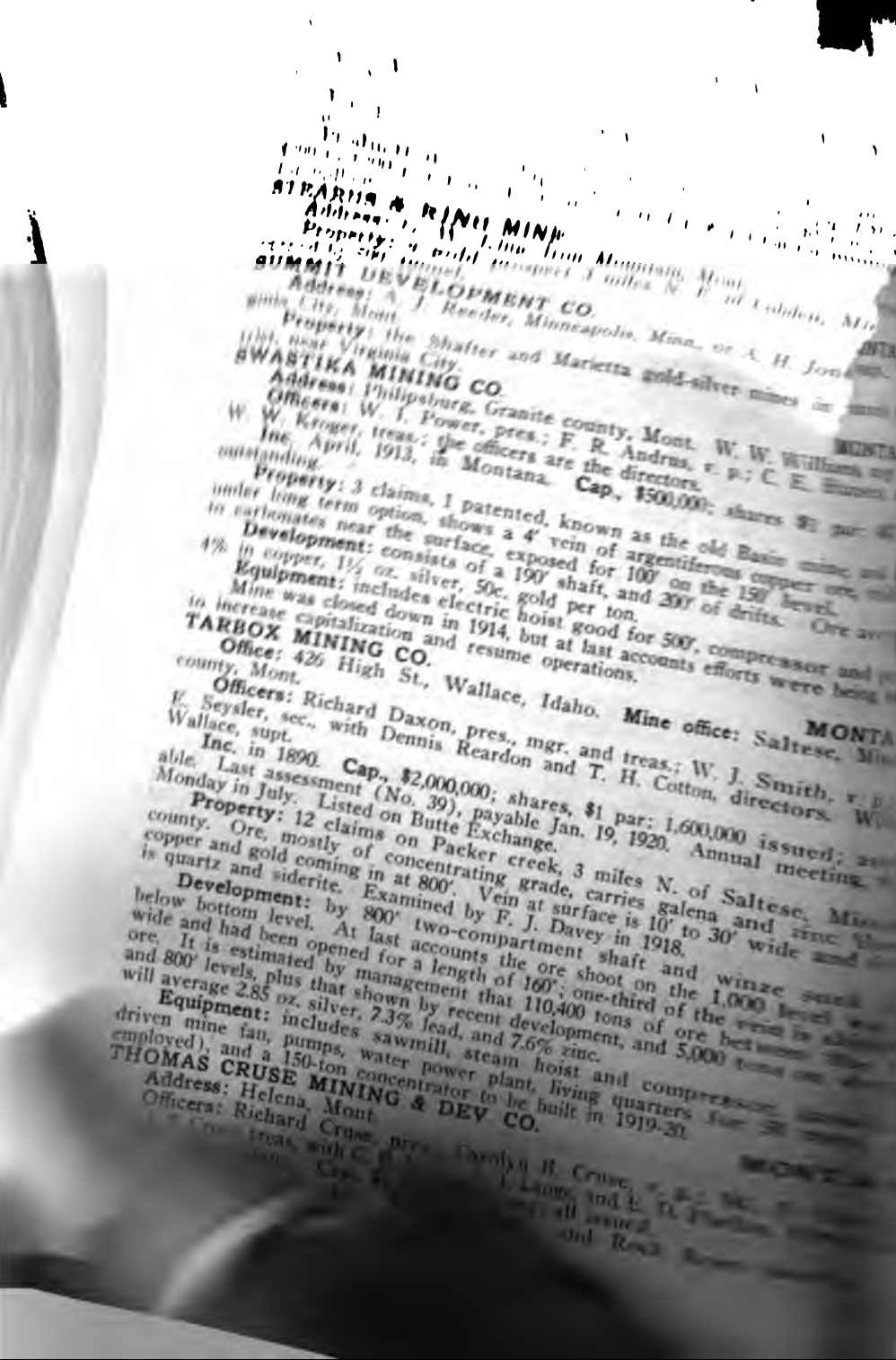
illed, ns	Lead concts., tons	Zinc concts., tons	Gold, oz.	Silver, oz.	Lead, lb.	Zinc, lb.
342	5,093	3,644	561	164,605	6,060,484	2,474,969
547	2,933	3,150	445	89,980	3,927,559	1,826,903

em as if company has a good mine and equipment, and is making develop it thoroughly. Profits so far have not been large, and n property are heavy, but dividends are expected in the not far

ONTANA MINING CO. **MONTANA**
. O. Hamilton, pres., Peyton Bldg., Spokane, Wash., D. E. red Ludwein, sec.-treas., with Wm. Gumm and Andrew Kuklo,

0,000; $1 par. Annual meeting October 15.
2 claims, 2 miles from Basin, Jefferson county, Mont., de- nels in veins in granite. Ore contains galena with gold and

ORSE MINING CO. **MONTANA**
Maiden, Mont. S. B. Coolidge, mgr.; C. L. Carstens, mine mill, mill supt.
zona. **Cap.**, $50,000; $100 par.
an old and well known gold mine, 35 acres, 1 mile from



stricts, Lewis & Clark county; also claims on
; and Butcher creek, Carbon county, a total of
.. F. Word of Helena. Ores are principally gold

one at each mine in 1918, and a new ore-shoot was 640′ in one mine, and 2′ of solid galena ore at 400′ in the of the mines are equipped with machinery, and smelting and shipped from small payshoots.

S COPPER MINING CO. **MONTANA**

active.

Copper City, Broadwater county, Mont. Herbert G. Dunbar, rks, Mont.

a group of claims, at Copper City, 7 miles north of Three ped by 400′ shaft. As shaft is in lead material from top down, d to be 200′ wide. Sulphide copper ore appears at 325′, or 25′ vel. Company planned extensive prospecting on 400′ level. somewhat bismuthiferous, assaying up to 20% copper, with small and silver.

t: includes steam power and an air compressor. No recent d.

ING CO. **MONTANA**

by Jas. A. Murray of Butte, Mont.

1 fractional claim, about 2 acres, lying between the Bell and s of the Anaconda and the Speculator and Edith May claims of te. Mine has a 700′ incline shaft on the vein with levels opened 0′ and 600′, said to show 4′ of good ore in the bottom. Work was injunction, secured by the Anaconda Copper Mining Co. Idle past.

MINING & DEVELOPMENT CO. **MONTANA**

urned from former office: 8 Allen Blk., Missoula, Mont. Mine Mont.

R. B. Hughes, pres and gen. mgr.; Oliver Blood, v. p.; H. -treas., with David C. Smith, E. C. Mulroney, F. C. Robb and er, directors. Henry E. Kuphal, engr.

25, 1906, in Montana. Cap., $500,000; increased later to es $1 par, non-assessable; issued $665,000. Debentures, $150,000 ued. Annual meeting, third Monday in February.

13 claims, 10 unpatented, 230 acres, well-watered and partly Wallace district, 2½ miles from a railway, in 3 groups, known group of 8 claims, and the Hill group of 5 claims, 2 miles N. E. 17 miles E. of Missoula. The company also owns land in the a.

contain fissure veins cutting granite and altered sedimentary contact with a large batholith of granite. The veins show chal- ornite associated with hematite, siderite, and quartz in altered Triangle group shows a 16′ vein, opened by a 540′ tunnel with At the face the vein is 14′ wide and assays 2% copper, ½ oz. gold, while an 8″ streak averages 15.04% copper, 3.20 oz. silver and a 4′ footwall streak averages 4.65% copper, 12 oz. silver

ent: by a 140′ crosscut and 540′ drift tunnels and 40′ shaft, ock out 25,000 tons ore. The Grass Widow claim has 513′ of 300′, 75′ and 100′ drifts. The Hill group has a 300′ drift tunnel. : includes a 40-h. p. boiler and an Ingersoll-Rand air-com- several mine buildings. Idle since 1917.

MINING & MILLING CO. **MONTANA**

Elliston, Powell county, Mont.

V. M. O'Connell, pres.; F. B. Hubbard, v. p.; E. J. P. Dwelly, [illegible]ley, J. L. Hurd and John Churchill, directors;

Maiden, in Judith mountains. (See Geol. of Judith Mts., Montana, by W. Pirsson, U. S. Geol. Survey.)

Development: by 450′ shaft. Five distinct oreshoots extend to level. Reserves are given as 20,000 tons.

Equipment: the mill contains crusher, rolls, Chilean mill, and counter-current decantation system of cyanidation, treating 120 tons da

Production: monthly output of concentrate is 30 tons, assaying $200 to $800 per ton. Costs are reported as $2 per ton for mining, and for milling.

STEARNS & KING MINE MONT

Address: G. W. King, Iron Mountain, Mont.

Property: a gold prospect 3 miles N. E. of Cobden, Mineral opened by 500′ tunnel.

SUMMIT DEVELOPMENT CO. MONT

Address: A. J. Reeder, Minneapolis, Minn., or A. H. Jones, supt. ginia City, Mont.

Property: the Shafter and Marietta gold-silver mines in Summ trict, near Virginia City.

SWASTIKA MINING CO. MONT

Address: Philipsburg, Granite county, Mont. W. W. Williams,

Officers: W. I. Power, pres.; F. R. Andrus, v. p.; C. E. Hanse W. W. Kroger, treas.; the officers are the directors.

Inc. April, 1913, in Montana. **Cap.**, $500,000; shares $1 par; outstanding.

Property: 3 claims, 1 patented, known as the old Basin mine, a under long term option, shows a 4′ vein of argentiferous copper ore, to carbonates near the surface, exposed for 100′ on the 150′ level.

Development: consists of a 190′ shaft, and 200′ of drifts. Ore a 4% in copper, 1½ oz. silver, 50c. gold per ton.

Equipment: includes electric hoist good for 500′, compressor and

Mine was closed down in 1914, but at last accounts efforts were bei to increase capitalization and resume operations.

TARBOX MINING CO. MONT

Office: 426 High St., Wallace, Idaho. **Mine office:** Saltese, M county, Mont.

Officers: Richard Daxon, pres., mgr. and treas.; W. J. Smith, E. Seysler, sec., with Dennis Reardon and T. H. Cotton, directors. Wallace, supt.

Inc. in 1890. **Cap.**, $2,000,000; shares, $1 par; 1,600,000 issued; able. Last assessment (No. 39), payable Jan. 19, 1920. Annual meetin Monday in July. Listed on Butte Exchange.

Property: 12 claims on Packer creek, 3 miles N. of Saltese, M county. Ore, mostly of concentrating grade, carries galena and zinc copper and gold coming in at 800′. Vein at surface is 10′ to 30′ wide an is quartz and siderite. Examined by F. J. Davey in 1918.

Development: by 800′ two-compartment shaft and winze be below bottom level. At last accounts the ore shoot on the 1,000 leve wide and had been opened for a length of 160′; one-third of the vein is ore. It is estimated by management that 110,400 tons of ore between and 800′ levels, plus that shown by recent development, and 5,000 tons on will average 2.85 oz. silver, 7.3% lead, and 7.6% zinc.

Equipment: includes sawmill, steam hoist and compressor, a driven mine fan, pumps, water power plant, living quarters for 50 employed), and a 150-ton concentrator to be built in 1919-20.

THOMAS CRUSE MINING & DEV. CO. M

Address: Helena, Mont.

Officers: Richard Cruse, pres.; Carolyn B. Cruse, v. p.; W sec.; J. J. Cruse, treas, with C. B. Nolan, E. J. Lange, and E. D. Phel

Inc. in Montana. Cap., $1,500,000; $1 par; all issued.

Property: the Franklin, Helena, Looby, and Rock Rose

E. C. Welch, J. W.

ing, February 1.

l for gold, sil-
d dip N. Pay
g sulphides.

unnel and
t returns
NTANA
county,

G. B.
ores,

ued.
592;

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at

NA

Inc. in Montana. **Cap., $500,000**; shares $1 par; 300,000 issued. A nual meeting, April 4.

Property: 5 claims, 70 acres, patented, in Elliston district, 8 miles fr Elliston, on east side of Telegraph creek. Ore occurs in granite, and mana ment reports 6 veins, of which one is developed by 2 shafts, 185′ and 50′ de and a 250′ tunnel with 3 crosscuts. Total workings 525′, said to prove vein wide, traceable for 3,000′ and proven to 170′ depth, carrying 5% copper, 4% le 19 oz. silver and $3 gold per ton. Value is said to increase in depth and sulp ores expected at about 300′.

Equipment: includes steam power, one 40-h. p. hoist and several be ings. Reported 1915, that development would be resumed, but nothing repo since.

UNITED SMELTING & REFINING CO. MONTAN

Controlled by American Smelting & Refining Co.

Property: the East Helena, Mont., silver-lead smelting plant.

UNITED STATES COPPER MINING CO. MONTAN

Address: H. V. Edwards, Jr., Wallace, Idaho.

Officers: Mrs. Emma Stansfield, pres.; H. V. Edwards, Jr., sec.-tre with J. Lucas, C. W. Edwards, H. V. Edwards, Charles Strope, and Jesse Fr man, directors.

Cap., $100,000; 10c par; non-assessable.

Property: 3 patented claims on Clear creek, Sanders county, carry copper-silver ore, and developed by tunnels. Not working at last accounts.

VALENTINE MINING CO. MONTAN

Address: O. A. Olsson, Wallace, Idaho.

Officers: F. Bland, pres.; A. L. Thurston, v. p.; O. A. Olsson, se treas., with T. McCabe and O. W. Lewis, directors.

Cap., $1,000,000; par $1; non-assessable.

Property: 7 claims near DeBorgia, developed by 600′ tunnel and sh Idle at last accounts.

VALLEY FORGE MINING CO. MONTAN

Address: S. A. Mendenhall, mgr., Rimini, Mont.

Property: silver-lead-zinc mine in Ten-Mile district, 14 miles W. Helena. Shipments were 80 tons daily, of dump ore in 1917. No recent ret

VANDOR MINING CO. MONTAN

Address: E. B. Lindberg, Livingston, Meagher county, Mont.

Officers: J. F. Simmons, pres.-mgr.; J. F. Stuart, v. p.; E. B. Lindb sec.-treas., with J. J. Tucker and J. P. Kurtz, directors.

Cap., $1,000,000; par $1.

Property: 5 claims, 7 miles S. W. of Ringling, Meagher county. P duction reported to mid-1918 as 16 carloads of ore averaging 6½% copper.

VERMILLION SILVER & LEAD MINING CO. MONTAN

Address: W. A. Kittrell, Wallace, Idaho.

Property: 6 claims, 12 miles from Trout creek, Sanders county, carry veins of gold-lead-copper-zinc ore, opened by tunnels. A 100-ton mill is run water power.

WAR EAGLE GOLD & COPPER MINING CO. MONTAN

Property: 3 claims, 7 miles from Alhambra, in Warm Springs go Jefferson county, Mont., shows strong fissure veins in granite. Mineralizat in bands of sulphide ore in soft altered granite, the ore consisting of pyrite an little chalcopyrite, whose value is mainly in gold.

Development: by a 300′ tunnel, planned to intersect the vein at ab 1,500′ and give a back of about 500′. Presumably idle, as letters sent comp were returned unclaimed.

WASHINGTON MINE MONTAN

See Angelica Mining Co.

WESTERN RESERVE MINING CO. MONTAN

Office: Youngstown, Ohio. **Mine office:** Basin, Mont.

Officers: F. S. Merwin, pres.; C. Livingston, v. p.; H. F. Duesinc

J. Burns, J. E. Richardson, A. F. Schontz, E. C. Welch, J. W.
rs. J. H. Hildebrand, supt.
)hio. **Cap.**, $100,000; $1 par. Annual meeting, February 1.
e: Youngstown, Ohio.
3 claims, at Basin, Jefferson county, developed for gold, sil-
:opper. The quartz veins in granite strike E. W. and dip N. Pay
arge and small bodies as shoots and streaks showing sulphides.
ent: by 2,700′ tunnel, greatest depth being 660′.
t: includes a steam compressor. Plan driving 100′ tunnel and
centration plant. Developing in 1916 and 1917. No recent returns

SMELTING & POWER CO. **MONTANA**

l Eitel Bldg., Seattle, Wash.; and Cooke City, Park county,

. L. Tanzer, pres.; C. A. Swartz, v. p.; J. J. Black, sec.; G. B.
ith C. J. Steeple, E. W. Gaylord, Joseph Schlenker, G. M. Moores,
tt, directors. W. M. Tanzer, mgr.; F. A. Hancock, supt.
in Washington. **Cap.**, $5,000,000; $1 par; 2,206,117 issued.
, first Saturday in March. Expenses in 1916 were $89,592;
: $79,161 in 1918.
1919, company reported that a 1,000-h. p. hydro-electric plant,
producing 20,000 board feet daily, and 5-drill compressor at
in operation. The 300-ton modern copper blast-furnace at
ark county, was expected to be working by end of 1919.

EF COPPER CO **MONTANA**

n Volume XIII. Absorbed 1918 by the Liberty-Montana Mines

1913. **Cap.**, $1,000,000; shares $1 par.

L MINING, MILLING & DEV. CO. **MONTANA**

Whitehall, Mont.
t last accounts, T. T. Gates, pres.; N. D. Root, v. p.; C. W.
h Edward Ryan, Jesse Johnson, L. B. Knight, R. Edwards, J. M.
nes Ryan, directors.
1914, at Whitehall, Mont. **Cap.**, $500,000; shares $1 par;
n treasury; 250,000 shares were given for the mining property.
5 claims, about 3 miles N. E. of Whitehall, Jefferson county.
ave an orebody 36′ wide from which shipments have averaged
lle at last accounts.

I GOLD CO. **MONTANA**

C. W. Young, Chicago, Ill. Worked since 1912 under lease by
(H. C., A. R. & Wm.), of Helena, Mont.
the mine, 3½ miles south of Helena, Mont., located in 1864
ntermittently to date, has been a good and profitable gold pro-
ns carry silicious ore, containing small silver values, developed
recent work is mostly between the 400′ and 500′ levels; a new
ed at 450′ in May, 1919.
: includes tramway, compressor, pump and hoist. Only 5
20-stamp mill and cyanide plant were worked in 1916, treating
and custom ores. Ore from the 400′ level was milled in 1917-18.

CBIN COPPER MINING CO. **MONTANA**

25 Union Bank Bld., Helena.
. A. Balliet, pres.; A. Major, v. p.; L. C. Henry, sec.-treas.;
and T. A. Grimes, directors.
), 1907, in Montana. **Cap.**, 5,000,000 shares; 10c par; non-
tanding 3,633,900. Annual meeting, third Tuesday in June.
7 claims, 3 patented, 140 acres, 20 miles S. of Helena, and a
Wickes, Mont. The claims show N.-S. and E.-W. fissure veins
aplite, andesite and dacite. Ores carry gold, silver, copper and

nt: by Bunkerhill tunnel, 1,030′ long and Tulare tunnel, 700′;
Total workings, about 2,500′, greatest depth, 350′.

Production: test lot of 31 tons in 1917 returned 4.87% copper, 17.6 o silver, and 0.01 oz. gold, equal to $24.94 per ton. The cost was $4 per ton.

Appears to be a promising property.

WILLOW CREEK MINING CO. **MONTAN**

Address: P. H. McDermott, chief owner, Helena, Mont.

Property: Owns the Mountain Meadow group, 4 miles from Pon Madison county, Mont., on Willow creek. Mine shows a 12′ fissure vein granite carrying free gold with pyrite and chalcopyrite, both with gold valu in quartz gangue. Has a small mill. Regarded as promising.

A small shipment was made in July, 1917, but no recent returns secured.

WILSON MINING & SMELTING CO. **MONTAN**

Address: William Burke, pres. and mgr., Saltese, Mont.

Officers: A. Burke, v. p.; G. W. Dougherty, sec. and treas.; M. Ha and G. Early, directors.

Property: 2 groups of claims on Silver and Big Thunder Creeks, abo 2 miles from Saltese, Mineral county; 6 claims on a lead and silver vein fo one group, 8 claims showing a shoot of copper, in the other group Commerc lead ore is reported in an upper tunnel.

An assessment to pay for further exploration was levied in March, 1918.

WINDFALL PLACER MINING & DEVELOPMENT CO. **MONTAN**

Office: Missoula, Mont.

Officers: W. J. Johnson, pres.; Chas. Marsh, v. p.; A. J. Gibson, trea A. K. Anderson, sec.-mgr., with Gunnar Nordquist, directors.

Inc. in Montana. **Cap.**, $1,000,000; $1 par.

Property: 620 acres of placer ground and of water rights, dump, a timber lands, of which 300 acres are said to contain gold-bearing gravel, miles from Quartz, Mineral county, and 3 miles from the N. P. and C. M St. P. railroads. The district is reported to have produced over $20,000,000 go

Geology: bedrock consists of soft shale, sandstone and quartzite, ov lain in places by porphyry, above which is from 15′ to 40′ of gravel, averagi 30 cents a cubic yard. The gold is high grade, being 984 fine.

Development: ground has been opened by the "booming" system moving gravel. Dumping facilities are good, there being a 1,200′ drop betw the upper and lower ends of property.

Equipment: includes a 6,000 board feet sawmill, a 6,400′ flume, 30″ 30″ in cross section, 1,600′ of 16″ to 24″ pipe having a vertical drop of 395′, bottom of which is a "Y" with two 11″ branches carrying water to giants fit with 2, 3, 4, or 5″ nozzles. An average of 300 miners' inches of water is av able for 7 months each year. A derrick is employed to lift up to 8-ton boulde and in 1918 an hydraulic elevator of 5 tons capacity under a 300′ head of wa was installed. Sluice-boxes consist of double line 36 by 48″ with grade of in 12′.

Production: approximates $360,000, from 200,000 cu. yd. Costs are es mated at 10 cents a yard.

No recent production figures are available.

WISCONSIN MONTANA MINING CO. **MONTAN**

Office: Downing, Wis. **Mine office:** Superior, Mont.

Officers: A. O. Nichols, pres. and gen. mgr.; D. McDonald, v. p.; C. Coolidge, sec.; Dr. P. A. Beebe, treas. and R. A. Cleveland, directors.

Inc. January 29, 1900, in Wisconsin. **Cap.**, $50,000; shares 5c par. A nual meeting, first Tuesday in February.

Property: 16 patented claims, 320 acres, and a 5-acre millsite, 1 m from the Missoula river and about 10 miles east of Superior. Claims sh fissure veins cutting through limestone, slate and quartz; one reported as wide, with irregular shoots assaying from 1 to 42% copper, with gold, silver, a lead values.

Development: by tunnels of 40′, 80′, 400′ and 710′ length, with lates A 3,000′ tunnel was planned. Mine was under lease in August, 1917. No cent returns received.

ACER MINING CO. **MONTANA**
J. M. Flugstad, sec., Corvallis, Ravalli county, Mont.
.000; shares $1 par; non-assessable.
: 480 acres of placer ground on Hughes creek, Ravalli county,
ıg-line scraper. Output in 1918 was $21,000.

LEY M. & M. CO. **MONTANA**
S. H. Ehlers, Libby, Mont.
0,000.
: a gold mine in Sylvanite district, Yahk Valley, Lincoln
ped by a 1,000′ tunnel.

BUTTE DISTRICT, MONTANA.

D & SILVER MINING CO. **MONTANA**
perated as one of the Anaconda units. A steel head-frame and
'e erected during 1918. For recent litigation, see Vol. XIII.
)er, 1919, minority shareholders were allowed a re-argument of
s covering sale of the mine to the Anaconda company. The dis-
the price paid, and upon jurisdiction of the court, the Alice Com-
:en incorporated in Utah.

COPPER CO. **MONTANA**
:e: 3 Lewisohn Bldg., Butte, Mont. Donald Campbell, pres.
19, 1906. in Montana. **Cap.**, $400,000, fully issued, shares $2
ted on Butte Exchange.
is very small acreage in the S. E. portion of the Butte dis-
ıce rights to sundry town lots.
ent: by shaft, sunk jointly by the Alliance and Farrell com-
was worked by lessees in 1919.

/TTE COPPER CO. **MONTANA**
ıtte, Mont.
ames H. Lynch, pres.; John A. Poore, v. p.; with F. Love, M.
ınd Thomas T. Poore, directors.
29, 1906, in Montana. **Cap.**, $2,500,000; $5 par; 198,000 issued.
the following lode mining claims: Amazon, Altoona, Annie,
tha, Henrietta, Jessie, Josephine, and Gaynor. Approximately 128
n the east side district of Butte, Silver Bow county.
ıs been inactive for a number of years.

COPPER MINING CO. **MONTANA**
Broadway, New York City. **Mine office**: Hennessy Bldg.,

ohn D. Ryan, chairman of board of directors; C. F. Kelley,
ayer, v. p.; A. H. Melin, sec.-treas.; R. D. Cole, asst.-sec.; J. T.
ıd.; D. B. Hennessy, asst. treas. Directors: John D. Ryan, B. B.
H. Church, Nicholas F. Brady, Wm. Rockefeller, C. F. Kelley, J.
ş. Andrew J. Miller and H. H. Rogers.
officials:

Mining Department

gen. mgr. of mines; W. B. Daly, asst. gen. mgr.; C. W. Goodale,
y First committee. C. L. Berrien, gen. supt. of mines; John
M. Norris, asst. gen. supts. The mine superintendents are as

Anaconda Group

Badger State mine.	Dan Cronin, Never Sweat mine.
ountain Con. mine.	Dan. P. Sullivan, Original mine.
ll-Diamond mine.	Charles Bonner, Steward mine.
gh Ore mine.	Jos. Merrick, Moonlight mine.
St. Lawrence mine.	Thos. McGrath, Gray Rock mine.
ıaconda mine.	Jas. L. Gwinn, Belmont mine.
Safety engr.	A. Barton, Asst. Safety engr.

Boston & Montana Group

John Varker, Mountain View mine.
Herbert R. Tunnell, Penn. mine.
K. P. Krueger, West Colusa mine.
G. E. Moulthrop, Tramway mine.
C. E. Calvert, Safety engr.
Jas. W. Tippett, East Colusa mine.
John Bartlett, Tramway mine.
Geo. Bennett, Leonard mine.
John C. Gaul, Berkeley mine.
Wm. McLain, Silver Bow mine.
Jas. McQuay, Tropic mine.

Zinc Group of Mines

J. J. Carrigan, gen. supt.
Herbert Tonkin, Poulin mine.
J. F. Dugan, Nettie mine.
John Bouck, Lexington mine.
Jas. Brennan, Emma mine.
Leo McGrath, Alice mine.
J. C. O'Brien, Southern Cross mine.
John Berkin, Orphan Boy mine.

Reduction Departments

Washoe Reduction Works, Anaconda

Fred. Laist, mgr.
L. V. Bender, gen. supt.
H. S. Ware, asst. supt.
L. E. Jones, supt. elec. dept.
W. M. Kelly, gen. smelter foreman.
W. N. Tanner, chief engr.
W. C. Capron, asst. chief engr.
B. S. Morrow, supt. of concentrators

Department.	Superintendent.
Converting and Casting	Pat Dalton R. E. Howe, asst.
Carpenter shop	Carl Johnson
Boiler shop	John Casey
Blacksmith	J. A. McDonald
Laboratory	J. A. Root
Sampling mill	Rod Munn
Local terminal and weighing	W. H. Nutting
Concentrator	B. S. Morrow
Blast	P. Barker G. Brolin, asst.
Surface	W. C. Cadwell
Power house	M. M. Adams P. J. Grush, asst.
Arsenic plant	E. M. Dunn
Foundry	H. N. Blake
Testing department	C. D. Demond
Research	F. F. Frick
Stock bins	Thos. Marron
Leaching plant	H. T. Maguire
Reverberatory	Ed. O'Brien
Briquette	H. S. Ware
Acid plant	M. R. Hoyt
Masons	A. N. Jette
Roaster No. 2 and McDougalls	J. K. Murphy
Coal dust	H. I. Silvester
Zinc concentrator	S. S. Rodgers
Brick plant	H. H. Coe
Electric department	L. E. Jones
Machine-shop	Clarence Bardon
Pipe-shop	John Bills
Paint-shop	James Sweeney
Lead burning	G. C. Detrich
Water works and Street Railway	H. M. Johnson
Chief clerk	Geo. C. Jackson

ston & Montana Reduction Works, Great Falls

mgr.	A. T. Elliott, gen. smelter foreman.
;upt.	Edgar C. Maclay, chemist.
;t. supt.	W. T. Burns, supt. elec. refinery.
metallurgist.	P. Cudahy, supt. furnace refinery.
mgr. brick dept.	Peter Thill, asst. chief engr.

International Smelting Co.

Utah, and Miami, Ariz. smelters, the East Chicago and Raritan ıternational Smelting Co.

Coal Department

mgr., Anaconda.
supt. Diamond Coal & Coke Co., Diamondville, Wyo.
. A. C. M. Co., Coal Department, Washoe.
supt. A. C. M. Co., Coal Department, Sand Coulee, Mont.

Lumber Department

ıgr., Missoula, Mont.
t., St. Regis.
supt., Bonner, Hope, Idaho.

B. A. & P. Railway

ngr., Anaconda.	C. F. Murphy, supt.
master mechanic.	J. H. Schuch, chief engr.

Labor Commissioner

:. 1895, in Montana, as successor of Anaconda Mining Co.
): shares $50 par, 2,331,250 isued.
: $16,000,000 2-year 5% gold notes, due March 1, 1917, were
t maturity.
· 31, 1918, an issue of $50,000,000 ten-year secured gold bonds
Of these, $25,000,000, designated as Series A,. bearing 6%
ued on January 2, 1919, under a trust agreement with the
o. of New York. The issue was sold to bankers. The amount
)r equipment of the Andes Copper Mining Co. and Santiago
to replace in current account part of the earnings which have
the company. It was deemed best to raise money this way
:rmanently to the capitalization.
ıt issued at the time this loan was raised, company reported
r 30, 1918, its current assets totaled $73,000,000, and current
00. The excess of assets increased by $11,200,000 from Jan.
0, 1918. Fixed assets of company and subsidiaries aggregated
ıcrease of $59,109,458. During that period, earnings totaled
lividends $82,687,500.
ncipal subsidiary companies and investments, the following
obtained during the period:

Inspiration Consolidated Copper Co.

:s @ $32.72		$8,210,433
d	$4,544,700	
present rate	2,007,200	

Greene Cananea Copper Co.

37.94		$2,261,437
d	$1,130,600	
present rate	476,800	

International Smelting Co.

Book value 120,000 shares		$12,00
Dividends received	$3,600,000	
Earnings from May 27, 1914, above dividends	974,864	
Total	$4,574,864	

International Lead Refining Co.

Book value 7,500 shares		$75
Earnings from May 27, 1914	$216,567	

Raritan Copper Works

Book value 20,000 shares preferred and 40,000 shares common stock		$6,99
Dividends received	$3,030,000	
Earnings from May 27, 1914, above dividends	921,739	
Total	$3,951,739	

United Metals Selling Co.

Book value 50,000 shares		$5,74
Dividends received	$3,700,000	
Earnings from April 1, 1915, above dividends	564,813	
Total	$4,264,813	

Company has a very broad charter, permitting it to acquire, mortgage, l assign and transfer the capital stock, bonds or securities of any other cor tion. National City Bank, N. Y., transfer agent; Bankers Trust Co., N registrar. Pogson, Peloubet & Co., auditors. Annual meeting, third Wedne in May at Anaconda. Stock listed in New York, Boston, London.

Balance Sheet, including subsidiaries, years ended December 31:

Assets.

Year	Mines and lands	Buildings and works	Investments in companies not owned	Supplies, etc.	Metals	Cash and accounts	T
1918...	$80,214,618	$56,416,775	$28,592,856	$13,411,134	$27,865,266	$30,702,053	$23
1917...	80,102,398	51,881,399	22,545,610	11,252,240	32,966,589	27,109,809	22
1916...	80,186,011	47,303,134	18,936,376	8,295,662	37,225,804	32,065,854	22
1915...	78,179,422	40,074,652	11,153,959	6,601,050	18,944,075	19,832,368	17
1914...	77,376,204	31,896,252	5,211,727	5,918,139	17,554,757	3,443,719	14

Liabilities.

Year	Capital Stock	Notes	Reserve for depreciation	Current	Dividend payable	Surplus	T
1918...	$116,562,500	.....	$15,476,482	$35,435,357	$3,496,875	$66,232,484	$2
1917...	116,562,500	.....	10,316,446	31,402,619	4,662,500	62,913,989	2
1916...	116,562,500	$16,000,000	5,278,269	33,114,710	4,662,500	48,395,863	2
1915...	116,562,500	16,000,000	1,900,578	21,743,997	3,526,586	15,051,865	17
1914...	116,562,500	.....	.....	15,974,835	1,182,404	7,681,059	14

Income Account, including subsidiaries:

	1918	1917	1916	1915	
Sales of metals (deliveries)..	$102,586,542	$109,055,593	$96,097,709	$61,473,678	$
Sales of merchandise.....	6,918,202	7,514,591	7,191,366	3,778,653	
Royalties, etc.	10,248,791	6,668,384	7,675,167	3,077,479	
Metals in process and on hand	27,865,266	32,966,589	37,225,804	18,944,075	14
Total.....	$147,618,802	$156,205,157	$148,190,046	$87,273,887	$
Metals in process and on hand	$32,966,589	$37,225,804	$18,944,075	$17,554,757	$
Mining and development.....	29,844,525	24,591,950	24,709,071	17,254,622	15
Ore purchase	19,474,604	21,156,715	15,227,457	13,647,795	1
Treatment and transportation	23,695,832	18,960,026	19,183,023	11,723,706	7
Transport, refining and selling metals	8,552,862	6,956,883	6,760,480	4,492,172	
Cost of merchandise sold.....	5,845,701	6,419,289	5,210,178	2,559,686	
Administration and taxes...	2,522,616	3,396,110	1,613,424	573,545	
Balance	24,716,073	37,498,380	56,542,339	19,467,697	
Total.....	$147,618,802	$156,205,157	$148,190,046	$87,273,887	$

Loss:					
.....	$24,716,078	$37,496,380	$56,542,330	$19,580,618	$9,198,420
anies not	2,867,515	2,749,083	2,350,642	112,922	2,843,491
.....	$27,583,588	$40,247,463	$58,892,980	$19,693,540	$12,041,911
.....	$6,104,185	$5,387,436	$7,113,463	$1,900,575	.....
.....	676,533	526,275	951,145	984,233	408,832
.....	17,484,375	19,815,625	17,484,375	9,325,000	9,077,500
.....	$3,318,495	$14,518,127	$33,343,997	$7,483,632	$2,555,589

paid quarterly; 13% in 1901, 4% in 1902, 1903, 1904; 11½% in 1906, 26% in 1907, 8% in 1908 to 1911, inclusive; 9% in 1912, % in 1914, 6% in 1915, 14% in 1916, 17% in 1917, 16% in 1918, . to Nov. 27. For 1920, $1 is payable on Feb. 24. The total 510,625.

'16 the following companies were organized under the laws e Anaconda owning 78% of the stock of the first named and other two companies; Andes Copper Mining Co., cap., $50,- $100 par; Andes Copper Co., cap., $50,000.000, shares $25 par; Railway Co., cap., $5,000,000, shares $100 par. These com- ting in Chile, and development so far shows 100,000,000 tons of These will be found described in the chapter devoted to Chile. made in 1916 amounted to $7,968,836. This includes total cost of er Co. stock acquired to Dec. 31, 1916; 20,740 shares of Alice fining Co.; 26,100 shares of Greene Cananea; 50,000 shares of ., and 188,300 shares of Butte Copper & Zinc.

estments, with $4,550,600 of Liberty Bonds, totalled $9,066,389, uding the cost of stock issued during the year by the South nies to reimburse Anaconda for advances made; 28,740 shares of Zinc; 50,900 shares of Inspiration Cons., and 2,700 shares of

sum of $8,883,628 was invested. Aside from advances made erican companies, the International Smelting Co. (a subsidiary), ion on 630,000 of the total of 1,250,000 shares of the Walker California (which see), and $794,668 in purchasing land and rizona Oil Co., which has producing wells in California.

ompany owns 1,168 acres mineral claims at Butte, including formerly held by the following companies: (1) **Boston & & S. Mng. Co.**; (2) **Butte & Boston Cons. Mng. Co.**; (3) . **Co.**; (4) **Washoe Copper Co.**; (5) **Parrot Silver & Cop- ice Gold & Silver Mng Co.**; (7) **Trenton** (formerly Colo- **ev. Co.**; (8) **Big Blackfoot Lumber Co.**; (9) **Diamond Coal** 0) **Original Cons. Mng. Co.**; (11) **Colusa Parrot Mng. &** s the Southern Cross gold mines near Anaconda. In 1915 e Scott mine at Butte, and in 1916, the Pilot Butte mine.

ns 1,100,000 acres lumber land (Big Blackfoot Lumber Co.) and er, Hamilton, Hope, St. Regis, Mont.; and 13,280 acres coal tville, Wyo.; Washoe, Belt, and Sand Coulee, Mont.

mine was bought August 4, 1915, for $65,000. Company has a e Emma mine (Butte Copper & Zinc Co.) operated as a zinc ght the Czarroma claim fraction, containing the continuation of for $225,000 late in 1915. Options were secured on several the S. W. part of Butte. The E. portion of the Alex Scott Little Annie claim, were purchased for $750,000. Company the low-grade gold property, called the Porphyry Dike, near so on the Bonanza claims in the S. W. part of Butte, because zinc-silver ore in commercial amount. The Gambrinus mine July, 1918; and company bought a half interest in the Kit $48,000, the ground lying between the company's Orphan Girl an of the Davis-Daly Co.

Geology: Butte hill is a network of metalliferous veins, the older v nearly east and west strike being displaced by a number of northwest fault v cut in turn by still later northeast fault veins and these all cut by the R fault. The geology is fully described by Walter Harvey Weed in Prof. Pap (1912) of the U. S. Geological Survey, which can be had free of charge f that Bureau. The matter of clearly defining apex and extra lateral rights, u the present Federal mining laws, is one of the greatest possible difficulty, an the past has led to litigation costing millions of dollars, all of which ultim had to be paid out of the profits from copper produced. In 1916 the mines owned by the Anaconda were developed by 42.06 miles of new opening which 2,879′ was shaft-sinking.

The mine waters are highly charged with copper, and precipitation p have been built at practically all of the big mines merged in the Anaconda. scrap iron, tin cans and wire rope are used as precipitating agents, these ar commanding a standard price of 1 cent per pound. The flow of the water i precipitation tanks and launders is much more rapid than is the case in the Spanish lixiviation plants. The principal plant, at the Leonard mine, cost a $20,000, and treats water from all of the Boston & Montana mines. It h building for drying and shipping the copper precipitate.

Mines and shaft equipment: by the merger of the Anaconda and Bo & Montana, both among the six largest copper producers of the world, and addition of a number of other mines of second and third rank in produ capacity, the Anaconda became the largest copper company in the world, em ing normally, 8,863 men in the mines and 1,854 on surface at high wages (a agreement, arranged July 1, 1919, and good for one year, gives miners $ first-class engine-men, $7.75; journeymen in other trades, $6.50; and la $5 per day), and with a payroll in Butte alone of over $1,000,000 monthly, very large additional payrolls at its works in Anaconda and Great Falls. company's interest in its employees is genuine, and in addition to a depart of labor, and a safety-first organization, a large area of ground near Ana called "Opportunity" has been drained and cut up into large lots for fa and residences.

As property lines have been practically eliminated, so far as underg work is concerned, by the merging of various companies, and workings been connected, the property can be most usefully described in sections c by the familiar names used under former ownership, or by the names of t operating shafts of the company.

The many mines of the Anaconda Company have immense reserves o of all grades, and each year's development maintains the required tonnage.

The Anaconda mine was opened, 1880, as a silver producer, but at 150′ depth the oxidized silver ores were succeeded by high-grade copper mainly chalcocite and bornite, while at depth there is a large amount of enar Net earnings of the mine, during the 15 years, 1880-1894; are unknown, may be safely estimated at not less than $50,000,000. At a depth of about quartz pyrite veins of the Anaconda showed impoverished values, there considerable pyrite, but the fault veins showed large orebodies at depth 1,200′ to the deepest levels yet reached in mining which is 3,400′ in the High mine.

The Anaconda mine proper has a 3-compartment shaft, 2,800′ deep, conn underground with the Never Sweat, St. Lawrence, Bell, Belmont and Mou mines. The mine has electric locomotives for tramming on several le Hoisting is by 8-ton skips, swung under double-deck cages and worked in co balance.

The St. Lawrence mine has a 2,600′ three-compartment main shaft, nected underground with the Anaconda, Never Sweat, Mountain View Pennsylvania mines. The St. Lawrence has been on fire since 1889, in an ex sive area above the 1,100′ level. The fire has been fought constantly, walled off by cement bulkheads, and while it cannot be extinguished troublesome, it does not result in the loss of copper, as the sintered ore rem after the burning of the sulphur can be mined later, and the mine water strongly charged with copper, much of which is recovered by precipitat

e it is run over scrap iron and cement copper is made. The hoist ylinders, raising 5-ton skips swung under single-deck cages.
r Sweat mine has a 2,500′ three-compartment main shaft. Square- is used in stoping, as well as back filling. Some trouble has been rom the St. Lawrence. The surface plant includes a 28″x48″ double ising 3-ton skips swung under single-deck cages; also a 7,500 cu. ft.

ont mine, about 1 mile south of the main shaft of the Anaconda, r, has a new 2,400′ four-compartment working shaft, the largest . Connections have been made with other mines and a 1,500-ton ed. Equipment includes a powerful new hoist, with capacity of rom the Corra mine.
ond mine has a 3,400′ three-compartment shaft, developing the d other veins to the bottom level. Equipment includes a 34″x72″ g single-deck cages with 5-ton skips: and 2 electrically-driven f 7,500 cu. ft. capacity each.
Ore mine is one of the deepest in Butte, having a 3,600′ three- shaft, producing high-grade chalcocite. The High Ore does the number of connecting mines of the Anaconda, handling all water conda, Washoe and Parrot properties. The mine has 9 electric ood for 600 gals. per min., with 1,200′ lift. These are located on ′ and 2,800′ levels. Relief pumps to run by steam or air are also ferent levels.
c mine has a 2,500′ three-compartment shaft, connected with the he High Ore mine. The Modoc has several veins besides the one ts chief ore supply coming from the veins, which are stoped up utte Co.'s boundaries on the north and to the Ballaklava mine on

tain Chief mine, area 1.15 acres, lies next north of the Butte- l, is said to have produced about $1,500,000 worth of ore from a The Mountain Chief is developed to 500′ by its own shaft, but s are worked through the High Ore mine.
t group of properties includes the former holdings of the Parrot r Co., 19 fractional claims, area 40.6 acres, embracing the Parrot, llona, Original No. 6 and the Oro Butte, Champion and Copper l various other small properties. Main shaft of the Parrot mine an air shaft, and the ground is worked from the West Steward at shafts.
Mina 1,200′ shaft is now used for air only.
al, Steward and Gagnon shafts are on a western continuation of nd Steward veins, and in 1912 a continuous ore shoot of good 00′ long, was opened in the bottom level of these mines.
al mine has a 3,100′ shaft with three compartments below 1,100′. ocated, 1864, in the first stampede to the new Silver Bow diggings . st mine patented in Butte.
d mine has a 3,800′ vertical shaft, showing, in the bottom work- . carrying good copper ore, with silver values. Equipment in- eel headgear and a 34″x72″ first-motion duplex hoist, good for

nine, purchased for $1,125,000 cash, in 1916, is now part of the ine. It has been equipped with a steel head-frame and large

n is the westernmost of the productive copper mines of Butte. rried more silver than those of the mines farther east and have f minerals, such as hübnerite, unusual elsewhere in the camp.
n old 2,800′ three-compartment incline shaft, sunk at an angle sed as an auxiliary shaft, ore being hoisted through the Original vertical 2,800′ shaft, near the west end of the property, is as ntilation only. Equipment includes a 22″x48″ hoist.
ght mine, once the principal producer of the Washoe Co., has

ore averaging about 1 oz. silver for each unit of copper. The Moonlight has 1,700′ three-compartment shaft, connected underground, with the Blue Ja Never Sweat and Anaconda.

The Poulin mine, formerly owned by the Washoe Co., has a 1,200′ shaf but is operated through the 1,500′ Buffalo shaft, and is to be operated for zinc or

The Silver Bow No. 1 mine has a 1,000′ shaft, connected with the Pen sylvania, Berkeley and No. 3 mines. It has been a good producer for many year

The Berkeley 1,500′ three-compartment shaft has a 28″x48″ double dru hoist, handling 3-ton skips in each compartment.

The Rarus mine has a 2,800′ three-compartment shaft, connected with th Tramway mine. The veins have divergent branches, and constitute a sort stockwork, with an ore zone up to 300′ in width, in places. It has been equipp with steel head-frame and 34 by 72 in. air-operated hoist.

The Tramway mine, lying between the Minnie Healy and Rarus, former owned one-third by Butte Coalition, and two-thirds by Butte & Boston, has shaft that is the central shaft for the Minnie Healy-Rarus group. The Tramwa shaft, 2,800′ deep, has 3 compartments, each 5′x4′ 2″ in the clear. The first the new levels in the Minnie Healy is the thirteenth, about 50 below the old 1,5 level, in which fire was burning, 1908-1909. The Tramway has numerous bod of 5 to 6% copper ore, with good gold and silver values, the really great or bodies coming in between the 1,300′ and 1,400′ levels, and on the 1,700′ le there is an orebody up to 75′ in width, averaging nearly or quite 7% copper.

At the Tramway mine equipment includes a 92′ steel head-gear with sheave wheels. A 34″x72″ Allis-Chalmers 2-cylinder Corliss hoist, with drums, using 1½″ round wire cables, has capacity to raise 7-ton skips from depth of 3,500′. Each compartment has 5-ton skips changeable to 4-deck cage for lowering men, an auxiliary hoist being used for sinking and handling sup plies through the third compartment. The main surface plant of the departme at the Tramway shaft, includes a boiler house, engine house, carpenter sho machine shop, office buildings, warehouse and changing house with hot an cold water and shower baths.

The Nipper mine of the Red Metal group, includes the Nipper, Chief Josep Balm and L. E. R. claims. The Nipper mine, area 15.18 acres, has 2 shafts, 1,000′ and 1,200′ depth, with 12 exits, being connected underground with th Parrot, Never Sweat and Little Mina mines, and has been operated to som extent through the Parrot shaft.

The Green Mountain mine has a 2,200′ three-compartment shaft, not deepen for several years.

The Mountain Consolidated mine has a 2,500′ three-compartment shaft, wi a good ore showing on the 1,400′ level and below, and an especially good showi on the bottom level, at 2,500′. A Nordberg first-motion hoist was erected in 19 The East Grey Rock shaft is used for ventilation only.

The West Grey Rock mine, producing ore carrying values mainly in go and silver, with a small percentage of copper, has a 1,826′ shaft, the 1,800′ bei the deepest level open in 1916. The veins, though small, carry good ore, ri in silver. The Corra shaft is kept open for ventilation.

The Leonard has an old 1,800′ shaft, used for men and supplies, and th main, or No. 2, a new shaft of 4 compartments, 2,800′ deep. Mine is timbere with 12x12″ and 14x14″ square sets, requiring monthly an average of abo 1,000,000′ of mine timber, board measure. The 2,000′ level shows equally lar and good orebodies. Water from the Mountain View, Pennsylvania, Tramwa East Colusa and West Colusa mines drains to the 1,200′ level of the Leona and is forced thence to surface by 4 electric pumps. Valves are of pot for and the entire water end is phosphor-bronze, columns being lined with woo thoroughly soaked in oil, to withstand the corrosive action of the mine waters.

The Leonard surface equipment is the show plant of Butte, and is ve complete, including a 152′ steel headgear and 2,000-ton ore bins. The pow plant has ten 250-h. p. boilers, and a 34x72″ hoist, good for 3,500′ depth, rai cages with 5-ton skips swung under, with 1½″ round cable. There also i

g engine. Plant includes 3 air compressors of 3,000, 4,000 and 5,000
y per minute, respectively, and 2 of 7,500 cu. ft. each.
t Colusa mine has a 2,200′ three-compartment shaft, with levels at
s to depth of 1,200′, and thereafter at 200′ intervals. Shaft
arly in 1910, and cut down to 3 compartments, being given false
ate squeezing, which caused much trouble in the past. Mine is
1 10x10″ and 12x12″ square sets, and shows vein matter up to 400′
nnection is had underground with the Mountain View and Leonard
ice equipment includes a 23x60″ hoist, operating 2 double-deck cages,
id a 28x48″ single drum auxiliary hoist.
t Colusa mine has a 2,000′ three-compartment shaft with levels
Y intervals from 300′ to 700′. The mine has a vein of about 65′
·ly averaging 3 to 4% copper, but mine is now an important pro-
ore for the new electrolytic zinc plant. Production is about 200

ısylvania mine has a 2,800′ three-compartment shaft, with levels
ıls from 100′ to 1,000′, and at 200′ intervals below. This property
stopes above the 600′ level, ore lying nearer surface than in most
mines. Equipment includes a 350-gal. electric pump on the 1,800′
water to a crosscut to the Leonard mine, whence it goes to the
plant. Surface equipment includes 2,000-ton ore bins, a 34x72″
ɔerating two 5-ton skips and a 28x48″ single drum hoist sinking

er State mine in the northwestern part of the camp, develops the
Jessie, Edith May, Emily and several other veins. Mine has a
npartment shaft with extensive orebodies opened up on the 1,100′,
1,600′, 2,000′ and 2,200′ levels. The Emily shaft auxiliary to the
eepened from 400′ to 817′, or 1,000′ level of the Badger and con-
n 1912. Property is now an important producer of copper and zinc

ıtain View mine has a 2,249′ three-compartment shaft, and a 2,000′
e Mountain View shows 6 veins of 8′ to 60′ width, ore averaging
:opper tenor, being among the richest mines in the camp. Equip-
4,500-ton ore bins, a hoist good for 3,000′ depth, and a 28x48″
ıxiliary hoist.
c shaft on one of the most easterly claims of the company is 900′
is now a producing property.
ıleaf mine, located east of the proven ore zone of Butte, has a
ith about 800′ of lateral workings. Work was suspended, July,
roperty is by no means devoid of promise.
ıern Cross mine, situated in the Georgetown district, west of
·chased 1912, for $370,800, is a gold property developed by a
ipped with electrical machinery. It was extensively worked be-
zed ore is good iron flux, but was closed permanently Dec., 1919,
:xhaustion of orebodies.
mpression plant at the High Ore mine has eight 1,200-h. p. air
ach with a capacity of 7,500 cu. ft. of free air per minute. The
ed to 90 lb. and is used in the hoisting engines in place of steam.
′ long, contains 25 receivers, each 10x30′ on the ground, for the
. this air-storage plant having reserve power for 8 hours. In
ı this plant is the largest steel water-tank in the world, 100′ in

wer, supplied by the Montana Power Co., is brought from Great
. and from Canyon Ferry, near Helena, 70 miles distant, current
the mine with a primary voltage of 50,000 volts, reduced to 2,000
former station, just outside of Butte, power being distributed to
rkings from a main station at the Never Sweat mine, the current
40 volts.
and fire protection have been given much attention by Anaconda
in 1917 a systematic plan covering all underground workings was

adopted, electrically-driven surface fans with a capacity of 696,100 cu. ft. free air per minute being installed. In 1918, five Sirocco double and single-i fans, of 228,000 cu. ft. capacity, were put in. To increase the velocity of currents in shafts, experiments were made at the Parnell shaft, inserting c crete slabs between the timbers. Results were so good that all shafts will b arranged.

As a protection against fire, shaft and station timbers are covered by m laths and cement coating at the Belmont, High Ore, Parnell, Rarus, and Tr way shafts. At other points underground, timbers are coated with cement the "Gunite" method.

New development—the total at all mines:

Year	All work feet	Shafts deepened, feet	Ore mined, tons	Cost Minin per to
1918.....	220,704	4,991	4,918,468	$6.07
1917.....	182,688	2,809	4,193,624	5.86
1916.....	222,103	2,879	5,582,077	4.42
1915.....	186,560	.....	4,383,339	3.93

The normal daily output of ore is 16,500 tons.

A feature of work in 1917 and 1918 was the mining of pink manganese (rhodochrosite) from the Emma and other mines. This was concentrated, partly sold or used in making ferro-manganese at Great Falls.

Coal mining—the quantity raised and its disposition.

Year	Mined tons	Used at coal mine, tons	Used by Anaconda, tons	So to
1918.....	1,065,743	56,589	632,012	374
1917.....	1,054,510	66,238	551,533	43
1916.....	964,122	64,773	616,910	282

Lumber Department—the mills at Bonner, Hamilton, Hope, and Regis had the following record:

Year	Timber cut, feet	Purchased, feet	Used at mills, feet	Sent to mines, feet	Used at factory, ft.	Sold, feet	
1918.....	82,950,859	41,219,939	1,415,915	72,162,891	2,208,966	35,765,541	54
1917.....	87,880,500	16,476,014	1,455,703	57,205,887	4,172,414	50,534,133	41,
1916.....	105,495,846	30,005,910	1,361,549	91,321,061	6,215,378	80,800,144	50

Profits from the coal and lumber departments were $1,295,119 in $363,312 in 1917; and $354,187 in 1918.

Railroad—the Butte, Anaconda and Pacific line had the follo results:

Year	Ore and freight, tons	Passengers, number	Gross earnings	Operating charges	Taxes, interest etc.	
1918.....	5,680,451	245,682	$2,122,607	$1,535,724	$213,960	$
1917.....	6,800,161	355,224	1,803,374	1,436,199	219,580	24
1916.....	8,416,003	408,865	2,199,611	1,464,796	207,648	52

The Washoe smelter, where all the Anaconda company's ore is concent and most of it smelted, is about 2 miles from Anaconda and 26 miles f Butte, all ore being hauled by electric power over the Butte, Anaconda & P R. R., owned by the company. In 1914-15 the entire plant was remodeled capacity increased to 15,600 tons per day, leaching and flotation plants insta an acid plant erected, a zinc plant put in operation and brick works built improvements costing, it is said, over $6,000,000. The results are so remark as to be almost startling. The great items of saving of the remodeled comprise coal-dust firing of reverberatory furnaces with greatly incre capacity (583 compared with 239 tons per day) with less slag loss; the a donment of briquetting and blast furnace smelting in favor of the new re beratory practice; the treatment of all ore in the Anaconda concentrator, ins of sending it to Great Falls; the introduction of flotation and the operat the leaching plant. The saving has been increased from 75 to 96%, the tail formerly carrying 0.62% copper now carry but 0.1% copper—that is, 2 lb copper to the ton. The savings amount to 8.4 lb. copper per ton, and paid entire cost of reconstruction in the first half year of operation. This work

la company in the ranks of low cost producers and was a great metallurgists.

e Smelter: This plant can treat 16,000 tons of ore per day oke, 900 tons coal for reverberatory furnaces, 3,000 tons lime- 60 tons coal for power and heating. Sixty million gallons of ach day and 42,000 gals. per min. Three thousand, two hundred d at a monthly wage of $400,000 in and around the works.

orage bin the ore passes through an automatic sampler; thence itor plant of 2 great buildings, each housing 4 units com- rushers, Harz jigs for coarse and Evans jigs for medium rates, 4 sets of 55x24" rolls, 8 Wilfley tables using Butchart conda classifiers, six 7½'x72" Hardinge mills, each with 225-h. p. g steel linings and steel balls; 6 Dorr classifiers, 4 Minerals on machines, each having 15 agitators and 14 spitzkasten with Anaconda operates under license from Minerals Separation, from 4 to 12 cents per ton of ore treated, depending on quantity. i differs from the other 7 in having Hancock instead of Evans be mills using Forbes liners and pebbles.

oncentrate goes to the blast furnace, the fine to settling tank, centrate to Dorr thickeners, 12x50', discharging 60% solids

ent is very fully described in the Mining World, March 4, 1916, ns of A. I. M. E. for 1916.

oaster divisions, one having Evans-Klepetko type of McDougal idling 215 tons per day of fine concentrate, fine lime rock and igs. A Ruggles-Coles dryer prepares concentrate for the acid verter. Roaster No. 2 contains 28 Anaconda roasters, a modi- ougal furnace and treats material from the tank house and

itory furnace plant is in 2 buildings, each with 4 furnaces and ch furnace is 143x23' and handles 700 tons material per day tons coal in 24 hours. The coal previously ground in Raymond verizer to 100-mesh, is blown into furnaces through Warford ounces pressure. Coal dust firing is much more efficient than ach furnace develops 6½ boiler h. p. per ton coal burned, hot ough Stirling boilers. Furnaces are fed from top, banking ist side walls. Slag flows off continuously instead of being nmed and matte is tapped at intervals, running into 10-ton rect to converters.

iace building contains two 51' furnaces, and one 87' long, each s. The latter handles 3,000 tons per day, the others 1,600.

ding contains 7 stands for Great Falls type converters. Latter iigh, and weigh 450,000 lbs. with magnesite brick lining. The nverter is 85 tons matte, 35 tons ore, blown to blister copper Blister copper is poured into 2 casting furnaces, each of 140 one in reserve. Air at 15 lbs. pressure oxidizes copper which ind poled and poured into a casting machine. All handling e by electricity.

iing plant, 2,000 tons capacity, recovers the copper from sands dump. These sands are roasted in McDougal furnaces, cooled wetted to lay dust and conveyed to tanks 50' in diam. and 14' 1,050 tons, where it is leached by hot solution of salt and copper precipitated from solution by scrap iron.

int treats flue dust in White-Howell rotary furnace, the dust- a Cottrell electrical treater for removal of dusts, then cooled nic trioxide removed by a second Cottrell treatment, the fine arged by a screw conveyor into barrels.

naking 11,000 standard fire brick per day and another making k from retreated tailings is one of the newer features of the

The reverberatory costs have been reduced from $1.75 to $1.25 per ton ore by coal firing and other changes in practice, as compared with $1.35 p ton of charge for the blast furnaces, but so much limestone has to be used the blast furnaces charge that the cost, per ton of copper ore, is higher.

It has been found that leaching produces cleaner tailings than flotati though other factors equalize the 2 processes, since for leaching the roasti costs are 25 to 30c., excavating 14c., hauling 8c., and other costs 33c., a total 80c. per ton, using 65 lb. of 60% acid for 9 lb. copper. Over 500,000 tons tailing and ore are leached annually.

Full description of the Washoe smelter plant and the technical treatm have been published in the Trans. Am. Inst. M. E. and in Mining & Scient Press, Feb. 26, 1916, and Mining World, March 4, 1916.

The acid plant produces 200 tons a day of 60% acid, but a much big plant will be built in the next few years to supply acid for the zinc plant a other uses.

The changes in the Great Falls plant have been equally important. T refinery has been enlarged 50% and now turns out about 200,000,000 lb. refined copper a year.

Probably the most important event of recent years was the production a large scale of high-grade electrolytic zinc. The 10-ton test plant showed su good results that a 2,000-ton concentrator, using flotation, was erected at An conda, and a refinery of 100-ton capacity of metal per day at Great Falls. Bo company and custom ore is treated. The refinery was increased to 150 tons spelter daily. In two years plant improvements at all points cost $13,645,9 Changes in practice are ably described by Frederick Laist in "Eng. & Min. Jou of October 7, 1916.

In 1917, work was started on a new stack at Anaconda, 585′ high, with inside diameter of 70′ at bottom and 60′ at top. This was finished and co nected with the 20 Cottrell electric precipitators in May, 1919. The brick w made from tailings from flotation plants. To treat flue-dust, a 100 by 20′ rev beratory furnace was erected near the Cottrell treaters. Two sets of treat are connected with this furnace; one removing dust, the other removing arse from the gases. This arsenic will be saved in marketable condition.

The copper rod and wire manufacturing plant at the Boston & Monta works at Great Falls, put in operation June, 1918, is the first rod and wire pl to be built in the West, and marks the entrance of Anaconda into a new fi that of manufacturing.

The Chicago, Milwaukee & St. Paul system requires large quantities of w and rods in connection with its electrification, as will other northwestern r roads, and to meet this demand was one of the reasons promoting the constr tion of the Great Falls plant, the manufacture of rods and wire at Great F obviating the expense incident to shipping refined copper products from Ea plants to Northwest points.

Five electric furnaces, for the manufacture of ferro-manganese, w erected in October, 1918, but were closed in December, on account of lac demand resulting from the end of the war. In 1919, this plant was re-model for the production of calcium carbide. In January, 1920, manganese ore again being sent to this plant. The manufacture of fertilizer is also under utilizing acid from the reduction works and a deposit of phosphate rock Maiden Rock, 45 miles from Anaconda. Present production of 50 tons fertilizer daily will be increased to 1,000 tons daily by end of 1920.

With the proposed 25% increase in the capacity of the zinc reduction pl at Great Falls, which now is capable of producing around 7,000,000 pounds spelter monthly, the proposed brass works at Great Falls is expected to be re sidered by the Anaconda, as freight charges east would cost the Anaconda more than a brass product, which is made up of an alloy of copper and zinc.

In order to secure additional roasting capacity for the zinc plant at Gr Falls, 14 of the 28 furnaces for the copper-leaching plant were re-modeled roasting zinc concentrates.

on—omitting outside ore and metal, excepting zinc:

Anaconda and Great Falls

er ore d, tons	Copper output, lb.	Gold, oz.	Silver, oz.	Zinc ore treated, tons	Zinc, lb.
.....	131,421,977	42,593	7,024,757	.....	48,126,679
350,446	272,923,031	64,317	10,076,748	393,193	72,131,238
006,901	239,014,880	58,545	8,368,180	326,479	50,624,524
273,066	307,395,092	92,099	10,790,706	196,680	20,906,439
.....	253,311,574	106,702	9,005,618	.....	.....
.....	223,720,292	99,651	8,314,116	.....	.....
.....	270,303,644	64,898	10,321,296	.....	.....
.....	294,474,161	61,314	11,014,737	.....	.....
.....	259,407,092	48,950	9,731,561	.....	.....
.....	266,608,461	57,260	9,534,888	.....	.....
.....	3,767,564,570	857,057	134,149,646	.....	.....

ion curtailed account of market conditions and coal shortage.
0,000 tons of ore from outside mines is treated each year at

Electrolytic Refinery at Great Falls

	Cathodes produced, lb.	Melted into shapes, lb.	Zinc produced, lb.
.....	191,404,125	189,067,167	72,131,238
.....	141,517,768	132,089,914	50,624,524
.....	127,620,000	56,062,000	20,906,439

1 of the other smelters and refineries will be found under heading
al Smelting Co., a subsidiary.
onda properties have for years produced one-third of the copper United States and one-sixth of the world's production. The splendorce and equipment of the company and the excellent showing of ate that it will maintain its pre-eminence for years to come. The ing copper is never published, but it is thought that in normal was around 9 cents per pound.

MINES CO. **MONTANA**

dissolved May, 1916, and properties sold to Anaconda Copper ov. 1, 1916. Fully described in Mines Handbook, Vol. XII.

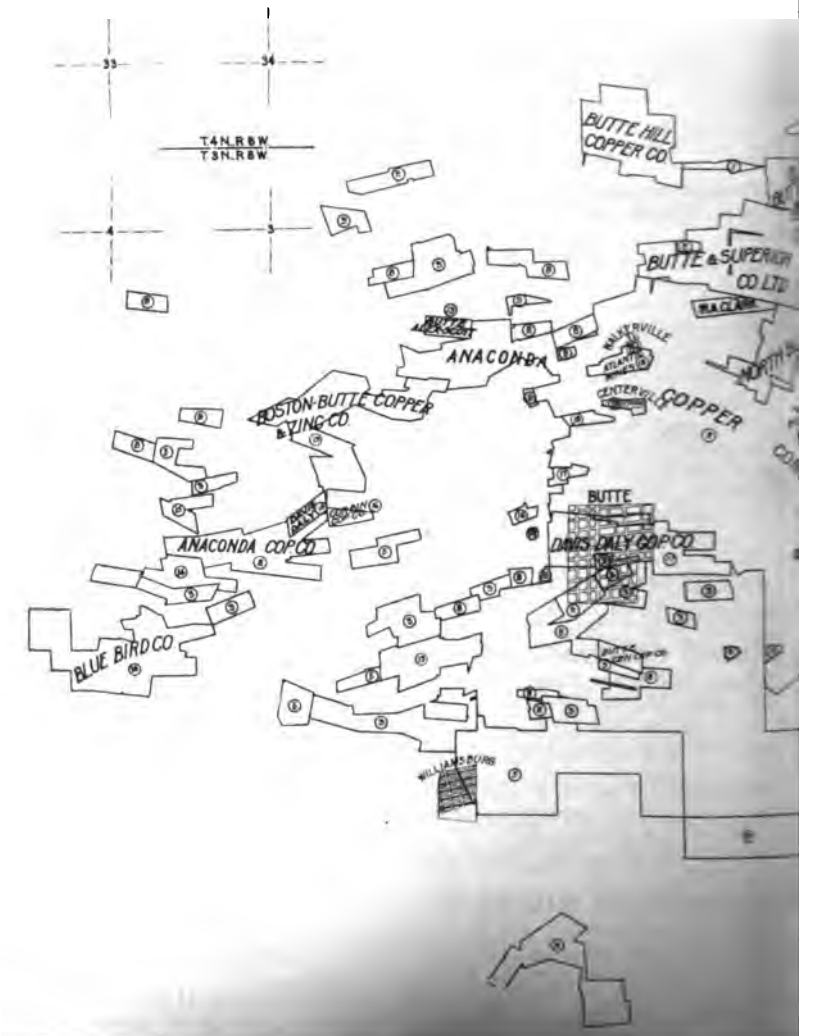
COMPANY (THE) **MONTANA**

5 Sears Bldg., Boston, Mass.
W. B. Dickerman, v. p.; Clarence W. McGuire, sec.-treas.; one and H. K. McHarg, directors.
in New York. **Cap.**, $500,000; shares $5 par; 66,667 shares

237 acres, in Butte, Mont., shows silver, copper and zinc ores. never operated its property. See U. S. G. S. Prof. Paper 74, by or geology, etc.
ie mine was taken over under bond and reopened. Shipments

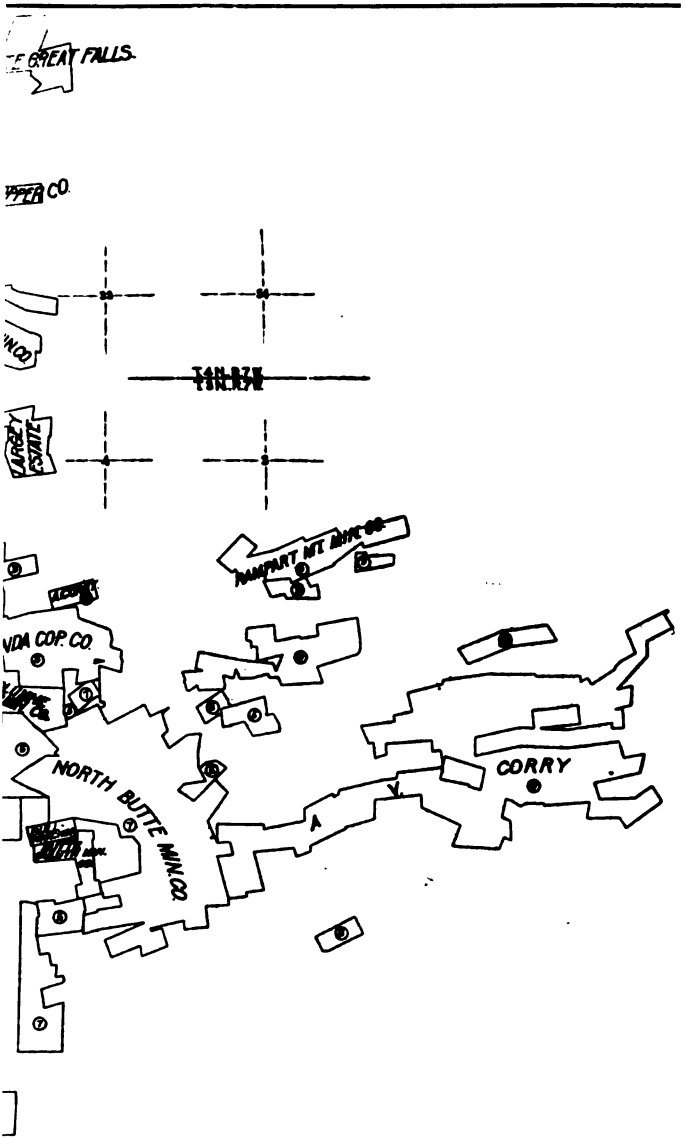
UTTE MINING CO. **MONTANA**

n Kenoffel, 111 S. Main St., Butte, Mont.
Chas. H. Lane, Wm. Youlden, J. J. McCarthy, H. H. Walrath, ohn and Geo. E. Johnson, directors.
1915, in Montana. **Cap.**, $500,000; shares $1 par.
the Bonanza, Bonanza Extension, and Ruth claims, 4 miles
Mine under lease and bond to a syndicate of Butte people, who
a substantial payment on the property.
ent: the Bonanza vein is opened by a 55′ shaft and 300′ cross-
new tunnel, 166′ lower than old tunnel, was over 1,000′ long in
5 different but parallel E.-W. tourmaline veins, showing stringers



PROPERTY MAP

Holdings are as follows: (1) Butte
argey Estate; (4) Rainbow
orry; (7) North Butte; (8)
. Corry; (12) East
Davis-Daly; (16)
19) Boston



TANA

of Butte to the end of 1917 is approximately as fol-
lb. worth $1,020,000,000; gold 1,600,000 oz. worth
lb. worth $2,000,000; silver, 310,000,000 oz. worth
lbs. worth $65,000,000; the total value being

and spots of galena. This tunnel cut the downward extension of the ore exposed in the winze sunk below the upper tunnel. The shoot shows bo of high-grade, fine grained and dense galena, with no copper. Selected sa are high in silver, but average samples are too low-grade for milling. The is in a granite area surrounded by rhyolitic rocks, near the B. & M. rese on the road to Lowland creek. Ore carries a little gray copper, but the of the black material seen in it is a tourmaline and not copper glance.

BOSTON-BUTTE COPPER & ZINC CO. MONTA

Office: 46 East Broadway, Butte, Mont.

Officers: W. W. McDowell, pres.; F. J. Dorhofer, v. p.; W. E. Reyn sec.-treas., with W. S. Carns and Charles Schmidt, directors.

Inc. Dec. 12, 1912, in Arizona. **Cap.**, $1,000,000; $1 par; 871,775 is Annual meeting, January 11, each year.

Property: 13 claims, all patented, on W. side of Butte district.

BULLWHACKER COPPER CO. MONTA

Reorganized as Butte Bullwhacker Mining Co., which see.

BUTTE-ALEX SCOTT COPPER CO. MONTA

Dissolved. **Property:** 4½ acres at Butte, Mont., sold to Anaconda C per Mining Co., for $750,000 cash, on Feb. 10, 1916. Stockholders re dividend of $10 a share. There were 79,311 shares outstanding and $80,0 the treasury. See Copper Handbook, Vol. XI.

BUTTE & ANACONDA CONSOLIDATED M. & M. CO. MONTA

Office: Box 138, Anaconda, Mont.

Officers: J. C. Keppler, pres.; J. Winterhalter, v. p.; Andrew Fle sec., Box 359, Portland, Oregon; John J. Wegener, treas., with W. R. A directors.

Inc. 1908, in Montana. **Cap.**, $1,500,000; shares $1 par; assess 900,015 shares outstanding. Company is a consolidation of the Flint C Mining Co., and the Golden Eagle M. & M. Co.

Property: 9 patented quartz claims, 3 unpatented placer claims 2 millsites, about 240 acres, in Flint Creek Gulch, Granite Co., Mont., 3 m from a railroad. Claims show quartz veins carrying tellurides. Average as said to run $25 per ton in gold and silver. Developed to depth of 450' shafts and 2 tunnels, 900' long. No work was done in 1918, but in 1919 p erty was leased for 18 months.

BUTTE-ARGENTA COPPER CO. MONTA

Probably dead. See Vol. XII.

BUTTE & BACORN MINING CO. MONTA

Owned by Great Butte Copper Co., which see.

Office: 53 Silver Bow Block, Butte, Mont. **Pittsburgh office:** 331 Fo Ave. Chas. Hyde, treas.

In June, 1916, company was reorganized and sold its property to the G Butte C. Co., which company paid indebtedness and exchanged 400,000 sh of its stock in ratio of 4 to 1. See Vol. XII.

BUTTE-BALLAKLAVA COPPER CO. MONTA

Office: 510 Sellwood Bldg., Duluth, Minn. **Mine office:** Butte M

Officers: I. Freimuth, pres.; Gust Carlson, v. p.; R. C. Ogilvie treas., with Milie Bunnell, J. A. Percival, Frank Boutin and G. C. Sw directors.

Inc. March 15, 1907, in Arizona. **Cap.**, $2,500,000; shares $10 par assessable; fully issued. Bond issue of $200,000, 7%, dated Jan. 1, 1916, ized with $95,200 issued. Listed on Boston and Butte Stock Exchanges. a 50c. dividend August 1, 1910. Boston Safe Deposit & Trust Co., transfe Federal Trust Co., Boston, registrar.

Interest on bonds unpaid since June 1, 1917.

Property: the Burke and Ballaklava claims, about 6½ acres in the part of Anaconda hill, adjoining Mountain Chief, Modoc and High Ore of the Anaconda Copper Co. Property willed to Bishop Carroll of the C Church, who sold it for $400,000 cash to this company.

Claims form a narrow tract 1,960' long running with the veins on the

Butte hill. The Burke vein crosses the claim of that name and
d in the Modoc mine. There are 4 veins, but one of which is
ble. This vein is generally correlated with the Jessie, but com-
nditions led to a lawsuit with the Anaconda Co. for ownership
ody mined on the 800′ level. This suit was settled by a division
Nov. 28, 1913.

nt: 1,625′ three-compartment shaft with 12 levels. The mine
ed on the 800′ level, for ventilation and safety, with the Modoc
aconda, and on the 1,200′ level with the West Colusa. This
for drainage.

n the 100′ and 300′ levels show ore carrying 5 to 8.5% copper
. silver per ton, from which small shipments were made. The
pyrite and a little high-grade silver ore, and the 700′ level shows
sive bornite, pyrite, glance and some chalcopyrite, all argenti-
l ore production has come from the 800 to 1,600′ levels, inclusive,
chalcocite, carrying good silver values. The vein ranges up
carrying rich ore on the 800′ level; the 1,200′ level shows the
width, with ore averaging 4 to 4.5% copper, and the 1,400′ level
lcocite and bornite of about 7.5% average copper tenor. This
oped westward to the workings of the High Ore mine, whose
uous with those of the Butte-Ballaklava mine.

by a drift from the High Ore mine, run by the Anaconda
fine body of commercial ore, but inability to reach it with its
crowded capacity at the High Ore has retarded ore extraction.
level the mine has been practically worked out and the pro-
y off certain debts.

nd 2,400′ levels are worked from the Modoc shaft of the Ana-

6 a winze was sunk from the 1,600′ to the 1,800′ level and a
he vein. It was reported that 24′ of 3% copper ore had been
ng started.

trically driven though an auxiliary steam plant is in reserve.
includes a double-drum hoist, operated in counterbalance,
. p. motor, designed to hoist an unbalanced load of 5 tons, at a
r minute, from a depth of 3,000′. There also are a 165-h. p.
drum hoist, good for 1,500′, and a 10x12″ auxiliary steam hoist,
, with cross-compound air cylinders, each driven by a 100- h. p.
ctric station pump. The auxiliary steam plant includes a cooling

clude an engine house, office with warehouse on the ground
hop, smithy, and steam-heated changing house.
begun April, 1910, was continued until stopped by injunc-
Anaconda Copper Co., in August, 1910. During this period
Pittsmont smelter (East Butte), were about 125 tons daily, of
t 8% copper and 12 oz. silver per ton, this being the highest
ore produced by any Butte mine for that year. Producing
ily in 1916, mainly from 800′, 1,000′, 1,200′, and 1,600′ levels.
had a checkered career, being successful at first, then involved
with the Anaconda C. M. Co., which was finally compromised;
tions which paid expenses until stopped by the big fire in the
mines in 1917.
1917-19, and foreclosure proceedings by bondholders expected

WHACKER MINING CO. **MONTANA**
essey Block, Butte, Mont.
Frank, pres. and gen. mgr.; H. I. Wilson, v. p.; H. Frank,
rald, treas.
1914, in Washington. Cap., $1,000,000; $1 par; assessable;
al meeting, second Monday in January, at Butte. Security
trar Co., New York, transfer agents and registrar. Listed on
A dividend of 1c per share was paid Oct. 25, 1917.

Property was leased for one year to East Side Mining Co., incorporated by I. A. Heilbronner and Patrick Wall, April, 1916. Lease called for royalty 25% and shipments of not less than 1,000 tons a month. Controlling stockholders also gave an option on 51% of entire stock at 50c. a share, payments in 30 to 90 days and at intervals for 18 months.

Company is a reorganization of the Bullwhacker Copper Co., whose stockholders received share for share in the new company on payment of 15c. a share in six months' installments. This wiped out a debt of $121,200 due the sons of Patrick Clark (Clark Bros. & Klein) and put $20,000 in the treasury. Mine was profitable when leased, but ran into debt for an experimental leaching plant. The Mines Operating Co. secured control by buying three-fifths of East Side stock at 75c. per share.

Property: one claim, 20 acres, on the east side of the Butte district near the Pittsmont smelter. Easterly part of claim covers a zone of granite impregnated with oxidized copper ores, mined in an enormous open pit 200 across and 75' deep, from which 30,000 tons of 4.07% copper ore were extracted by lessees in 1912-13. It is a highly silicious ore.

Development: by an old 300' shaft with crosscuts beneath the orebody at that level, also several new shafts, proving an extension of the orebody beyond the open pit.

Equipment: includes hoist, compressor and a 75-ton leaching plant which as yet has not been successfully operated (described by P. E. Peterson in "Min. & Eng. World," Oct. 4, 1913, p. 584).

The orebody is extensive and, though probably not deep, has a large tonnage from which much money should be made. Deep development is expected to show veins carrying copper sulphides. Early in 1919, the company was reported shipping 500 tons of ore daily to the Anaconda company's leaching plant.

BUTTE-CABLE COPPER & GOLD MINING CO. MONTANA

Officers: Louis Feldman, pres.; Nicholas Bossnitz, v. p.; preceding officers, Wm. Henthorne, John Strasser, J. G. Kimball and Dan Kowsky, directors. G. W. Peterson, Anaconda, sec.

Inc. Nov. 21, 1906, in Montana. **Cap.,** $1,000,000; shares $1 par.

Property: 6 claims, 4 patented, 15 miles west of Anaconda, near Ca... Consolidated Mining Co., show a 3 to 4' vein carrying about 2' of commercial ore, giving assays of 11.9% copper, 156 oz. silver and 0.6 oz. gold per ton. Sullivan & Peterson, of Anaconda, offered stock at 15 cts. a share, Feb., 1911, to raise money for patenting claims. Idle at last accounts.

BUTTE CENTRAL COPPER CO. MONTANA

Fully described in Volume XI.

Property was sold to satisfy judgment for $57,000 at sheriff's sale in No... 1918, and bought in by Butte Copper & Zinc Co., operated by the Anaconda company. Butte Central, et al. did not redeem property.

BUTTE CENTRAL MNG. & MLG. CO. MONTANA

Offices: 27 State St., Boston, Mass.; and Butte, Mont.

Officers: Walter R. McDonald, pres.; William G. Burns, v. p.; Ralph Gallagher, treas., with S. S. Carpenter and Harry W. Davis, directors. W. Burns, sec.; Carl J. Trauerman, agent and mgr., Butte, Montana.

Inc. Aug. 11, 1914, in Delaware. **Cap.,** $750,000; $5 par; all issued. Bonds: $300,000 1st mortgage 6% 30-year gold bonds, all issued. Fifty-one per cent. of the stock is owned by the Butte-Detroit Copper & Zinc Mng. Co. and 66⅔% of the bond issue by the U. S. Manganese Corp. Federal Trust Co., Boston, Mass., transfer agents. Davison Company, 27 State St., Boston, Mass., registrars.

Property: company formerly owned the Ophir claim, 20 acres, at Butte, once owned and developed by the Butte Central Copper Co.

The Ophir plant and mill were sold by the Sheriff of Silver Bow county, Mont., October 31, 1918, to satisfy an old judgment. It was bid in by the Butte Copper & Zinc Co., a subsidiary of the Anaconda Copper Mng. Co., and not redeemed within the legal period.

ICORDIA MINING CO. **MONTANA**
8, 1915, in Montana. **Cap.**, $50,000; shares 25 cts. **Directors:** G. W. Deniger, G. Widmer, S. V. Wilking, 615 Phoenix Blk., E. C. Schwardner, O. J. Olson, Geo. W. Wall, F. A. Kean and n, all of Butte, Mont.
r details obtainable.

PER CO. **MONTANA**
James H. Rowe, pres., 120 West Granite St., Butte, Mont.
[. H. Rowe, pres.; E. T. Lawler, v. p., Brookline, Mass.; W. :., with R. L. Rhule and B. J. Keenan, directors.
1 20, 1906, in Montana. **Cap.**, $1,500,000; $1.50 par.
company owns two-thirds interest in the Robert Emmet d 2; the remaining third being owned by the Anaconda Copper ompany also owns approximately one-half of the Anselmo, An- id Trifle claims, balance being owned by the Hauswirth family. irectly west of the Gagnon mine and is supposed to carry the e rich veins mined in that property. The group has produced worth of gold and silver ore, the principal development being haft in which a large vein carrying copper ore was cut at a depth obert Emmet shaft, 375' deep, is reported to show 7% copper ore. ıy has been dormant for several years and its relations to the lining Co. and Butte Copper Montana are not fully understood, r company is supposed to control this one through stock owner- dent reported, May, 1917, that the property was under lease and interests who were then operating and developing the ground fle shaft. No recent information.

'ER CZAR MINING CO. **MONTANA**
. M. Green, or L. P. Sanders, Butte, Mont.
)0; shares 25c par.
Copper Czar, Sunflower, and Mayflower claims E. of Butte. . V. Corry and Morton Webber. In March, 1918, New York n option on control of shares.
ıt: during 1918, work was in charge of Mr. Webber. A sta- 300' level, 510' of crosscutting done, and 477' of driving on the rface workings the ore-shoot constituted an attractive mining its downward prolongation was the crux on which the future nded. The work done indicated that the shoot did not persist st assays, in spots, were less than 2% copper and 2 to 3 oz. of s result the New York syndicate dropped its option. A circular utte Copper Czar company in 1919, containing proposals for aid to contain incorrect statements concerning the work done r's direction.

ER KING MINING CO. **MONTANA**
e Beebe Grain Co., Butte, Mont. C. E. Beebe, pres.; A. c.
. 1906, in Montana. **Cap.**, $1,500,000; shares $1.50 par.
fractional claims, 28 acres, known as the Frenchman No. ıd Missouri Girl, west of the Jennie Dell mine. Idle since

R & ZINC CO. **MONTANA**
oadway, New York. Mine at Butte, Mont. Control of ted for a period of 5 years (ending Jan. 31, 1920), in the A. J. Seligman, Albert Fries, Jacob Oppenheim. Additional impfheimer, A. S. Bailey and I. N. Speigelberg.
. 1904, in Maine. **Cap.**, $2,500,000; $5 par; increased to 1917; 600,000 shares issued. Shares listed on New York rust Co., New York, transfer agent; Security Transfer & York, registrar. Annual meeting, first Wednesday in April. dividends are divided equally wth the Anaconda com-

Year	Ore Sold	Operating charges	Paid Anaconda	Net Profit	Surplus afte dividends
1919.....	$666,602	.....	$49,190	$49,190	$8,7
1918 (13 months)	$669,328	$47,582	.....	$619,986	$319,8
1917 (17 months)	1,535,163	1,025,013	$356,222	119,772	119,7

An initial dividend of 50c., $300,000, paid July 30, 1918.

Property: the Emma mine, 13 acres, and other claims totaling over 9 acres in the Butte district, 1½ miles from the main properties of the Anacond company. Mine was formerly developed to 800′ level, but due to low copp and relatively high zinc content of the ore, was idle for several years. Develo ment resumed by Anaconda by virtue of an option and lease, dated July 8, 19 given to that company. Terms of lease are as follows: the Anaconda C acquired an option for 9 months on all or part of the 88,300 shares of But Copper & Zinc Co. remaining in the treasury of the latter company, at a pri of $1 per share. The A. C. M. Co. took a lease on the Emma mine for 5 yea with privilege of renewal for an additional 5 years, and agreed to install equi ment and to unwater mine to the 800′ level. A new lease was obtained Anaconda on July 6, 1917, to run until 1931. For expenditures actually ma by the A. C. M. Co. in developing the Emma mine, the Butte Copper & Zinc C agrees to make payment in its capital stock in lots of 10,000 shares or fractio parts thereof, but total payment to the A. C. M. Co. for work and equipme shall in no case exceed 50,000 shares of Butte C. & Z. Co. stock. The A. C. M Co. shall have a right to abandon the leased premises if it finds working the impractical, or impossible, in which event all machinery or equipment install and permanently attached to the Butte property shall belong to that compan Further stipulations are provided in the event of a renewal of the lease.

The A. C. M. Co. has fulfilled the terms of this lease and taken up th shares optioned to April, 1916. An additional option on 100,000 shares was al exercised, and Anaconda now owns 217,040 of the 600,000 shares issued.

Development: aggregates several thousand feet from a 1,000′ shaft wi levels at 200′, 400′, 500′, 800′ and 1,000′.

The Emma mine is in the heart of the city of Butte, and as transportati facilities were difficult, a crosscut was driven 2,500′ from the 1,800′ level of t Gagnon mine of Anaconda to connect with and develop the Emma orebodi During 1918, rich zinc ore was opened, also considerable rhodochrosite (pi manganese), which was much in demand, and enhanced the value of the mi The manganese workings are kept open, as the ferro-manganese made at Gre Falls may eventually be sold as far east as Chicago, Reserves amount to seve hundred thousand tons of zinc-silver ore and as much manganese ore. T depletion of reserves and their low grade was offset by the ore opened on t 1,000′ level which is reported to be one of the best silver-zinc-lead bodies open by Anaconda on this property.

Production: in 1918 was 32,293 tons of zinc and 71,364 tons of mangan ese ore and in March, 1919, ore extraction was at rate of 2,000 tons of 19 zinc and 7 oz. silver ore per month.

Butte Copper & Zinc is rather an attractive property on account of the assur market for its ores. Its stock had a varied speculative career during 1918-19.

BUTTE & CORBIN CONS. COPPER MINING CO. MONTA

Officers: J. L. Templeman, pres.; Lewisohn Block, Butte, Mont.; L Williams, v. p.; J. B. Fitzpatrick, sec.-treas.; at last accounts.

Inc. May 1, 1907, in Montana. **Cap.,** $700.000; $1 par; issued 469,8 Annual meeting, February 4.

Property: 5 claims, 82 acres; also 10 acres timber lands in the Cor or Colorado district, on the eastern side of Valparaiso mountain. The ore a complex mixture of lead, copper, and zinc, occurring as short shoots in f veins in granite. Vein reported by company to average 8′ 4″ in width, a carry 4% copper, 6% lead, 2% zinc, 8 oz. silver, and $1 gold per ton.

Development: by shaft and the 500′ Rarus tunnel, which cut a at 165′ from the portal, assaying 2.5% copper, with paystreak carrying

copper, 8 oz. silver, and $6 gold per ton. Amount of ore on dump, $10 value, according to Ropes & McIntyre.
ast accounts.

RTIS & MAJORS COPPER MINING CO. **MONTANA**

: Geo. D. Curtis, 35 W. Granite St., Butte, Mont.
organized upon a lease and bond to purchase the surface and s of the Curtis and Majors addition to the city of Butte, the bond 25,000. The company went bankrupt and in 1917 owed about $700 There are no legal assets and having defaulted on bond payment company has no rights thereunder, save the sentimental courtesy John Curtis and associates, who would like to see the company ınd refinanced. Idle at last accounts.

ER LODGE MINING CO. **MONTANA**

Phoenix Bldg., Butte, Mont.
W. L. Hugo, pres.; Simon Bank, v. p.; J. R. Davenport, sec.- . F. O'Flynn and Dr. S. Herman, directors.
. 1916, in Montana. **Cap.**, $300,000; $1 par; all issued. Annual ıne.
: 11 claims, 7 patented, 200 acres, 9 miles S. E. of Deer Lodge N. of Butte. Former owners are said to have received over lividends.
ıent: a 1,400′ incline (35°) shaft follows the ore to the bottom, aving been driven. Water, in May, 1919, stood at 600′. Sampling l shows 100,000 tons of over $10 silver-gold ore, and dump is said ,000 tons, that average $4.10 per ton, with silver at 56 cents an

ıt: steam hoist, 1,000 cu. ft. air-compressor, mine pump, and

ıas not been operated since 1917, when tests were made to devise ıent. A concentration of dump ore, 12 into 1, gave a product ton, with silver at 68 cents. A flotation plant and electric power ed.

ROIT COPPER & ZINC MINING CO. **MONTANA**

me Bank Bldg., Detroit, Mich.
. F. Austin, pres.; Ellery C. Wright, v. p.; Josiah S. Pishon. Burns, sec., Boston, Mass. Directors: Walter Colson, Charles A. A. Gallagher, Brigadier-General Henry M. Pellatt, James E. rd N. Morrison, Joseph Reriham, mgr, and Montana agt.; Carl ngr., Butte, Montana.
h 7, 1916, in Delaware. **Cap.**, $2,500.000; $1 par. Transfer Trust Co., Boston, Mass., and United States Corporation Co., egistrars, State Street Trust Co., Boston, Mass., and Equitable York.
ɔwns 51% of the Butte Central Mng. & Mlg. Co. The U. S. p. owns 51% of the shares of Butte-Detroit Copper & Zinc Mng. agreement with shareholders of the latter company to exchange r common stock of the U. S. Manganese Corp. It is probable anese will eventually own all stock of the Butte-Detroit company.

JTH MINING CO. **MONTANA**

ıs. M. Everett, receiver, Lewisohn Block, Butte, Mont.
ı. B. Wolvin, pres.; C. M. Everett, sec.-treas; with Meyer Green, John W. Neukom, directors.
y is under lease to Mines Operating Co., of Butte, controlled by ıd associates, for 5 years, and has been in active operation since

ınesota. **Cap.**, $2,500.000; shares $10 par; 200.000 issued, bal- edemption of $500,000 bond issue, on which interest is overdue . and sinking fund provision not fulfilled. Company went into on friendly suit, March 16, 1915. Receiver's report shows ead of bonds and a floating debt of about $190,833 unsecured.

The prior lien is mostly for labor certificates ($39,000) issued in half payme of wages in 1914. Bankruptcy proceedings instituted in March, 1915, were s aside by the Federal Court, Sept. 29, 1915.

Property: Brundy group, at the base of the mountains east of Butt includes the Macarona, Montgomery, and portions of the Altona, Colleen Baw and Amazon claims. These claims aggregate 67 acres and are crossed by th Columbia Gardens street car line and adjoin the Pittsmont mine on the southea

The ore thus far mined has come from open-cut work on the hillsi back of the mill. This ore is an altered granite stained green and impre nated with silicate of copper with carbonate and oxide of copper in nes and bunches. As mined in the cut it has carried a little over 1.5% copp and with a mechanical loader can, it is said, be put in the mill for 15c a to

Development: underground is mainly on the Montgomery claim o which there is a tunnel 1,200′ long and a 200′ shaft, the latter with extensi workings at 100′. The main ore body on Altona hill, to the east of th street car line, has several tunnels, proving the downward extension of th ore on the property.

Equipment: is electrical throughout and includes a 75-h. p. hoist an 750-cu. ft. compressor at the Montgomery shaft.

The Butte-Duluth mill was fully described by C. F. Sherwood in the Sa Lake Mining Review of November 30, 1915. Its total cost was $725,000.

The property has merit, and aside from its leachable ores has a d cided prospective value in the veins at depth of 1,000′ below the surface.

In bankruptcy proceedings the former superintendent, Mr. Sherwo said the mill ran on ore averaging 1.52% copper for 4 months before was shut down, and that drill cores to a depth of 202′ from the bottom a 23′ pit ran 0.98% to 2.70% copper. With acid at $12.50 per ton, a savi of 38c per ton could be made in leaching costs.

Production in February, 1915, was 120,000 lb. electrolytic copper an 30,000 lb. of cement copper. In 1918, the daily output was 175 tons of containing 1.75% copper which was sent to the leaching plant of th Anaconda company. A year later the quantity was 250 tons, averaging The mine is operated under a lease that is regarded by certain shareholde as worse than unfair to company, as the ore reserves are being depleted, an shareholders get nothing. See Mines Operating Co.

BUTTE EAST SLOPE MINING CO. MONTAN

Office: 619 Daly Bank Bldg., Butte, Mont.

Officers: E. P. Lomas, pres. and mgr.; M. F. Lyth, v. p.; C. B. Lom sec.-treas.; also directors.

Inc. Jan. 28, 1916, in Montana. **Cap.**, $500,000; $1 par. Annual meeti last Tuesday in January.

Property: 5 claims, 3 patented, 100 acres in Jefferson county, on E sl of range next east of Butte.

Geology: the country rock is granite and the vein formation is of t quartz-pyrite type. Ore carries gold and silver, with copper showing depth. At 90′ in depth vein is 23′ wide and assays $6.10 per ton.

Development: recently started, consists of a 185′ vertical shaft, wh is to be sunk to 500′, a crosscut driven at 250′, and hoist erected.

BUTTE & ELK RANGE CO. MONTAN

Address: Grant St., Pittsburgh, Pa.

BUTTE EXEMPTION COPPER CO. MONTAN

Officers: James H. Lynch, pres.; John A. Poore, v. p.; Butte, Mo with W. F. Love, M. J. Cavanaugh, T. P. Poore, and J. D. Crossman, dir tors.

Inc. in Maine. **Cap.**, $2,500,000; $1 par; 2,010,000 issued.

Property: consists of undivided ¾ interest in the Canyon, Colle Bawn, Exemption, and the entire interest in Mountain Spur lode cla approximately 56 acres, situated in the Eastern part of the Butte distri Silver Bow county.

Company has been inactive for a number of years.

REAT FALLS MINING CO. **MONTANA**
Address: Box 1393, Butte, Mont.
. Bryant Crump, Bloomington, Ill., pres.; R. M. Green, Butte, mgr.; Allen Pierse, sec.-treas.; with Ira N. Honnold, L. G. ı, Wm. Richardson, J. W. Beckwith, Louis Lauritson, R. M. P. Mondloch, Walter A. Kinney and C. F. Murphy, directors. 28, 1911, in Montana. **Cap.**, $500,000; shares $1 par; assess- ıtstanding; $32,000 was expended on development work dur- ı December, 1916, an assessment of 5c per share was levied. ›w Butte monzonite cut by aplite and traversed by wide, rying tourmaline and occasional specks of chalcopyrite. The runs S. W.-N. E., with dip of 35° and reported width of 30'. composed granite with clay and quartz streaks and one 3' and tourmaline carrying occasional sulphides. Has a 1½ ıaft, 500' deep. The Genevieve is said to have a good show- ı on 200' level, but average of assays is small. The Silver a 200' tunnel. Property reported on by Paul Billingsley, Peterson.
included electric hoist, good for 1,500', pump, 10-drill com- ›uilding and dwellings. Mine closed down and hoist sold,

he Genevieve group of 8 claims, 134 acres, in the Lost Child 3½ miles N. E. of the Butte & Superior property. garded as a prospect of doubtful merit.

ULES MINING CO. **MONTANA**
eo. de Snell, sec., No. 1 North Montana St., Butte, Mont. quoted at 1c a share on Butte Public Stock Exchange. Is ›ration, fathered by Passmore & Co., of 25 W. Granite St.,

patented claims in the zinc-silver area on the western edge rict, near Rocker.

COPPER MINING CO. **MONTANA**
arry A. Frank, sec., Daily Bank Bldg., Butte, Mont.
aurice Eisenberg, pres., 61 Broadway, New York City; J. p., with Duncan MacRae, W. P. Cary, W. H. Hall, Thos. n S. Davies, directors.
3, 1906, in Montana. **Cap.**, $5,000,000; $5 par; $2,950,000 is- eeting, fourth Saturday in January.
patented claims, 173 acres, in an undeveloped district in th of Walkerville. Has a 200' shaft, cutting a vein of 40' showing stringers and bunches of ore assaying up to 4% z. silver per ton. Has not been worked for several years is dismantled. Property is well located, has strong veins, er developed ground than it was when operating.

EXTENSION MINING CO. **MONTANA**
e C. J. Kelly, treas., 805 W. Broadway, Butte, Mont.
is. S. Warren, v. p.; John M. Murphy, sec.
1906, in Montana. **Cap.**, $500,000; shares $1 par.
claims, known as the St. Angus group, 12 miles N. E. of shaft with a crosscut showing 2 veins. Idle at last

DON COPPER DEVELOPMENT CO. **MONTANA**
ıst Broadway, Butte, Mont.
W. McDowell, pres.; John D. Haines, v. p.; W. E. Rey- Passmore, treas.; with Fred. Whiteside, Guy W. Staple- J. A. Sheldon and Maurice Eisenberg, directors.
, in Arizona, as Butte & London Copper Co. **Cap.**, $5,000,- 000 outstanding. Annual meeting, third Tuesday in Jan- Boston Curb.
acres, known as the Greendale placer claims, lying im-

mediately north of the Pittsburgh & Montana in the valley of Silver B Creek, east of Butte. Property claimed by the management to carry possible extension of the Rainbow lode. Forty acres of the propert said to be valuable for townsite purposes.

Development: 1,350′ three-compartment shaft with 2 crosscuts on 1,100′ level cutting 9 veins, none carrying ore of commercial value, exce streak that gave assays of 2% copper, 50 oz. silver, and $2 gold, per ton

The company agreed December 24, 1912, to accept a contract with J F. Cole, for the transfer of all its property to a new company, the Green Exploration Co., with a capitalization of $200,000, to be organized by The terms of the contract provided that in consideration of sinking the to 1,600′ level, running crosscuts north and south 2,500′ the entire width the property, and doing other stipulated development work, Mr. Cole to receive 51% of the stock of the new company, one-half to be paid the work progresses, the balance remaining in escrow until the work finished. Mr. Cole spent $300.000 on this development, and contract completed. Failing to find shipping ore in commercial quantities the p erty was closed down.

BUTTE MAIN RANGE COPPER MINING CO. MONTA

See Tuolumne Copper Co., which controls and operates the Butte M Range property.

BUTTE METALS MINING CO. MONTA

Address: Butte, Mont. This company was formed in 1919 to wor group of claims in the S. E. part of Butte, S. of the Davis-Daly mine. 200 acres include the Otisco, Mary Louise, Syndicate, Railroad, Curr Major, and Alliance. In the Otisco workings 4′ of ore was found on one of the vein and 6′ on the other; stoping was started, 1920, and a shaft is b sunk on the Mary Louise.

BUTTE-MILWAUKEE COPPER CO. MONTA

Assets sold 1914 to Butte-New York Mng. Co. a Butte & Sup subsidiary, for $500,000. Shareholders were obliged to exchange their s at the rate of 2½ old for 1 new share, or 30c cash per share. Comp paid a liquidating dividend of $0.3278 per share in July, 1914, and course of dissolution. Fully described under Butte-New York Mining

BUTTE MINE EXPLORATION CO. MONTA

Officers: Clinton C. Clark, pres., 408 West Granite St., Butte, Mont P. Connolly, sec., at last accounts. **Inc.** 1901. **Cap.**, $250,000; shares $1

Is no relation to the company of same title formerly holding the O'Clock property, in Butte, or to the Butte Mines Exploration Co. merly having property at Tecoma, Box Elder Co., Utah.

Property: the Pacific quartz lode claim, on which considerable was done, 1901-02. Company practically defunct, but property was rep under option to the North Butte Mining Co.

BUTTE-MINNESOTA MINING CO. MONTA

Officers: Peter E. Peterson, pres.; Angus McLeod, Butte, Mont., liam Vuoti, J. E. Porthan, A. W. Havela, John Kukko, Emmanuel A John Lampi, Ade Herranen, directors. Mines near Butte and Helena.

Inc. June, 1912. **Cap.**, $750,000; shares $1 par.

Property: 6 claims, about 1 mile south of Rocker, at the western of the Butte district. Ground shows well-defined veins, 1 of which is t able for 3.000′ across the surface. Country rock is granite, and par the same mass as that in which the Butte deposits occur.

Development: 400′ tunnel on the vein and an incline shaft 35′ sunk on the vein disclosing well-defined walls, 6′ apart, from which ore been taken carrying 0.5% copper, 8% lead, 12 oz. silver, and $28 gold ton. The property is equipped with a gallows frame, boilers and hoi

Late in June, 1913, the company bought a group of mining cl the Wolf Creek district, 40 miles east of Helena, Mont. Reports sta development on these claims shows more than 100,000 tons of ore ave

er blocked out. A mill was to be built, but company has not ecent work.

ITOR TUNNEL MINING CO. **MONTANA**
:are C. J. Kelly, Daly Bank & Trust Co., Butte, Mont. De-ume XIII.
1919 that mine was purchased by North Butte Mining Co.,

' ENGLAND MINE **MONTANA**
a fractional claim in the Davis-Daly tract at Butte. In May, ient was under way on the 150' level, where good silver-s being opened, but work was suspended in August, possibly avis-Daly might claim apex rights.

' YORK COPPER CO. **MONTANA**
of the Butte & Superior Mng. Co., which see.

.UTUS MINING CO. **MONTANA**
. R. Moyle, pres.; M. S. Cohen, v. p., Butte, Mont.; D. J. Mc-

the Plutus claims N. of Anaconda's Nettie group at Butte, veins of silver and manganese ore; also a half interest in the ms near Philipsburg, carrying manganese ore.
nt: in 1919, the Plutus shaft was being sunk from 160 to 400'. ood ore was reported opened in the Mapleton claim, at 100'

SDELL COPPER MINING CO. **MONTANA**
om 22 Hirbour Bldg., Butte, Mont.
Henry Meloy, pres.; J. D. Pope, v. p.; J. A. Henshaw, sec.; mith, supt.
17, 1917, in Montana. **Cap.**, $300,000; $5 par.
64 acres owned and 25 acres leased from Davis-Daly in art of Butte district. Ore carries gold, silver, copper, and

nt: by 300' shaft, which in July, 1919, was reported to be ng vein.
: in 1918, averaged over 30 tons of ore daily. This ore car-o 7% copper and 5 to 8 oz. silver per ton. In September, output was a car of 10% ore.

D EAGLE COPPER CO. **MONTANA**
ayette Harrington, pres., Missoula, Mont.; Jas. A. Canty, e, Mont.
1907, in Montana. **Cap.**, $5,000,000; shares $5 par.
claims, patented, S. E. of the Butte & Bacon and N. E. of perior, the Red Eagle claim having a 400' tunnel, showing a : shut down since 1907, but company still alive.

DARD COPPER MINING CO. **MONTANA**
re H. G. Klenze, Box 377, Butte, Mont.
G. Klenze, pres.; A. M. Stephens, v. p.; J. W. MacLane, rt., with J. L. Templeman and H. H. Griffith, directors.
ntana. **Cap.**, $1,000,000; shares $1 par; 350,000 shares in : being offered at 12½c, August, 1917.
claims in the northern outlying section of the Butte camp claims at Amazon, Jefferson county, Mont., both partly de-t to carry commercial orebodies. Selling stock in 1917. No

:IT COPPER CO. **MONTANA**
idle. **Address:** 818 Hornet St., and Excelsior Ave., Butte,

L. A. Blomgren, Geo. P. Arnold and Wm. H. Smith, all of. rt., directors.
1916, in Montana. **Cap.**, $3,000,000; shares $10 par.

Property: the Hornet claim on the Yellow Jacket vein and a secon vein 180′ to the south.

Development: by 200′ shaft, with levels at 100′ and 200′. Oreshoot o 100′ level. Yellow Jacket 13½′ wide, with 4′ of ore assaying high in le and silver, with over 20% zinc. On the 200′ level 7′ of commercial o was opened on the downward extension of shoot cut on 100′ level.

BUTTE & SUPERIOR MINING CO. **MONTAN**

Office: 25 Broad St., New York. **Mine office:** Butte, Mont.

Officers: D. C. Jackling, pres.; Charles Hayden, v. p.; K. R. Babb v. p. and gen. counsel; with F. L. Ames and J. L. Bruce, directors. A. Ranaghan, sec.; C. W. Peters, treas. Operating officials: Charles Bocki gen. mgr.; Angus McLeod, mine supt.; E. V. Daveler, gen. supt.; J. Bruce, cons. eng.

Inc. Oct., 1906, in Arizona. **Cap.**, originally $6,000,000; $5 par; reduc December 3, 1910, to $2,500,000; $10 par; increased September, 1912, $3,500,000. Outstanding December 31, 1919, $2,970,000. No bonds. Sto listed on Boston, New York and Butte Exchanges and on the Paris Bours Name changed May, 1916, and new stock issued.

Controls the North Butte Extension Development Co., through owner ship of 80% of the stock; also controls the Butte-New York Copper Co through ownership of more than 55%. Equitable Trust Co., New Yor and Old Colony Trust Co., Boston, transfer agents; Guaranty Trust C New York, and National Shawmut Bank, Boston, registrars. Annual mee ing 3rd Friday in April, at New York.

In 1912 the control of the company passed into the hands of Hayde Stone & Co. interests, who have been closely identified with the Utah Co per Co., Chino, and other great and successful mining companies, thus e suring ample finances and competent direction.

Comparative General Balance Sheet—years ending December 31:

Assets.

Year	Prop. Equip. & Devel.	Investments	Current	Deferred Charges	Total
1918.....	$5,816,408	$695,138	$4,335,890	$547,896	$11,395,3
1917.....	5,799,475	749,325	3,384,002	543,256	10,476,0
1916.....	5,245,260	692,063	4,393,668	542,163	10,882,1
1915.....	4,458,133	574,295	5,267,080	486,129	10,785,6
1914.....	4,190,872	338,567	1,269,633	274,330	6,073,4

Liabilities.

Year	Cap. Stock	Current	Prem. on Sales Cap. Stock	Reserves	Undiv. Profits	Total
1918.....	$2,901,845	$451,320	$1,214,106	$1,129,407	$5,698,654	$11,395,3
1917.....	2,901,845	482,331	1,214,106	807,469	5,070,306	10,476,0
1916.....	2,901,872	1,155,337	1,214,222	.....	5,610,722	10,882,1
1915.....	2,726,970	606,317	1,214,386	.....	6,237,965	10,785,6
1914.....	2,726,089	111,985	1,213,985	.....	2,021,944	6,073,4

BUTTE & SUPERIOR MINING CO.

Our Statistical Department will furnish complete information on application.

HAYDEN, STONE & CO.

Members New York, Boston and Philadelphia Stock Exchanges.

25 Broad Street, NEW YORK 87 Milk Street, BOSTON

capital:

sh and . Bonds	Ore and products	Supplies, etc.	Accounts receivable	Total current assets	Total current liabilities	Excess of assets
377,032	$1,208,004	$647,610	$108,244	$4,385,890	$451,320	$3,884,570
845,359	1,769,204	728,584	50,855	3,384,002	482,331	2,901,671
853,529	3,198,741	325,445	15,962	4,393,667	1,155,337	3,238,330
128,187	2,912,881	175,457	50,555	5,267,080	606,317	4,660,763

accounts:

	1918	1917	1916	1915
s, less freight.	$5,915,245	$6,716,437	$13,141,551	$12,087,117
rges.....	5,263,320	4,595,501	4,349,420	3,012,965
.....	$651,925	$2,120,936	$8,792,131	$9,074,152
.....	62,874	103,191	81,712	51,796
e.....	$714,799	$2,224,127	$8,873,843	$9,125,947
xes, etc.....	86,451	236,647	.....	.....
rplus account	$628,348	$1,987,480	$8,873,843	$9,125,947
revious year..	*5,070,306	5,610,722	6,227,309	2,021,944
ble.....	$5,698,654	$7,598,202	$15,101,152	$11,147,891
l.....	.....	1,567,057	9,490,430	4,908,115
.....	$5,698,654	$6,031,145	$5,610,722	$6,239,776

e from metals, etc., in 1919, was $4,537,969, of which $961,115

in 1914, $611,908; in 1918, $4,908,115, in 4 quarterly payments
d extra payments of $15 per share; in 1916, $9,490,472 in
ents, 2@75c, 2@$1.25, ea. and extra of $30.00 per share; 1917,
terly, for first three quarters, $1.25 extra for first two, and
0c, a total of $6.65 for the year.

27 mining claims, 164.90 acres, about 2 miles N. E. of the
n of Butte, with the exception of 4 claims, Peake, Parker,
ardee, which lie about 3 miles N. W. of Butte. In addition,
ests equivalent to 8.88 acres are owned in 11 claims, 60.3
ce rights only for 34.15 acres. The North Butte Extension
o. owns 4 claims and a fractional interest in a fifth, amount-
equivalent area of 29.48 acres.

er, 1917, a syndicate, known as J. L. Bruce Trustees, was
e for the Butte & Superior 200 acres of zinc-lead ground W.
ine of the Butte Copper & Zinc Co.

nia-Tzarena claims, 1 mile S. W. of Butte, were worked
option in 1918. Shaft was sunk to 1,000′ and 500′ driven
ments being due before ground was explored the bond was

ee claims just W. of Butte, carrying a vein of rich silver
ed.

Butte & Superior has had eight years of costly litigation,
e Elm Orlu Mining Co. involving extralateral rights of cer-
nd the other concerning the patent rights of Minerals Sepa-
ation process. In this latter dispute, B. & S. has really done
the whole mining industry, in forcing the patents to be

Orlu, through its controlling company, the Clark Montana
ed suit against the Butte & Superior Mining Co. over rights
dies in the Elm Orlu claim and in the Black Rock claim
erior. The successive steps in this controversy are as

U. S. District Court decided in favor of Elm Orlu, giving

this company the westernmost 301′ along the vein and B. & S. all rights the Rainbow lode east of the point where it enters the Black Rock cl (B. & S.); subject, however, to the prior rights of the Pyle vein of Elm Orlu, below its junction with the Rainbow.

The B. & S. appealed this to the U. S. Circuit Court of Appeals at S Francisco in November, 1917, which affirmed the decision of the lower co and found that ore taken by B. & S. from the disputed ground was wo with interest, $177,707. Application to the U. S. Supreme Court for a view of this decision, was denied on May 10, 1918; but the Circuit Court Appeals granted an appeal to the U. S. Supreme Court, who heard the peal January, 1919, and sustained the decision of the Circuit Court of peals. The geological features of this case were presented by R. M. Sea in 'M. & S. Press' of May 10, 1919.

Another collateral issue of the case not wholly determined by the U. District Court involved claims on the part of Elm Orlu to certain orebod developed in the Black Rock claim 550 ft. eastward of the point ab referred to by reason of the alleged apex in the Elm Orlu claim of a bra of the Rainbow lode extending into the earth beneath Black Rock cl This issue was never tried as a settlement was arrived at in August, 1 and confirmed by the Court. By this agreement, Elm Orlu gets about and B. & S. 2/3 of the disputed area, while B. & S. pays Elm Orlu $2,500 cash for ore already extracted. Elm Orlu was awarded 186′ additional e ward on the Rainbow vein below 1,200′ and the B. & S. that portion ab 1,200′. The Jersey Blue vein west of the new plane below 1,300′ awarded to Elm Orlu. Each side paid its own costs. The suit involved amining 12 levels in each mine, crosscuts, 6 miles of drifts, 10 raises, 50 1,200′ long, and a complexity of vein-intersections and fault-crossings.

Litigation with Minerals Separation over United States patents first provoked by the installation made in 1911 by James M. Hyde (forme an employee of Minerals Separation, Ltd.), at the mill of the Butte & S perior Copper Co. (name since changed to B. & S. Mining Co.) In t suit (Minerals Separation v. Hyde) the District Court at Butte, Monta sustained U. S. Patent No. 835,120 and found infringement as to 7 clai In 1914, the Ninth Circuit Court of Appeals at San Francisco, reversed t decision; but on writ of certiorari the U. S. Supreme Court on December 1916. unanimously adjudged this basic patent for air-froth flotation valid to 10 of its 13 claims. The remaining 3 claims, which specified the use "a small quantity of oil," and which the Court held to be invalid, have sin by disclaimer, been brought within the scope of the Supreme Court's cision.

Following this decision of the Supreme Court in the Hyde case, Butte & Superior Mining Co. began using oil in minimum quantities ½ of 1 per cent, contending that this relieved it of liability for infringeme This issue was tried in the suit of Minerals Separation v. Butte & Super and on May 4, 1917, the United States District Court at Butte, Mont., ag found validity and infringement as to the 10 claims (3 modified by claimer) previously litigated. On May 13, 1918, the Ninth Circuit Cour Appeals at San Francisco partly reversed this decision, holding the pa limited to ½ of 1% of oil on the ore. The U. S. Supreme Court revie this case on writ of certiorari, and on June 2, 1919, partly reversed the cision of the Circuit Court of Appeals, holding that the patent extende and covered the use of oils in amounts equal to any and every fractio 1% on the ore. Pursuant to this decision, the District Court of Montana tered its decree on July 19, 1919, issued a permanent injunction against Butte & Superior, and held it to account for all profits made by reason its infringement. This accounting was set for October 27, 1919, but was tended to December 1. In its report filed with the U. S. District Cour November, B. & S. suggested to M. S. the sum of $451,097 for infringem this not being an admission of the amount saved by flotation, but as an in the accounting. On September 8, 1919, the U. S. Circuit Court of A

ncisco dismissed an appeal of the Butte & Superior Mining Separation. The appeal was against certain provisions of udge George N. Bourquin at Butte in September, 1917. In S. brought contempt proceedings against B. & S., alleging nction.

e consists of zinc blende, galena and small quantities of pyrite occurring with gangue material, mostly quartz, silici- ochrosite and rhodonite as vein replacement of the granite. in parallel or branching ore shoots ranging in thickness ingers up to orebodies as much as 100′ wide within the l general zone of mineralization known as the Rainbow surface the commercial ore consisted principally of was mined in the early days of Butte mining. The ore shoots as developed during recent years occur down- ximately the 500′ level, and as far as disclosed by present ease in horizontal area and in importance as greater depth actually blocked out ready for mining is maintained at tons, greater development than this being inadvisable iculty in maintaining developed drifts and crosscuts for period before actual mining operations are to be con-

es from 10% to 30% zinc, averaging about 18% zinc, 1.25% , 8 oz silver and 30c gold. The small amount of iron, ontents permits of the production of a good grade of zinc the very fine dissemination of the mineral requires fine ent concentration, and most of the zinc mineral is after- y oil flotation.

ntent decreases slowly with depth, but thus far the zinc n and without appreciable pyrite.

Total otage	Shafts feet	Total miles workings	Ore reserves tons	Zinc %	Silver oz.
3,459	950	29	830,000	17.0	5.70
7,730	724	23	1,059,200	17.6	5.90
1,838	2,649	20	1,044,850	17.7	5.65

id of 1919 show a decrease of 25% due to loss of ground n in the Elm Orlu case and not to any diminution of ore-

e shafts—No. 1 is 1,200′ and No. 2 is 2,050′; No. 3 which is ew main or working shaft. It has concrete skip-pockets 00, 1,500, 1,600, 1,700, 1,800 and 1,900′ levels. Ore occurs with frequent fault seams and slips, and there is con- t as a result of ore extraction. These facts necessitated t. All 3 shafts are well protected by concrete and cement 200′ station of No. 2 shaft electrically-driven quintuplex mine water. The main ore-shoot has been opened con- E. of the ground in dispute with the Elm Orlu. No. 3 to 3,050′.

) men are employed underground.

main shaft is a Nordberg hoist designed for an ultimate ling at 3,000′ per minute, driven by a 2,000 h. p Westing- oying the Ilgner and Ward-Leonard systems of balance essors, complete machine-shops, coarse-crushing plant at ,800-ton mill using gravity concentration and flotation. are employed in surface operations.

centrates are sold under contract to the American Zinc, Co., and U. S. Smelting Co. under a toll basis, though been disposed of by sale to various zinc retort smelters

throughout the country or to the Anaconda Copper Mining Co. for treatme at its electrolytic plant at Anaconda.

Production: figures for the production of the property prior to 1913 a not available, but the results of operations since that time are as follows:

Year	Tons Milled	Oper. Cost	Tons Concts.	Assay Con., %	Lb. Zinc Concts.	Zinc Rec. %	Aver. Price, c.	Net Total	Pa per d
1919.....	402,486	$9.97	56,703	54.85	113,887,464	95.6	7.04	$961,115	$
1918.....	468,814	11.23	135,548	51.22	139,522,506	92.97	7.58	3651,324	1
1917.....	461,953	9.95	138,661	47.86	132,036,735	91.13	8.73	2,847,486	1
1916.....	627,370	6.93	171,747	52.87	181,624,842	93.10	12.03	8,873,446	1
1915.....	522,300	5.76	158,171	53.61	165,382,921	93.00	12.34	9,125,947	1
1914.....	327,210	5.33	101,383	53.16	108,644,120	88.71	5.04	1,417,128	1
1913.....	296,940	5.70	106,443	49.00	102,997,916	88.43	5.52	942,368	1

Silver production in 1919 was 2,010,000 oz.

This table does not give the lead, copper, and silver in concentrate, whi in 1918 amounted to 11,956,951 lb., 1,293,313 lb., and 2,781,394 oz., respective

Butte-New York Copper Co.

Controlled through stock ownership by Butte & Superior Mining Co

General office: 25 Broad St., New York.

Officers: M. M. Ferguson, pres.; R. J. Schaefer, v. p.; W. G. Sarge sec.-treas., New York; M. M. Ferguson, L. B. Holloway, Philip Lawren G. M. Minton, A. J. Ronaghan and W. G. Sargent, directors. Annual me ing 2nd Monday in January.

Inc. Oct. 17, 1906, in South Dakota. Previously a holding compa controlling over 95% of the capital stock of the Butte-Milwaukee Cop Co. In 1914 it purchased all the assets of that company, comprising fo claims in the Summit Valley mining district, Silver Bow county, Mon adjoining the property of the Butte & Superior Mining Co., and thr claims in the Argenta mining district, Beaverhead county, Mont. Clai aggregate 53 acres. **Cap.** authorized, $1,000,000; outstanding, $582,17 par value $1. The former authorized capital stock was $4,000,000, consi ing of 800,000 shares of par value of $5 each; the stockholders, howev voted April 16, 1915, to change the par value from $5 to $1 per share, a to increase the amount of stock by 300,000 shares, making $1,100,000 authe ized. The Butte & Superior Mining Co. owns $323,655 of the stock. Sto transferred at company's office. Registrars: Empire Trust Co., New Yo

Bonded debt: $150,000 first mortgage convertible income gold 6s; dat June 1, 1916; due June 1, 1925; int. J. & D. (up to and including June 1920, interest is payable only out of income at rate of 6%, but is cumulativ for that period; thereafter interest will be paid unconditionally.) Coupo $100, $500, and $1,000. Authorized, $500,000. The unissued bonds are r served for future requirements. Convertible at any time prior to maturi into stock of the company at par. Subject to call on and after June 1, 191 at 105 and interest. First offered ($150,000) to stockholders of record Ap 19, 1915, at par, on the basis of $100 bond for each 400 shares of stock he Normal income tax deducted from interest.

Property: holdings consist of 4 claims, patented, known as the Polloc Colonel Sellers, Florence, and Bird, lying immediately north of the Butte Superior, and 3 lode mining claims in the Argenta district, Beaverhe county, Mont.

The Colonel Sellers claim has a promising surface showing with stron persistent quartz veins in granite. The Butte & Superior completed th sinking of the 1,200' Milwaukee shaft on Colonel Sellers claim and co nected it by crosscutting with 1,200' level of Black Rock mine. This wo was continued beyond the Colonel Sellers shaft so as to open the Mastodo vein on the Florence claim. The Milwaukee shaft is well equipped wi power plant and hoist. The Butte & Superior Co. spent $24,000 in develo ment work on the Butte-Milwaukee property and in return received 205,0 shares of the capital stock of the Butte & New York Co. Developmen work said to have proved good zinc orebodies.

tcrop on Bird claim is 100′ wide and resembles outcrops of
: veins of the district.
:k mine has 4 veins, 2 more or less developed by a short
30′ three-compartment shaft. A silver vein was opened on
nd mine is said to have produced, years ago, about $400,000
with values mainly in silver and gold, from above the 200′
ore running 2% copper and 15 oz. silver per ton, with small
produced, 1906.

NITH CITY MINING CO. **MONTANA**

reimuth, Duluth, Minn.; and 30 E. Broadway, Butte, Mont.
Freimuth, pres.; G. T. Paul, v. p.; Sol. Genzberger, sec.;
treas.; with W. D. Gibson, C. O. Baldwin and L. S. Loeb,
. D. Gibson, supt., at last accounts.
)12, in Montana. **Cap.**, $3,000,000; $10 par; 93,000 shares were
ns of the Silver Bow Copper Co. In 1915, 50,000 shares of
were sold at $3 per share to provide funds for development

atement from November, 1912, to May 1, 1919, shows receipts
, of which $319,487 was from sales of shares; $42,446 from
ery, and $11,788 advances from I. Freimuth. For equipment
ne expenses $342,710 was paid. Cash in banks amounts to

2 patented claims, 343 acres, all in a compact group, about
the developed section of the Butte district and a short dis-
ilver Bow junction, where 4 railroads meet. Ground shows
d aplite cut by numerous strong and persistent quartz veins,
ult-veins, which in the copper district of Butte have proven

t: by shaft, 1,500′ deep, with a crosscut at 460′ and cross-
el showing good indications, with all surface veins in place.
vater was encountered at 460′, flooding the mine, and costing
nwater and put in pumps. On the 1,000′ level crosscuts were
rth and 801′ south, and veins explored by 1,023′ of drifts.
sed the same veins as at 460′, and of slightly better mineral-
he shaft reached 1,500′, company's finances were low, and
nditions of 1918 making further work impossible, the mine
machinery sold. The veins show occasional value at the
n commercial quantities. The quartz veins are of the silver
ss veins are similar to the copper veins of Butte. In 1919,
ilver ore was under way in the Corinthian claim crosscutting
shaft 220′ deep disclosed two strong veins, assaying from
per ton.
still considered promising, and its exploration a meritorious

ANA REALTY CO. **MONTANA**

Exchange Place, New York City.
orporation, controlled by Hon. W. A. Clark, as a holding
: Ophir mine, Utah; ½ interest in the Elm Orlu mine,
t in the Timber Butte Milling Co., Butte, Mont.; Sunset
daho, and in general all the Clark properties in the north-
For litigation with Butte & Superior see that company

ARD EXTENSION COPPER CO. **MONTANA**

ry of the Tuolomne Copper Mining Co.
W. McDowell, pres., 804 W. Park St., Butte, Mont.; Guy
Meyer Genzberger, treas.; W. E. Reynolds, sec.; with J.
rs.
1906, in Arizona. **Cap.**, $5,000,000; shares $5 par.
:laims, patented, 42 acres, consisting of the Maggie placer,
, Little MacQueen, Undine and Snow Bird placer, about

a mile east of the Colusa and Leonard mines, and near the Pittsmo shafts of the East Butte Copper Co.

Development: by 800 three-compartment shaft on the Little MacQue claim lying about the center of the group, that has cut several small string of ore assaying up to 9% copper, but none of commercial size. There is al a 7' vein of 2% ore carrying 14" paystreak said to range 8 to 10% in copp tenor, with small values in gold and silver also some lead and zinc.

Property reopened August, 1916, by the Tuolumne C. M. Co. under agreement whereby the T. C. M. Co. acquires a 51% interest in the C. property for sinking shaft from 800' to 1,600' and driving crosscuts on th latter level to the N. and S. boundaries of the group.

See Tuolumne Copper Mining, p. 1005.

COLUSA-PARROT MINING & SMELTING CO. MONTAN

Office: Box 1683, Butte, Mont.

Officers: Hon. Wm. A. Clark, pres.; Wm. C. Siderfin, v. p.; W. C Messiass, sec.; Alex. J. Johnston, treas.

Inc. Nov. 26, 1897, in Washington. **Cap.,** $500,000; shares $50 par.

Company is practically out of business, its only present property bein lands, platted as an addition to the city of Butte. Has an asset of co siderable value in a million-ton tailing dump at the Butte Reduction Wor which is being treated.

CRYSTAL COPPER CO. MONTAN

Officers: 31 Milk St., Room 209, Boston, Mass.; and 73 Hirbour Bldg Butte, Mont. Matt W. Alderson, mng. dir. A. C. Ray, mgr., Basin, Mon

Officers: Bowdoin S. Parker, pres.-treas.; George W. Clement, v. p. Eugene H. Walker, sec., with Louis H. Goddu, Edward P. Barry, and Jo E. Allen, directors. William D. Gibson, mgr. E. P. Barry, gen. counsel.

Inc. April 4, 1916, in Maine. **Cap.,** $2,000,000; $5 par; increased 19 from $1,000,000; $5 par; changed November 7, 1918, from $1,000,000; $1 pa Stock listed on New York and Boston Curbs. Security Transfer and Regi trar Co., New York, and Federal Co., Boston, transfer agents, Securit Transfer & Registrar Co., New York and Old South Trust Co., Bosto registrars. Annual meeting April 1.

Property: (1) the **Goldsmith mine** at Butte, Mont., under bond an lease. The deposit is a quartz lode, on the western split of the Rainbo lode. The main shaft, 367' deep, developed from the surface 3 veins fro which about $1,500,000 worth of silver ore was produced by former owners.

The Anaconda company owns ground adjoining the Goldsmith. I Alice mine, the richest silver mine of that company, is only 1,500' awa while W. A. Clark's Moulton mine, reputed to have produced over $6,000,0 is but 400' distant.

Development: the Crystal company opened and retimbered the ol Tong shaft, sinking it to the 500' lev[illegible]e crosscuts intersect both th northern and southern veins, from which the company has been mining an shipping silver ore since November, 1918. The shaft was deepened to th 600' level late in 1919, and crosscuts driven to several veins have cut ship ping ore, 2' of it very high grade.

Equipment: the mine has up-to-date machinery and appliances, includ ing a 150 h. p. electric compressor, a 100 h. p. electric hoist, good for a shaf of 1,000' depth; all mining operations are carried on under the advice o experts in each branch of the business.

(2) The **Crystal mine** and group of claims are about 8 miles N. o Basin, Jefferson county. The company owns an undivided half interest i the Commence and Crystal; one-half and one-sixth of the St. Lawrence an Jack Fraction; the Mammoth claim, total of about 84.39 acres, in the Catar act district. The output is mostly copper ore, but a good grade of silver-lea ore has also been developed, and shipments made.

The gross value of copper ore mined and sold since the Crystal com pany took over the mine is $70,000, and of the silver ore, $25,000, a tot of $122,000.

nt: all work done so far has been devoted to mine develop-
per tunnel has been extended to 1,334', carrying it within 50'
m. There is over 3,000' of unexplored vein to be opened by ex-
nel farther W., the known orebodies on the St. Lawrence claim
' further west. The Lower or Mammoth tunnel, 200' below the
vein through the Mammoth claim and cuts the Crystal vein
the portal, running on it for 300' or more. The Mammoth
s the other claims, as the only outlet of the lower tunnel
Mammoth.
ore extracted thus far has been of fair average grade for
ere is also in the mine a large tonnage of ore profitable for
The silver ore obtained from the Crystal mine last year
to 45 oz. per ton, indicating that the mine might be operated
ilver ore alone.
al of matter was published about this company during 1918
circular issued on July 17, 1919, and signed by the president,
at the Basin mines were being operated under lease during
n a royalty basis. Over $100,000 has been spent at the Butte
oments from both properties are said to meet all operating
hould soon give a surplus for dividends.

COPPER CO. **MONTANA**

Milk St., Boston, Mass.; and Butte, Mont.
. M. Burton, pres.; Wm. Bloom, v. p.; Charles G. Schirmer,
F. M. Kimball asst. treas.; and F. A. Schirmer, directors
cons. eng. J. L. Bruce, gen. mgr.
4, 1908, in Maine, as successor of Davis-Daly Estates Cop-
$6,700,000; shares $10 par; assessable; ($8.50 paid), issued,
ed on Boston Stock Exchange. Annual meeting 4th Tues-
er. Federal Trust Co., Boston, transfer agt.; State Street
on, registrar.
rlier chapters in the history of the company, readers are
ription of the Davis-Daly Estates Copper Co., in Vol. VIII
Copper Handbook.

tatement—years ending June 30:

	Ore sales, etc.	All expenses	Profit after de-ciation, etc.	Current assets	Current liabilities
.....	$1,336,777	$1,029,814	$415,963	.....	.....
.....	1,400,219	603,007	457,490	$513,104	$69,929
.....	742,003	578,200	163,803	231,696	41,128
.....	236,991	284,326	.....	140,617	100,778
.....	.....	.....	.....	93,903	20,475

ted net profit for quarter ending September 30, 1919, was
treasury at end of 1919 was $500,000.
initial of 50 cents paid June 29, 1918, and toal of 75 cents for
nts December 20, 1919.
small surface area and mineral rights of 320 acres under
e, adjacent to, but south and west, of the older productive

vo main veins have been developed, running in N. W.-S. E.
ponding to the Blue vein system to which the Jessie, Edith
very productive fault veins belong. There are also several
eins on which but a small amount of development has been
tly. The veins are frequently faulted and a careful study of
ions is necessary for recovery of veins beyond the faults.
it: to a depth of 2,800' by the Colorado shaft, and workings.
' Hibernia and the 800' Mt. Moriah shafts having shown the
ep exploration, the Colorado shaft was sunk to 2,000' and later
tifying results. The chief development work is on the Hesperus.

vein, the principal one in the mine, been opened down to 2,100, 2,300, a 2,500', these levels producing ore running over 7% copper. The 2,500' le was connected with the Anconda company's Belmont mine in May, 1 improving ventilation of the Colorado mine. Reserves are said to be e to an output of 15,000 tons of ore monthly for 3 years. In December, 1 6' of 8% copper and 6½ oz. silver ore was cut on the 2,100' level of t Colorado mine. Development is at the rate of 9,000' yearly.

The Davis-Daly ground has been generally considered to contain o low-grade and base zinc-pyrite ores and to be outside the copper sect of Butte camp. Developments show, however, that good copper ores ex and that the extensive area of unexplored ground will make this prope a profitable one.

The Hibernia mine contains zinc-silver and manganese ore, which w be worked when a pending dispute is over.

Normally, 360 men are employed, of whom 300 are underground.

Equipment: a hoist was installed early in 1917, with a capacity of 3 tons per trip and speed of 2,000' per minute at depth of 4,000'. There is electric-driven air compressor, and a large battery of boilers ready in ca electricity is cut off. The ground around the shaft being limited, the outp at the mine is conveyed several blocks over a narrow-gauge surface tr to ore bins alongside the Northern Pacific railroad. In the Colorado mi storage battery locomotives are to be used, also skips.

Production: years ending June 30 (normal output of ore is 300 to daily).

	Ore mined, tons	Copper, lb.	Silver oz.	Tot prof
1919**.....	21,850	3,230,000	126,000	$364,5
1919.....	53,983	8,118,369	340,851	415
1918*.....	58,720	5,894,396	390,488	457
1917.....	.....	.....	.....	163
1916.....	20,511	4.04%	5.37	....

* Also 1,316,310 lb. zinc and 611,907 lb. lead from Hibernia mi
** Quarter ending September 30.

In June, 1919, the yield was 775,600 lb. of copper and 31,400 oz. of silv in August the copper output was 1,300,000 lb. Average grade of the o during 8 months of 1919 was 9% copper and 6.6 oz. silver per ton.

Davis-Daly is doing well and with normal demand for copper sho continue to pay regular dividends.

DULUTH-NEW YORK MINING CO. MONTA

Address: John Zundel, Butte, Mont.

Property: the Excelsior claims in North Walkerville, Butte, and t Amy-Silversmith group nearby. Eastern capital is said to be advancing $65 for deepening the Excelsior shaft to 1,500' and other work.

EAGLE MINING CO. MONTA

Address: Care Harper McDonald Co., Lewisohn Block, Butte, Mo Hon. Patrick Mullins, Arthur V. Corry, and Thos. Bryant, directors.

Inc. March 10, 1906, in Montana. **Cap.**, $150,000: shares $1 par; supposed to have increased capitalization, April 29, 1907, to $250,000, sha 50 cts. par.

Property: north of Walkerville, a suburb of Butte, has a 250' sha showing a 5' vein.

Mine is dismantled, but worthy of further prospect work. Idle at l accounts.

EAST BUTTE COPPER MINING CO. MONTA

Office: 85 Devonshire St., Boston, Mass. **Mine and works office:** Bu Mont.

Officers: Robt. H. Gross, pres.; Hon. Jas. H. Reed, v. p.; Wm. Everts, sec.; Frank P. Son, treas.; Oscar Rohn, gen. mgr., with F. Ward Pa and Wm. A. Paine, directors; L. A. Thulin, asst. treas.; Andrew J. Ray, m

othwell, mill supt.; Julius H. Warner, engr.; G. E. Burton,

, 1905, in Arizona. **Cap.**, $3,000,000; shares $10 par; in-
909, to $6,000,000, shares $10 par; 421,849 issued. State Street
registrar; American Trust Co., Boston, transfer agent. Stock
ston Stock Exchange and N. Y. Curb. Annual meeting, first

te Copper Mng. Co. has no indebtedness. It owns all of the
and all preferred stock of the Pittsmont Copper Co., the
o $1,000,000 par value; also four-fifths of the common stock,
00,000 par value. East Butte Co. works the property of the
Co. under an operating agreement. During 1918, East Butte
Co. $1,000,000 cash for accrued rentals, which was repaid by
0,000 preferred shares, $5 par of the East Butte Co., placing
easury of Pittsmont. This enabled the East Butte Co. to pay
r share.

tement, years ending December 31:

Assets.

ınd nt	Stock Unissued	Cash and Copper	Accounts Receivable	Total
1	$1,781,510	$1,637,442	$197,936	$7,018,379
)	1,792,690	1,947,589	183,837	7,222,936
	1,890,000	2,214,568	11,928	7,597,009

Liabilities.

	Accounts Payable	Contingent Funds	Total Surplus	Total
)	$283,695	$126,456	$608,227	$7,018,379
	941,187	75,152	206,597	7,222,930
	1,219,600*	36,897	340,513	7,597,009

'ittsmont Company.

ts at end of 1919 were about $2,000,000.

Income Account.

	1918	1917	1916	1915	1914
....	$5,875,322	$5,397,868	$5,523,688	$2,753,588	$1,455,454
....	5,033,178	4,089,710	3,198,317	1,699,603	1,048,856
....	53,739	116,640	294,191	214,692	136,101
....	22,936	169,557	465,411	56,296	48,244
...	632,774	831,731	.....	.....	.....
....	132,595	190,230	1,565,769	782,997	222,253

ial of $1 per share Jan. 29, 1917, and total of $2 for that
50 cents in 1919, a grand total of $1,687,396.
Dutton group, 134 acres, held by placer patent, is in the
ıear the Pennsylvania mine, and is idle at present.
erty is the **Pittsmont group** at Butte, described below.
oldings include the Swissmont group of 6 claims, near Elk-
ty, Mont., and the Chamounix group, near Austin, Lewis &
, including the Christina group of 6 claims and the Fannie
claims. The Swissmont group has developed a considerable
oxidized gold ore carrying an excess of iron over insoluble
lue as a flux.
group has shipped some silver-copper ore in the past, but
ny also has timber operations at Feeley, Mont.
ed at the Elkhorn property in 1917, but owing to scarcity of
ost of cyanide, operations have been postponed until condi-
favorable.
ıas a 49% interest in the Ohio Oil Co., a Standard Oil sub-

'ittsmont claims cover 280 acres of flat valley bottom,

about 1½ miles east of Butte and extending outward from the footslopes the continental divide mountain ridge. The ground is a filled-in valley, sandy wash and debris being in places several hundred feet deep, so that no crops of any kind exist on the ground. The underlying rock is the normal granite (quartz-monzonite) which is cut by 3 systems of veins; Northwest, responding to the Blue Vein series. Ore-shoots occur in veins of each The zone of oxidization and leaching of copper extends from 500′ to 700′ the surface. There are 12 principal veins that have been productive. these are not wide, usually under 5′, the ore-shoots are long and persistent. least 2 veins on the 800′ level have been stoped almost continuously for in length. Though the 800′ level has been the most productive level opene date, due both to an increased primary mineralization and secondary enrich which has affected the lower levels to a much lesser extent, the lower levels tinue to yield strong ore shoots of commercial grade, though lower in value ore from upper levels.

Development: 2 shafts, No. 2 and 3, 1,830′ and 1,240′ deep, respecti No. 2 is the working shaft, and levels are opened from it at 800′, 1,000′, 1,500′ and 1,800′.

Total workings are over 20 miles, and new work each year averages ft. Good ore has been opened on the two bottom levels, but as the 1,800′ has bad ventilation, and it is difficult to get men to work there, a new shaft raised from the 1,800′ level to surface.

Ore production comes from the following levels: 800′, 39%; 1,000′, 1,200′, 15%; 1,500, 23%, and 1,800′, 5%.

Normally, 630 men are employed underground.

Equipment: consists of hoisting plant, flotation plant, and smelter. above includes a 2,000-h. p. steam plant, 2,000-h. p. electric plant, 600-h. p. hoist good for 2,000′, and 50-h. p. steam hoist good for 1,500′; two 25-d compressors, and 50 machine drills. Electric power is used for practically thing except hoisting. There are about 20 buildings, which include the sintering plant, 2 engine rooms, change-house, boiler-room, concentrator, tion plant, carpenter, machine and electric shops, sampling mill, laboratory, office building. The smelter building contains one 600-ton blast-furnace 300-ton furnace with 3 basic-lined converters. The sintering plant contains 42" Dwight-Lloyd machine. Concentrator is equipped with crushers, jigs, etc., and flotation plant is equipped with tube-mills and Janney machines. capacity of concentrator is 600 tons and of flotation plant 800 tons, the tional capacity of flotation plant to be used in reworking tailings, of 123,520 tons were treated in 1918, carrying 0.7 lb. copper per ton, at co $1.29 per ton.

The Pittsmont reduction plant is the only operating smelter in Butte does a considerable amount of custom business, treating ore from several dependent mines, including Davis-Daly. About 350 men employed on su

Production: normally, the daily output of ore is 900 tons.

	1918	1917	1916	1915	
East Butte ore tr., tons.	178,948	181,904	256,196	146,083	
Average copper, per cent.	4.25	4.31	3.67	4.28	
Custom ore treated, tons.	83,038	30,851	79,861	34,980	
Copper yield, lb.....	24,599,890	20,013,900	18,340,713	12,542,058	9,1
Silver, ounces.....	776,818	581,190	556,542	318,124	
Gold, ounces.....	1,419	1,825	3,844	2,696	
Cost per lb. copper, cents	19.71	17.70	16.89	....	

Copper production for 1919 was 20,000,000 lb., a decrease due to a conditions.

Management gives out little information about its work, but deve seem to be favorable and dividends should be resumed soon. The reve custom smelting helps swell profits considerably. Company has also lands in Kansas, Texas and Wyoming, which are said to be productive

EAST BUTTE EXTENSION COPPER MINING CO.

Office: 113 Hamilton St., Butte, Mont

as. J. Schatzlein, pres.; Philip A. Breen, v. p; Frank H. gen. mgr.; Dr. C. E. Blackburn, treas., with Chas. N. Joyce, Munroe, engr.

), 1906, in Arizona. **Cap.**, $1,000,000; shares $1 par; issued, October 1, 1906, a 1% dividend, amounting to $2,486. Stock xchange.

arious fractional claims, 4 acres, lying between the Bel- ia and Ground Squirrel mines of the Anaconda developed by 6 e 250′ two-compartment No. 6 shaft, begun 1909, with about

The Westlake and Wall mines are said to have produced, nership, about $300,000 worth of ore. The two-compartment ′ deep, and the 200′ No. 2 shaft shows ore assaying up to 13% silver per ton. No. 3, 1,040′, known as the Westlake, has a plant.

ients of 40 tons daily, with net smelter returns of $37,360, ny a net royalty of $12,881.83 in 1917. Company also owns a nterest in the Centerville claim, and interests as follows; one- leven-sixteenths in Little Evelyn; one-sixth in Valley Forge; ty; one-fourth in Simon; one-eighth in Eureka First; three- raction, and three-fortieths in Katy T.

ting in 1916 shipped several carloads of 8% copper ore from st Butte Extension is reported to receive 15% royalty on all o recent returns available.

INING CO. **MONTANA**

ee Kelley, sec. and gen. mgr., Deer Lodge, Mont.

Conlin, pres.; Tobias Schurtz, treas.; with J. E. Neville, . Wilson, directors.

1913, in Montana. **Cap.**, $800,000; $1 par; assessable; d.

aims, 1 patented, 20 acres, 10 miles S. E. of Deer Lodge, 17 miles N. of Butte, Mont. Claims show small stringers of face, which at depth of 40′ are reported to assay from 4-7% nd 7-14 oz. silver per ton.

by 100′ shaft. Shipped 15 tons of ore in 1915 netting $30 returns.

NING CO. **MONTANA**

Bldg., Butte, Mont.

A. Clark, Jr., pres. and gen. mgr.; W. A. Clark, v. p., ngam, sec.-treas.; J. C. Pyle, cons. engr.; R. J. White, mine

p., $100,000; shares $10 par. Statements filed with As- w county for years ending May 31:

re	Value	Expenditure				Net
ıs	per Ton	Mining	Const.	Trans.	Reduct.	Profit
30	$18.20	$1,105,363		$351,338	$871,588	$43,790
36	22.65	846,568	199,439	492,375	1,563,745	867,333
52	18.52	1,011,537	18,029	408,823	1,783,352	495,751

pany owns the Elm Orlu mine adjoining the Butte & and the Badger State mine of the Anaconda Copper Co. n of the Butte district. The Poser claim is owned by a

Elm Orlu covers part of the Rainbow lode and several ıg large bodies of copper ore and immense bodies of zinc as chalcocite both in secondary fault veins and in veins of nd also as chalcopyrite mixed with zinc ore.

by 2,200′ shaft and several miles of workings, principally

velopment during 1919 was the opening of the Northwestern It carries copper, and the apex is below depth of 2,000′.

Litigation: in 1916, Elm Orlu, through its controlling company, Clark Montana Realty Co., began suit against the Butte & Superior Mi Co., which had been mining ore beneath the Elm Orlu claim. The history o controversy ended 1919, is as follows:

The U. S. District Court, in 1917, decided in favor of the Elm Orlu, g the company the westernmost 301' along the Rainbow lode, west of the where it enters the Black Rock claim (B. & S.); subject, however, to the Orlu prior rights to the Pyle strand below its junction with the Rainbow.

The B. & S. appealed to the Circuit Court of Appeals, which affirmed decision of the District Court and gave judgment for $177,707 against the Superior Co. On appeal to the U. S. Supreme Court the decision of the C Court of Appeals was confirmed. The geologic features of this case were illustrated by R. M. Searles, in Mining & Scientific Press of May 10, 191

A collateral feature of the case involved orebodies in the Black Rock 550 ft. eastward of the point above noted.

The case was settled by payment of $2,500,000 to the Elm Orlu. Elm gets 1/3 and B. & S. 2/3 of the disputed area, while Elm Orlu takes 180 tional eastward on the Rainbow vein below the 1,200' and the B. & S. thr tion above 1,200'. The Jersey Blue vein of the new plane below 1,300' als to Elm Orlu. Each side paid its own costs.

Litigation with the Anaconda company concerning part of the Em in the Pilot-Butte mine is the next apex suit of Elm Orlu.

Equipment: is exceptionally complete and recent additions includ trically-driven hoist with 2 drums 10' diameter by 8' face, designed to wind of rope at a speed of 2,500' per min. The motor is of 1,800-h. p., operat conjunction with a motor-generator flywheel set.

The output of the mine is treated in the mill of the Timber Butte M Co. (which see), also owned by Senator and W. A. Clark, Jr.; zinc concen go to the National Zinc Co.'s plants at Bartlesville, Okla., and Springfie Copper ore is shipped direct to the Anaconda smelter, the mine yielding 50 to 100 tons a day when working full time.

Normally, 380 men are employed underground and 73 on surface, pro 730 tons of ore daily.

Timber Butte Milling Co.

Is the corporation owning the mill in which the ores of the various properties are concentrated.

Officers: W. A. Clark, Jr., pres. and gen. mgr.; W. A. Clark, v. p D. Mangam, sec.; J. K. Heslet and A. J. Johnston, directors; W. N. Ros supt.

Cap., 1,000 shares; $100 par. A close corporation.

The mill was erected to concentrate zinc ores of the Elm Orlu Capacity 750 to 1,000 tons daily. Process, gravity separation and fl Crushing is by rolls and Hardinge mills; separation by tables and Minerals ration flotation machines. Electric power is supplied by the Montana Co. Mill began operations about May 1, 1914. Recovery over 93% an centrates average 52% zinc.

GREAT BUTTE COPPER CO. MONT

(Successor of Butte & Bacorn Copper Co.)

Address: 53 Silver Bow Block, Butte, Mont.

Officers: F. W. Bacorn, pres.-mgr.; H. H. Robinson, sec.; Charles treas., with W. B. Schiller, C. W. Brown, Henry Fownes, R. C. Patterso Eisaman, and C. G. McIlvain, directors.

Inc. 1916, in Montana. **Cap.,** $1,000,000; shares $1 par; all outst non-assessable. The Great Butte took over the property of Butte & Bo July, 1916.

Property: 23 patented claims, one [illegible] of the Butte & S mine. Holds under option the Calume [illegible] and Jasper lode cl 46 acres.

Development: exploration is in p[illegible] Calumet shaft, w 2,000' deep with crosscuts and drifts at

making a praiseworthy attempt to develop commercial ore in the outskirts of the Butte district. See Butte and Bacorn Cop-III.

EXPLORATION CO. **MONTANA**

London Copper Dev. Co.

Rainbow Lode Development Co. When the Rainbow Lode o acquire the Butte & London property at Butte, Mont., several not practicable to recall a majority of the outstanding stock of d the Greendale Exploration Co. was organized to meet the property of the Butte & London was transferred to this com-Lode Dev. Co. receiving 51% of the stock in return for cer-work (see Rainbow Lode Dev. Co.); the remaining 49% is Dev. Co.

TING CO. **MONTANA**

Frank, sec., Daly Bank Bldg., Butte, Mont

ed Frank, pres. and gen. mgr.; C. W. Whitely, v. p.; with and E. L. Newhouse, Jr., directors; B. H. Grant, supt.

Delaware. **Cap.**, $100,000; $100 par.

perating the Butte-Duluth (which see) mine on E. side of and lease. In September, 1919, daily output to the Anaconda plant was 250 tons of 2% ore. Is a highly successful oper-ose head is a brilliantly successful financial engineer. What ondholders will have left, on expiration of the lease, is better

EXTENSION DEVELOPMENT CO. **MONTANA**

ad St., New York. **Mine office:** O'Rourke Estate Bldg.,

Bell, pres.; A. J. Ronaghan, sec.: with I. A. Heilbronner, David Angus and C. W. Peters, directors.

1908, in Maine. Cap., $1,500,000; shares $1 par; issued, onstruction of the North Butte Extension Mng. Co. A con-st of $800,000 was sold, March, 1910, to the Butte & Superior meeting in September.

ited by the Butte & Superior interests against the promoters e Extension Development Co. to recover shares of stock n illegally issued and a proposal to return 50,000 shares was by the company.

company's only present property is the Overman claim, the al claim of 2½ acres and the Clipper and Assay mill sites. by a 700′ shaft, planned to be deepened to 1,000′.

und on which the various North Butte Extension companies held only under options which were forfeited. The Occi-eloped by a long crosscut from the Butte & Superior shaft, rtance was found and after payments of $90,000 the claim uch of the original ground held by the company is now w Development and Butte & Superior companies.

e contract with the Butte & Superior, the latter company the 1,200′ level through the Four Johns claim and through the Overman claim belonging to the North Butte Extension ration E. of the 1,221′ crosscut of the Butte & Superior was ork was abandoned at the property.

MINING CO. **MONTANA**

Suite 3300, 120 Broadway, New York. Statutory office: Duluth, Minn. **Mine office:** 14 West Granite St.,

Joseph B. Cotton, v. p. and gen. coun-; Henry B. Paull, auditor; Norman B. Directors: Robert Linton, Francis DeC.

Sullivan, William D. Thornton, Joseph B. Cotton, William F. Bartholomew, C Ashley Tomlinson, Thomas F. Cole, Henry B. Paull and Frederic R. Kenned Transfer office: American Trust Co., Boston. Registrar: Old Colony Trust Co Boston. Stock is listed on Boston Stock Exchange.

Inc. April 5, 1905, in Minnesota. **Cap.**, $9,000,000; $75 par; 430,000 issue

Comparative General Balance Sheet—Years ending December 31:

Assets.

	Property	Granite Mtn. shaft	Invest.	Metals on hand	E. Side Devel.	Other Current	Total
1919....	$9,185,185	$172,275	$121,082	$2,688,328	$415,749	$189,990	$12,767,6
1918....	9,172,586	188,845	90,000	1,688,157	283,384	496,908	11,871,8
1917....	8,983,930	214,292	99,600	707,969	99,117	1,382,580	11,497,4
1916....	8,980,470	231,765	9,000	2,706,485	.....	738,317	12,722,3
1915....	8,986,265	256,945	9,000	1,569,643	.....	259,032	11,063,8
1914....	8,921,783	228,239	9,000	1,074,819	.....	88,357	10,322,1

Liabilities.

	Capital Stock	Current	Surplus Reserve	Total
1919.....	$6,450,000	$1,051,580	$5,265,092	$12,765,6
1918.....	6,450,000	720,194	4,701,684	11,871,8
1917.....	6,450,000	184,349	4,853,139	11,487,4
1916.....	6,450,000	984,575	5,287,018	12,721,5
1915.....	6,450,000	731,067	3,882,418	11,063,4
1914.....	6,450,000	731,027	3,141,771	10,322,1

Comparative Income Account.

	Revenue	Operating expenses	Net income	Dividends	Surplus	Reserve for deprec.	Total Surplus & reserves
1919.....		$6,450,000		$1,051,580	$5,265,092		$12,765,6
1918.....		6,450,000		720,194	4,701,684		11,871,8
1917.....	4,615,216	3,974,090	641,126	1,075,000	(d)433,874	1,387,869	4,853,1
1916.....	7,121,259	4,646,664	2,479,595	1,075,000	1,404,595	.....	5,287,0
1915.....	4,155,522	3,027,875	1,217,646	387,000	740,646	.....	3,882,4
1914.....	3,084,774	2,726,559	358,215	635,000	(d)276,785	.....	3,141,7
1918.....	5,182,674	3,744,897	1,437,777	820,000	617,777	.....	3,418,5

(d) Deficit.

Dividends: paid since organization of company per share: $1.25 1905; $7.25 in 1906; $6 in 1907; $3 in 1908; $4 in 1909; $1.10 in 1910; $1.2 1911; $1.70 in 1912; $2 in 1913; $1.50 in 1914; 90c in 1915; $2.50 in 1916; $2.5 1917, and $1 in 1918. Total, $35.90 per share, or $14,657,000.

Property: consists of two groups of claims, the Speculator group about 220 acres on Butte Hill, and the East Side or Sarsfield group, about acres. Also owns a smelter-site consisting of 2,216 acres, near Whitehall, water-rights about 18 miles from Butte, 8 miles from Anaconda, and near tracks of the C. M. & St. P. Railway and the Northern Pacific Railroad.

In order to give a more regular outline to the company's property and avoid controversies over extra-lateral rights, exchanges of acreage have been made between the North Butte and Anaconda companies and agreements have been made between the North Butte and Tuolumne companies covering the ownership and rights to certain parts of the Jessie vein. An undivided one-interest in the Granite Mountain claim was acquired from the Lewisohns, company to sink at its own expense the existing shaft from the 500' to the 2 level and make certain connections and explorations, the title to the shaft maining with the North Butte company. During 1912 and 1913 company chased by cash payments and 20,000 shares of the company's stock the undivided interests in the lode claims in the Butte East Side mineral area; and 1917 also purchased the property of the Butte-Monitor Tunnel Mining Co., sisting of 8 claims.

Eastside Group

Eastside Group: It is believed that these claims carry the easterly exte of numerous big ore-bearing veins operties contiguous to this The group lies about 2 miles east hill, and covers the mo slopes between the bed of Silver e Continental Divide adjacent to the A. C. M. Co.'s Tro Main Range Co. and

of the East Butte Co. Development work has been in progress
for the past two years, and includes a 900′ four-compartment
the Sarsfield claim at a point about 150′ east of the Continental
s level, over 1,500′ of cross-cutting has been done in two direc-
e the ground on both sides of the Continental fault.
uipment consists of a 125 h. p. electric hoist, compressor, and
ectric pumps of 600 gal. capacity, one on the 700′ and one on the

9 the company was preparing to work the Bertha claim on the
hip silicious ore to the Anaconda leaching plant.

Speculator Group.

itor Group, or Butte Hill property, is traversed by a number of
tly belonging to the Blue Vein series. These veins carry high-
oots, which have thus far been remarkably persistent in depth.
much primary chalcocite, frequently massive, with considerable
rgite and smaller proportions of other sulphides. All ores carry
values in gold. The veins are 'heavy,' requiring close attention
ith square-sets, monthly timber used being about 1,000,000′ board
ste is hoisted, all being used for dry-filling.
of the vein system has shown the necessity of thorough drifting
t considerable depth, and development on all levels down to the
l profitable orebodies.
l ore supply comes from the following veins, named in their
ce from the south boundary of the mine northward; Speculator,
th May, Gem, South Croesus, North Croesus, Snowball, and
. the Speculator, Adirondack, South Croesus, and Snowball be-
or Anaconda vein system; the others are well-known members
, or Northwest fault-vein series. The Edith May and Jessie
rincipal ore producers of the North Butte in the early opera-
pany.
y vein is opened on the 700 and 800′ levels, and at 200′ intervals
el to the 3,400′ level. The vein varies in width from 5 to 42′,
occurring above the 2,000′ level. A good body of ore has
ned on the 700′ level, where a width of 8½′ averages 3.6%
ance of 240′. Below the 700′ level the vein was of little value
el was reached, after which a marked improvement was noted.
es above the 2,000′ level were practically all first-class smelt-
ance of 1,000′. The 2,000′ level showed a slight decrease both
ngth of ore-shoots. At the 2,200′ level the vein splits into a
t-wall vein. Metal contents of the foot-wall vein are low be-
el, while the hanging-wall vein carries good ore on all levels
st level now opened. On the 3,200′ level, 5′ of ore has been
ance of 210′, the average assay being 4.3% copper. The 3,400′
has encountered ore of a similar character.
n ranks next to the Edith May in production. Where opened
in the Gem crosscut, the Jessie vein was 10′ wide and held
. The ore-shoot found on the 1,200 and 2,200′ levels was high
nearly 1,000′ long, changing in character below this depth and
le sphalerite in the drifts to the west. On the 2,200′ level the
ide, showing some ore up to 5% in copper tenor, but averaging
an the ore in the workings above. The west drift on the 2,000′
ore-shoot 6′ wide, carrying 6% copper and 7.5 oz. silver. The
low-grade ore only. The 2,600′ drift west showed 4′ of 3.5%
ed by a fault 15′ from the crosscut and not yet recovered;
ing east disclosed only small bunches of high-grade ore. On
vein where cut by a crosscut from the Granite Mountain
l width of 6′, with 3′ of ore assaying 11% copper and 10.0 oz.

[redacted]*in* is opened by drifts on all levels from the 1,600 to
[redacted]ge and important orebody. On the 1,800′ level the

ore-shoot is 8½′ wide, averaging 3% copper and 8 oz. silver per ton; on 2,000′ level it is 300′ long, averaging 10′ thick, 3% copper and 6 oz. si This shoot has been developed down to 2,200′, and on the 2,400′ level an shoot, 300′ east of the one just mentioned, shows 2′ of 3% ore with 7 oz. s per ton. This shoot has been opened on the 2,600′ level for a length of varying in width from 3 to 5′, and averaging 3.5% copper. The vein also tains considerable quantities of zinc ore, from which shipments have been from time to time.

The *South Croesus* vein has been mined from 1,600 to the 2,400′ level. the best showing at the 2,200′. Here two shoots are developed, one 2 length with an average width of 2′, the ore containing 5.5% copper and 3 silver per ton; the other, 240′ long, averaging 3½′ in width and assaying copper and 4 oz. silver per ton. On the 2,400′ level, a 3′ body of ore has driven on for 200′, averaging 2.5% copper.

The *Gem vein* showed no ore of commercial importance above the 1,600′ and the 1,800′ level had about 6′ of 4.5% ore. It is developed to a small e on the 1,800, 2,000, 2,600 and 2,800′ levels, both value and width increasing depth, the 2,800′ level showing 12′ of 5.3% ore carrying 2.2 oz. silver per The vein is irregular in size, and where developed has been broken by faults. The Adirondack vein, like the Gem, shows no commercial ore abov 1,600′ level, but has been mined from this horizon down to the 2,800′. O 2,400′ level the ore has been opened for 600′, varying in width from 2′ t and averaging 4% copper. On the 2,600′ level the shoot is over 200′ long, va in width from 4′ to 7′, and containing 3% copper. On the 2,800′ level there width of 4′, averaging 3% copper. About 500′ west on the 2,000′ level a shoot has recently been opened, a distance of 119′, showing an average wi 5′ of ore assaying 4% copper and 2.1 oz. silver.

The *Snowball* vein has characteristically high silver content. It was cut on the 1,800′ level in 1910, since which time it has been developed worked from the 1,400′ down to the 2,800′ level. The shoot varies in length about 800′ to over 2,000′. On the 2,200′ level it has been worked for a leng over 2,000′, of which 740′ averaged 5′ of ore assaying 8% copper. On the level the shoot is over 1,000′ in length, varying in width from 2 to 4′ and aging about 4% copper. On the 2,800′ level the vein has been exposed sh 265′ of ore 3′ wide assaying 4.3% copper and 7½ oz. silver per ton.

The *North Berlin* vein was opened in 1916 on the 2,200′ level. Since time this vein has been developed on all levels from the 1,800 to the 2,80 clusive. On the 1,800 and 2,000′ levels drifting exposed bunches of ore, but of commercial value. On 2,200′ level, an ore-shoot 500′ long and 4′ wid been developed, with an average assay of 5.5% copper and 11 oz. silver. O 2,400′ level the shoot now developed is 510′ long, of an average width of 3′ assays 4.2% copper and 5.5 oz. silver. On the 2,600′ level ore has been ex for a distance of 395 ft., having an average width of 3½′ and assaying copper and 3.8 oz. silver. The crosscut on the 2,800′ level has reached the which shows high-grade ore.

Development: is extensive, aggregating many miles of workings. development for 1918 amounted to 23,046′, compared with 12,175′ in 1917 21,694′ in 1916. The four-compartment Granite Mountain shaft, which principal working shaft, is 3,700′ deep, with levels opened at the 400, 600, 70 and at 200′ intervals down to and including the 3,600′ level. In 1915 a new trict hoist was installed at the Granite Mountain shaft, the largest electri driven hoist in America. It is capable of operating to a depth of 5,000′, ho 7 tons of ore, and making a round trip in about 2 minutes.

Following a serious fire at the Granite Mountain shaft in 1917, the wo fire-proofing this shaft was commenced and completed in January, 1918. work consisted of 1,500′ of concrete of monolithic construction, while the compartments of the upper part of the shaft were gunited (cement sprayed on).

The Speculator shaft, the other operating shaft, has been deepened to with levels at 200′ intervals, from and below the 1,400′ point, developing

. The Speculator shaft has a 128′ steel head-frame standing
crete foundation, equipped with self-dumping skips and pockets,
y of 1,500 tons of ore. No waste is hoisted, as it is used for
g.
e and 500′ Adirondack shafts are idle, and of no present value.
,200′ deep, is used for ventilation, and a connection has also
e Rainbow shaft on the 2,000′ level for purposes of ventilation.
as well as the Speculator, are provided with reversible fans.
ı of ventilation in the mine has been greatly improved, and
peratures prevail.
ide property, favorable developments were reported in August,
700′ level, which crosscut is being connected with the Main
e Tuolumne Copper Co. Four feet of the vein assays 4.5%
ient in October was yielding over 10 tons daily.
he main machinery plant and buildings are at the Specu-
engine-house has a 20-ton traveling crane, and a 32 by 72″
duplex-cylinder hoist, operating two cages, in counterbalance,
nberly skips swung under, and good for a depth of 3,500′. An
ylinder auxiliary hoist operates a double-deck cage in a third
handling men, material, and timber, and the shaft has a fourth
ıdders and pipes.
r-house has air-compressors with piston efficiency of 9,860′ of
. reduced to a pressure of 80 lb. per sq. in., capable of operat-
k-drills. Another large one was erected late in 1919. The
o 500 h. p. and five 100 h. p. boilers. Miscellaneous buildings
shop, smithy, carpenter shop, planing mill, and a plate-shop
. all thoroughly equipped.
1,550 men were employed in December, 1918. The North
d at the Washoe works of the Anaconda company under a
he company pays the smelter charges to Anaconda, and the
ed over to North Butte and sold by the United Metals Selling

Copper, lb.	Silver, oz.	Gold, oz.	Copper, per lb. Net Cost, c.	Copper, per lb. Sell. Price, c.
14,351,067	.....	....	.....	....
20,680,695	891,157	1,374	20.92	24.73
14,493,452	662,845	959	17.36	27.18
24,498,181	1,049,574	1,712	15.57	23.29
19,235,285	940,632	1,122	13.12	16.70
18,421,761	1,092,300	1,107	11.50	13.74
28,318,321	1,602,164	1,567	9.76	15.08
26,480,123	1,377,468	1,367	9.65	16.37
24,816,669	1,134,300	1,281	9.97	12.56
25,267,092	988,190	1,196	10.36	12.77

in 1916: 1,652 tons of ore for 412,953 lb. spelter.
rade of the ore mined is lower than that produced in the
ompany's operations, the total amount of copper now pro-
favorably with the record year. The high price of copper
to mine ore of a grade much lower than in previous years.
be mined in the future as long as the price of copper will
by so doing, the average grade of ore is obviously lowered
ıction raised.

IINING CO. **MONTANA**

ed. See Vol. XII.
19, it was reported that former shareholders might have to
Federal Government, alleged to be overdue as delinquent
tive levy from time of sale.

PITTSMONT COPPER CO. **MONTAN**

Controlled by East Butte Copper Co., which see.

Office: 1126 Farmers Bank Bldg., Pittsburgh, Pa. **Mine office:** Butt Mont.

Officers: R. H. Gross. pres.; J. H. Ree. v. p.; F. Ward Paine. se treas.; R. T. Rossell, asst. sec.-treas.; Oscar Rohn, gen. mgr., with Wm. Paine, directors.

Inc. April 21, 1906, in West Virginia, as Pittsburg & Western Copp Co., and changed name, Jan. 21, 1908, to present title. **Cap., $6,000,0** par value $5, divided into 1,000,000 shares common stock and 200,000 shares 6 cumulative preferred stock, all issued.

The East Butte Copper Co. owns $4,002,800 of the common and all the p ferred stock. $910,716 bonds outstanding December 31, 1916, were retir February, 1917. Annual meeting, first Monday in April, at Pittsburgh.

Company acquired the property of the Pittsburgh & Montana Copper under foreclosure proceedings, July, 1909, selling it to the East Butte Cop Mining Co., which agreed to purchase bonds enough of the Pittsmont Co Co., to fund its floating debt, aggregating at that time $2,300,000, and also agr until these bonds were fully paid for, to advance all funds necessary for deve ment and operation of the property and interest on the company's indebted In consideration of this agreement the Pittsmont Copper Co. contributed $4,0 000 of its common stock to the East Butte Copper Mining Co., the latter p chasing $1,000,000 of Pittsmont preferred stock and $110,000 of demand n issuing own stock therefor. This debt has now been paid off.

During 1918 East Butte paid Pittsmont $1,000,000 on account of rentals crued. The latter in turn purchased from the former its entire issue of 200 preferred shares, $5 par.

RAINBOW LODE DEVELOPMENT CO. **MONTA**

Office: 807 Lonsdale Bldg., Duluth, Minn. **Mine office:** 14 West Gra St., Butte, Mont.

Officers: Edward C. Congdon, pres.; G. A. Tomlinson, v. p.; Ja Wanless, sec.-treas., with Thomas F. Cole, Walter B. Congdon, directors.

Inc. Nov. 9, 1912, in Delaware. **Cap.,** $1,500,000; increased June 1, 1 from $800,000; shares $10 par, issued $800,000. **Bonds:** $400,000, 1st mort 5-year convertible 6% due June 1, 1920, convertible into stock at par, and $80 2nd mortgage authorized, $47,000 issued. Annual meeting, first Tuesda June.

Property: 10 claims, including the Third Sphinx, Michigander, Mo Valley Queen, Carn Brea, Sarah, Wedge, Hidden Treasure and Wanda cla with fractional interest in the Lone Star Claim. The group lies east of Butte & Superior property and is supposed to carry an extension of the R bow lode.

Equipment: at Rainbow shaft includes a 300-h. p. double drum h good for 2,500', 2 electric hoists, air compressors, combined capacity of 1,65 ft. per min., one 400 gals. and one 200 gals. pump, blacksmith shop, carpenter s change house and office.

During 1916 the company completed its Butte & London contract, and owns 51% of the Greendale Exploration Co. stock, which latter company o the Greendale Placer claim and the Six O'Clock claim immediately south. paid for this stock according to the contract by sinking the Butte & London s to 1,600' and crosscutting to the north and south boundaries of the Green Placer claim on the 1,500' level.

The crosscut at the 1,500' level of the Rainbow shaft was extended to north boundary and a few feet of drifting done from it along veins which l promising. The drainage drift on that level from the North Butte was c pleted.

While favorable indications of the possible proximity of ore shoots found, according to the statement of engineers familiar with Butte, no ore any commercial grade was discovered. The indications above mentioned sisted of quartz-filled veins of various dimensions and in several parts of

l Butte & London, open cuts gave trifling assays of gold, cop- vhere running over 8% zinc or 2% copper or an ounce or so of

complete the Butte & London contract, it was found necessary ney than was provided for in the first mortgage. Consequently, :age was authorized, and the amount outstanding on it, $47,000, two of the large stockholders so that the contract might be ıe Rainbow company get control of the Glendale placer claim. is now inactive, as it seemed best to await possible develop- hborhood of its property, which might renew the interest of the he company to an extent which would lead them to assist in financing.

ıpment has been disappointing in that no ore has been found 00' on the Rainbow group and 1,600' on the Greendale Placer s, the officers feel that still deeper development will reveal pay

)UNTAIN MINING CO. **MONTANA**

Security Bldg., St. Louis, Mo.

P. Meyer, pres.; Felix Coste, v. p.; E. C. Rowse, sec.

0; shares $1 par; $250,000 outstanding.

patented claims, 135 acres, in Park canyon, Silver Bow out 4 miles east of Butte, said to show fissure veins in granite, l, silver and copper. The Rocky Mountain claim is reported out 100' wide, supposedly the continuation of the Spread De- Main Range.

: by 1,500' of workings to depth of 400'. Tunnel said to ıssaying up to 7% with high silver value.

; tract for deep development by tunnel work, as the veins show ace.

ER CO. **MONTANA**

, August, 1915, to the Anaconda Copper Co., for $65,000, and d. Fully described in Vol. XI., Copper Handbook.

MINING CO. **MONTANA**

the Davis-Daly Copper Co., Butte, Mont., q. v.

E MINING CO. **MONTANA**

te, Mont. John G. Williams, M. E. Riley and Arthur at last accounts.

1906, in Minnesota. **Cap.**, $500,000; shares $100 par. Com- d by the Great Northern railway interests and has had much rious individuals and corporations, including the Butte Cen- ast Butte Mining Co., P. D. Morgan and others, winning prac- its. Property was leased to the Montana Consolidated Mining f particular value was developed, and the latter-named com- d.

ludes the Surprise placer claim, but company's chief asset l rights to a narrow strip along the Great Northern right- st accounts.

)PPER CO. **MONTANA**

Volume XIII. Company dissolved. See Tuolumne Copper ar Block, Butte, Mont.

)PPER MINING CO. **MONTANA**

e: Harbour Bldg., Butte, Mont.

Hickey, pres.; Wm. P. Jahn, v. p.; J. J. Harrington, sec.; reas.; Paul A. Gow, mgr.; Walter Harvey Weed, cons. engr. key, Wm. P. Jahn, Frank K. Wilson, Paul A. Gow, John Har- Canty, Charles R. Leonard.

)06, in Arizona. **Cap.**, $800,000; shares $1 par. Company , 1916, with capital of $2,500,000, shares $1 par; outstanding

1,960,015 shares. A bond issue of $500,000 6% convertible into stock at $2 share, was authorized December, 1919, Listed on Boston Stock Exchange a the New York Curb. State Street Trust Co., Boston, transfer office; Bea Trust Co., Boston, registrar. Annual meeting, second Monday in March. Butte, Mont.

Dividends: 45c per share in 1911, 20c per share in 1913.

History: company was formed to acquire and mine the Tuolumne cla which carries the Jessie vein. This and other veins were worked from 190 1918, to a depth of 2,680', with a production of 207,969 tons of ore yield 21,761,190 lb. copper, 658,194 oz. silver, averaging 5.25% copper and 3.1 silver. All work was stopped January 1, 1918, because increased cost of opera and declining grade of ore did not permit sufficient profit.

Following a reorganization of the company in 1916 the Main Range Colusa-Leonard Extension groups were taken over on very favorable deve ment contracts, and in 1918 all outstanding interests in these groups were quired and properties deeded to Tuolumne Copper Mining Co.

The Colusa-Leonard Extension group consists of 6 claims—the Ma Placer, Golden Hematite, Little McQueen, Undine, Snowbird Placer and Sy cate. The property, though practically undeveloped, has a two-compart shaft 1,200' deep. A connection has been made from this shaft to the M Range shaft on the 700' level. The property is well equipped, and during was unwatered and developed on the 1,200' level. The claims contain the w erly extension of the Spread Delight vein at depth, and the Sinbad vein traverses this tract.

The Main Range group consists of the 7 claims—Sinbad, Main Range Fr tion, Spread Delight, Tent Peg, Rory O'More, Kingstella, and Lillie. This pr erty has been partly developed from the Main Range shaft to the 1,200' level large orebody varying in width from 10 to 35' and 350' in length has been veloped in the Spread Delight vein on the 700 to 1,200' levels. Stoping op tions on orebody above the 800' level up to June 1, 1919, yielded 50,218 which contained 2,303,866 lb. of copper, 419,859 oz. of silver, and 382 oz. g yielding $491,144 in net smelter returns. During the year 1919 the Main Ra shaft was sunk to the 1,200' level and a large amount of development work on the vein on the 1,000' level.

Development: includes two 1,200' shafts, about 1,000' apart. The e ern or Main Range shaft has levels at 700, 800, 1,000 and 1,200' depth, with dr on the veins at each level. Considerable ore has been mined from above 800' level, mainly from the Spread Delight vein, the figures being given in accompanying table.

On the 800' level the vein was 110' thick and showed a 6-8' orestreak on wall which has not yet been developed. The main oreshoot in the middle the vein shows from 15-35' of ore which has been stoped out up to the 700' le

On the 1,000' level this vein is explored by a 590' drift and the ores was found to be leached and broken by faulting, the ore averaging 15 oz. silver 2% copper with a 6' band of 70 oz. ore on the sill floor.

On the 1,200' level the Spread Delight vein shows less quartz, and so as drifted on, shows all commercial ore.

In 1919 the company operations included 425' of shaft sinking, 1,931' crosscutting, 999' of drifting, besides station cutting and raises. Returns fr all ore mined above the 800' level, up to January 1, 1920, amounts to $577,4

In addition to the Spread Delight vein, four other large veins have been in this property, but they are as yet undeveloped. Shipments have been m from the Sinbad vein, which shows a width of 20', and the Rory O'More 40' wide, shows an ore-shoot 15' in width.

The Main Range mine is well equipped, the surface plant consisting of large double-drum electric hoist, 2,500 cu. ft. electrically-driven compressor, fra ing and carpenter shop with framer and saws electrically driven, blacksm shop, machine-shop, warehouse, boiler plant, change-house, office, 80' head-fra and ore-bins.

Main Range Mine.

Copper, lb.	Silver oz.	Gold, oz.	Average Copper, %	Average Silver, oz.	Average Gold. oz.
22,101	2,340.65	3.323	2.467	5.257	0.0074
424,894	101,519.58	88.810	1.972	9.422	0.0078
1,000,498	189,934.15	177.600	2.258	8.082	0.0075
1,110,286	215,529.00	199.400	2.094	8.128	0.0075

919 were interrupted by labor troubles. Production for 314 s, yielding net smelter returns of $217,796 or $8.215 per ton.
oldings of the company, embracing 13 claims in the Colusa- and Main Range groups, or a total of over 80 acres, are on on of the copper vein system of the Butte hill. The property Anaconda, East Butte, and North Butte, lies to the west of lt, and the extensions of the largest veins of the Butte hill n this property. Development has shown the existence of ood grade, and the policy of vigorous development that has company will, it is believed, result in making another large nd payer in the Butte district.

Butte Main Range Copper Mining Co.

Harrington, pres.; A. F. Rice, v. p.; Frank X. Giard,. er, sec., with M. C. Smetters, Lyman J. Roscow, Herbert M. ebaker, directors.
912, in Montana. Annual meeting second Monday in.

; shares $1 par; 38,140 outstanding.
ining property held by company consisting of 37 acres s been sold to Tuolumne Copper Mining Co. Assets of of 19,070 shares of the capital stock of Tuolumne Company.

olusa-Leonard Extension Copper Co.

roadway, Butte, Mont.
. McDowell, pres.; Guy W. Stapleton, v. p.; W. E. Rey- ienzberger, treas., with Jacob Kaufman, directors.
rizona. **Cap.**, $5,000,000; shares $5 par; 957,028 shares.

operty formerly held by company consisting of 43 acres nsferred to Syndicate Copper Co. for stock of latter com- npany stock was sold to Tuolumne Copper Mining Co. for capital stock. 213,229 shares of block of Tuolumne stock een distributed to stockholders of the Colusa-Leonard Ex- and the balance of 26,028 shares, which now constitute the mpany have been deposited in the First National Bank of distribution to the holders of 104,112 shares of Colusa- ock who have not yet participated in the distribution of the

Syndicate Copper Mining Co.

stock was acquired in 1918 by the Tuolumne Copper Mining ting of 42 acres in the Butte district were transferred to the l the Syndicate Copper Co. was dissolved in January, 1919.

MONTANA

Murray, owner, Butte, Mont.
ns, 79 acres, 2 miles S. W. of business center of Butte, the Gagnon, Bettie and other producing mines of the Ana- mined by W. H. Weed.
l by the strong outcrop of the Emma or Ancient vein, 80 to ging by its geologic and other features, should contain as s as the Rainbow lode. The eastern claims of property characteristics observed on the eastern end of Butte & e country rocks are granite and aplite. Silver-bearing zinc

Development: the Brittania claim has a shaft 400′ deep, with tempor hoist and other machinery.

Property is considered one of much promise.

UNITED STATES MANGANESE CORPORATION MONTA

Offices: 27 State St., Boston, Mass.; Montana Bldg., Helena, Mo and 832 Colorado St., Butte, Mont.

Officers: Austin M. Pinkham, pres.; Ellery C. Wright, v. p.; C. Phi treas.; James Quinn, sec. Directors: Frank Eichelberger, Carl J. Trauer Harold G. Gallagher, Charles E. Fryberger and Brig.-Gen. Henry M. Pe Board of managers: Frank Eichelberger and Charles E. Fryberger, mng. e Helena, Mont., and Carl J. Trauerman, mng. engr., Butte, Mont. Transfer a and registrar, U. S. Corporation Co., 65 Cedar St., New York.

Inc. May 17, 1918, in Delaware. **Cap.,** $7,000,000; shares $10 par: c sisting of 1,000,000 8% preferred, non-cumulative, participating, and 600,000 c mon shares: 40,000 preferred and 500,000 common outstanding. Of the l 250,000 shares were set aside for acquiring the 2,500,000 shares (par $1) Butte Detroit Copper & Zinc Co. Butte Detroit shares were exchanged at in U. S. Manganese on a payment of 10 cents cash., i. e., Butte Detroit ho had to turn in 10 shares and $1 in cash to obtain one share of U. S. Mang common stock, thus paying $250,000 cash to convert their stock into that of Manganese.

Dividends: 2% was paid April 27, 1919; and 2% July 27, 1919, 8% cumulative stock.

Business: this is a honding company ostensibly organized to ac and develop manganese properties and treat ores of same. Before the p of company could be fully completed, the armistice was signed and it had to up its manganese projects. It is at present examining and acquiring merito precious-metal properties. It holds 50% of the stock of the Liverpool S Mines Co., 51% of that of the Monarch Mining & Power Co., all of the s and 55% of the bonds of the New York-Montana Testing & Engineering 51% of Butte-Detroit Copper & Zinc Mining Co., and 66 2/3 of $300,000 issue of the Butte Central Mining & Milling Co., all of which are sepa described. The outstanding shares of the U. S. Manganese Corporation in the stock necessary to complete conversion of the Butte-Detroit Copper & Mining Co. shares.

Company will, it is said, endeavor to develop the field for high-grade ganese ore for dry batteries and chemical uses, a product commandin prices in a domestic market, consuming 25,000 tons annually.

Property: in taking over the Butte-Detroit, the U. S. Manganes the Ophir mine, which had been extensively opened to depth of 1,100′, sh considerable zinc and manganese ore. (For details of development, se XIII). The Butte Central M. & M. Co., the operating company for Butt troit, had an old judgment against it, and late in 1918 the Ophir mine a on which U. S. Manganese depended for its output of manganese, was sold Anaconda company for $57,000 at public auction. By law, the owners Ophir were allowed a year for redemption of the mine. According to the son Company, of Boston, which is promoting this bunch of interlocking panies, the Ophir mine contains 1,000,000 tons of black manganese, and manganese ore. The Butte-Detroit mill is reported to be capable of crush tons of ore and concentrating 250 tons daily. Crude ore carries 30% Mn. concentrate 50%. On a delivery of 100 tons daily at Chicago "a net pro $1,570" was expected, basis of manganese at $1.20 per unit ($60 per ton).

In January, 1919, it was announced that U. S. Manganese had a contra the output of the Valley Forge mine in Montana, and the Monarch mine near liston, Powell county, Montana, 25 miles from Helena. A mill is being at the latter. The company's plans are ambitious, but———

NEVADA

Nevada are not confined to a few districts as in many other
n all parts of the commonwealth. The descriptions of mining
refore, arranged alphabetically, excepting those of the chief
z.: Goldfield, Tonopah, Rochester, Ely and the newer camps
Divide districts. A nearly complete roster is presented of the
se two districts, so that the reader may readily find out what
ng the many companies, many of them "wild cats," organized
claims in these districts.
itinues to be a great silver producer and its total output of
than that of the white metal. In 1918, the output of the mines
alued at $48,528,124, and mining companies paid $8,000,000 in
of the gross value. The 1919 output was but $23,634,000, a de-
he 1919 gold output was $4,718,000, compared with $6,619,937
silver production 7,177,000 ounces, compared with 10,000,599
output figures being 4,927,000 and 6,686,152, respectively.

& M. CO. **NEVADA**

Arkell, mgr., Reno, Nev.
the Wedekind district, a few miles from Reno, Washoe
is said to be well financed, and is sinking a shaft to open a

OVEMENT CO. **NEVADA**

302, No. 65 Second St., San Francisco, Cal.
an Winkle mine, at Lone Mountain, Elko county, Nev., to
ning Co., in March, 1916. Property produced $13,813 net to
ent Co., making a total of $42,000 to date.
rns.

ER CO. **NEVADA**

ningstar, Lyon county, Nev.
E. Lutz, pres., treas. and gen. mgr.
1907, in Nevada. **Cap.**, $200,000; shares 10c par; non-as-
neeting, first Tuesday in November.
acres, with 400 acres miscellaneous lands, giving total
res, 3 miles from a railroad, in the Buckskin district, show-
ying nickeliferous malachite and melaconite, estimated by
age 3.5% copper, 2% nickel, 0.2 oz. silver and $2 gold per ton.
includes 5 shafts, of 30', 37', 54' and 253' and 8 tunnels
, with total underground workings of 1,400'.
ncludes a 15-h. p. gasoline hoist, good for 800' depth.

G & MILLING CO. **NEVADA**

own, Mont.
irectors: Albert J. Heinecke, pres.; Dave Trepp, v. p.-
d, Nev.; E. G. Ivins, sec.
9, in Montana. **Cap.**, $500,000; shares 10c par; 2,650,000

old McNamara mine located in 1880, consisting of 1
n N. slope of Palmetto Mountains, Esmeralda county, about
r Peak.
occurs in a contact vein between limestone and granite,
content being 4.28 oz. silver and from 5 to 50% lead. Four
ped in 1918 returned $70 per ton.
by several tunnels and 225' shaft, with a total of 2,000'
25' level 10' of 5 oz. silver ore was opened in 1919.
sinking to 400' level and installing power equipment in 1920.
Mark Bradshaw and J. E. Spurr.

NEVADA

Mining Co., which see.

ALTA SILVER MINING CO. NEVA

Address: 1026 Mills Bldg., San Francisco, Cal.

Directors: Geo. S. Sturges, Edw. B. Sturges, R. B. Worthington a Chas. H. Seoy. Geo. S. Sturges, Nevada agent.

Outstanding stock, September, 1917, 78,383 shares. A 3c assessment ca in 1916. Assessments levied have furnished necessary capital for repairs and development work. Listed on New York Curb.

Property: in Gold Hill section of the Comstock, Storey county, Nev.

Development: old workings and 1,150′ shaft said to show gold-silv lead ore. Drainage connection is made with the Sutro tunnel at 1,100′ le Idle because owners are developing other mining enterprises, which require available capital.

AMALGAMATED PIOCHE MINES & SMELTERS CORP. NEVA

Office: 63 William St., New York. **Mine office:** Pioche, Nev.

Officers: H. R. Van Wagenen, pres.; Wm. B. Randall, v. p.; E. Snow, sec.-treas.; Wm. F. Roberts, asst. sec.-treas.; H. S. Van Wagenen, su at last accounts.

Inc. July 27, 1911, in Maine, to take over the properties of the Neva Utah, Prince Cons., Ohio-Kentucky, and Pioche Cons. companies. It is the op ating company of the Cons. Nev.-Utah Corp.; property is described under t title.

Cap., $1,000,000; shares $1 par.

Operates the Pioche Pacific R. R. and Pioche Water Works, and deri income from lease on the Panaca claim granted the Combined Metals, Inc., wh see. In September, 1919, Tom McCormac started suit against company $13,100 damages, alleging that after he had shipped 297 tons of ore the comp refused to lease mine to him, as promised.

AMERICAN MINING & EXPLORATION CO. NEVA

Office: Imlay, Nev.

Officers: M. J. Finnegan, pres.; Geo. H. Morgan, v. p.; E. A. Vail, se B. F. Bauer, treas.; H. E. Clement, gen. mgr.

Inc. Aug. 1917, in Utah. **Cap.,** $1,500,000; $1 par.

Property: the Imlay mine, 29 claims and 2 mill sites; also operating Rye Patch mine, owned by the Rye Patch Mines Co., near Imlay, Humb county, Nev. The latter is an old time producer, formerly held by the Ec interests of Ogden and credited with production of $16,000,000 in silver.

Ore: contains gold and silver and occurs in fissure veins and in Rye Patch as bedding plane deposits in limestone.

Development: by 200′ vertical shaft on the Imlay and 1,200′ tunnel the Rye Patch.

Equipment: includes 25-h. p. gasoline hoist, oil-compressor, 100- pump and 50-ton dismantled Imlay mill.

AMERICAN PROSPECTING CLUB NEVA

Address: J. B. Kendall, Goldfield, Nev.

Board of governors: Warren R. Porter, A. G. Raycraft, Louis O'N H. W. Huskey, W. C. Ralston, J. B. Kendall, and L. O'Neill.

Inc. 1919, in Nevada. **Cap.,** 10,000 units of $100 each.

Company organized to finance and outfit prospecting parties to examine prospect promising properties in various parts of Nevada. It is proposed t prospectors the regular wage of the district and give a bonus for discovery. Club will also acquire and develop leases in proven areas.

AMERICAN STANDARD COALITION M. CO. NEVA

Address: Lorin Hall, Salt Lake City, Utah.

Property: controlled by the above, with Willard and John W. So croft, of Ogden, Utah, is at Schellbourne, 40 miles N. of Ely, White Pine co A 60′ vein carrying silver has been traced for 600′ on surface. Develop tunnel and some rich ore sacked in 1919.

ANDES SILVER MINING CO. NEVA

Office: 381 Bush St., San Francisco, Cal.; and Virginia City, Nev.

Officers: H. Zadig, pres.; Wm. Bannan, v. p.; J. W. Twiggs, sec.-

nk, treas.; W. W. Turney, Wm. Bannan and W. H. Moise, ligginson, supt.
1873, in California. **Cap.**, authorized and outstanding, par; assessable. Assessment No. 86 levied in 1916. Regis-., San Francisco, registrar. Annual meeting, December 20th, Stock is listed on New York Curb and San Francisco Ex-

aims, patented, 22 acres, in the Virginia mining district, y county, Nev.
rating and producing, but details are lacking.

OUP **NEVADA**

W. Trankle, Yerington, Nev. Includes 23 unpatented claims, kskin Range, Douglas county, 16 miles from Yerington.
re-bearing formation is a monzonite belt 4,200′ wide, ex-lip 47° to east, for 1½ miles, with diorite on the west and This monzonite is highly altered, showing strong kaoliniza-on to depth of 150 feet, deepest working. Surface shows nates throughout length and breadth, with small streaks of near footwall side. Water encountered in lower workings content.
a promising prospect. Has been examined by L. A. Wright, ichards, Fred Alsdorf, and W. H. Weed.

ING MINING CO. **NEVADA**

H. Fitch, pres.; Gust Holm, v. p.; John W. Geiger. , Utah; Allen C. Eakin, treas.; preceding officers, Edith B. bard and E. R. Reitsch, directors.
906, in Utah. **Cap.**, $300,000; shares $1 par; assessable; essments levied, amounting to 13c per share.
aims, partly patented, 15 miles from Humboldt House, eloped by 3 crosscut tunnels, each reaching the 2 principal

d. silver, copper, zinc and a little gold. The oreshoots -shale contact, one shoot carrying zinc sulphide, the other, ing gold and copper.
ludes 75-ton concentrating and flotation mill.
ing to lack of funds.

G MINE **NEVADA**

ated by J. M. Pine, Austin, Nev.
s S. of Austin, in Cottonwood canyon, Battle Mountain rked intermittently since 1871, and by present owner since

occurs in true fissure vein, filled with white and dark h stibnite and traceable for 900′ on the surface. Country silicious limestone, bluish-gray in color, with a little dis-ology fully described, U. S. G. S. Bull. 594, pp. 75-76.
y 250′ tunnel and 150′ shaft, reported to have opened pping ore. The commercial value of these antimony de-roved. Presumably idle.

LVER MINES CO. **NEVADA**

accounts, care J. H. Stallings, gen. mgr., 2176 S. 7 E. Utah. Directors: Judge A. J. Weber, Dr. O. W. French

ups, about 400 acres in Galena Canyon, near Battle nty, said to carry large deposits of milling ore averaging and high-grade antimony.
nsists of 1,500′ of workings, main tunnel being 350′

des 60-ton amalgamation and concentration mill. Pre-

ANTIMONY SYNDICATE NEVADA

Address: Mill City, Nev.

Property: the Black Warrior and Bloody Canyon antimony mines, claims, 40 acres, in Pershing county, Nev. The Black Warrior mine in the Buena Vista district is developed by several tunnels to depth of 150', with total workings amounting to 2,000'. Ore, partly oxide and partly sulphide, occurs in fissure veins in porphyry, with N. S. course and dip of about 80°. Equipment consists of 25-ton mill.

Output amounted to $92,500 in 1915, and $230,000 in 1916, the ore averaging 62% in 1915, and 40% in 1916. Production for 1917 amounted to 161¼ tons.

The Bloody Canyon mine in the Star district is developed by 2,500' of sinking to depth of 300'. See Pioneer Exploration Co.

ARCANE MINING CO. NEVADA

Idle.

Mine office: Pioche, Nev.

Officers: H. W. Rand, pres.; A. M. Cheney, v. p.; S. P. Kinney, sec.-treas.; preceding officers, Frank Holman, Frank Manning, directors. H. Freudenthal, res. agt. **Cap.**, $100,000; shares 10c par.

Property: five claims, adjoining the properties of the Ohio-Kentucky and Amal, Pioche, through which the Susan Duster lode of the Ohio-Kentucky extends, with 45° dip to the south. The ore from the lode on the O. K. property is said to have had an average assay value per ton of 7% lead, 20% zinc, 20 oz. silver and $2.50 in gold.

Development: 1,200' of underground work has been done. Company said to plan sinking a vertical double-compartment shaft to the 650' level, which depth it expects to cut the Susan Duster lode, 200' distant from the Arcane-O. K. line. The O. K. company is said to have followed the lode to the property line.

Equipment: power house, blacksmith shop, 40-h. p. gasoline engine and air-compressor.

ARGENTUM MINING CO. OF NEVADA NEVADA

Company inactive. Mines and mill under bond and lease to Candelaria Mines Co., which see.

Property: includes Northern Belle and Holmes Mines, in camp of Candelaria. Mineral county, Nev., 9 miles from Redlich, on Tonopah & Goldfield R. R. Fully described, Volume XIII.

ARIZONA EXTENSION SILVER MINES CO. NEVADA

Address: 265 Russ Bldg., Bush St., San Francisco, Calif.

Officers: (same as Arizona Silver Mines Co.), E. S. Van Dyck, pres.; F. W. Lockman, v. p.-supt.; C. D. Olney, sec.; M. E. Pratt, chief eng.

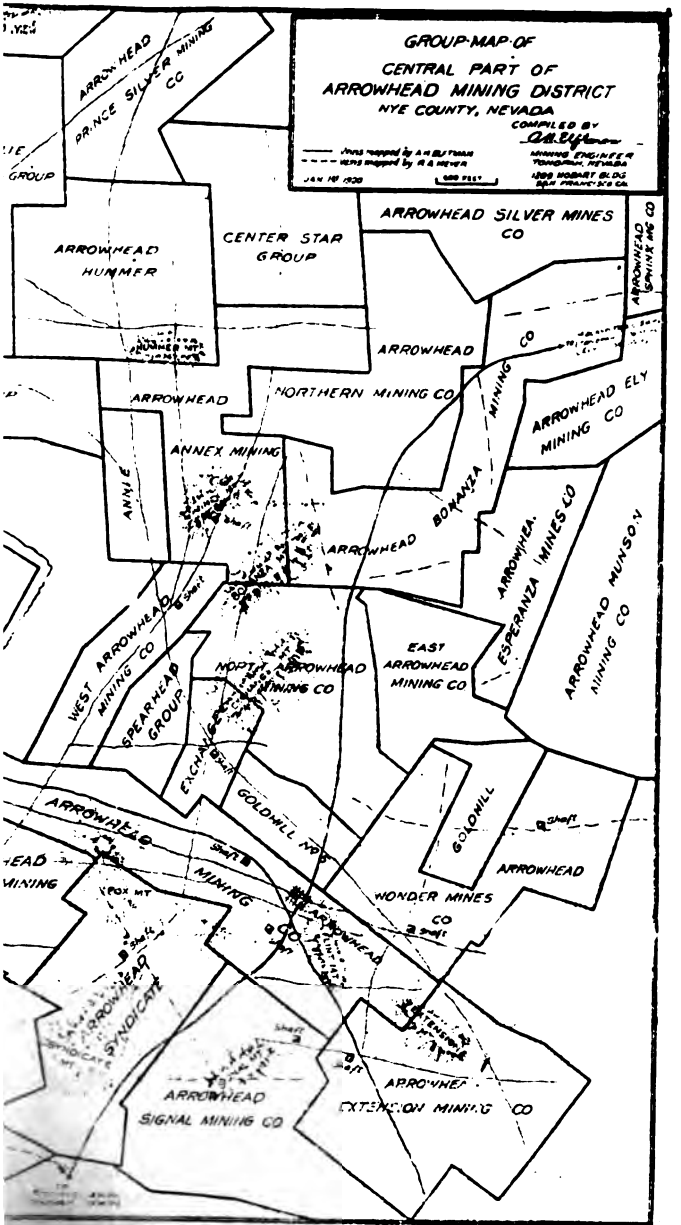
Inc. in 1919, in Nevada. **Cap.**, $1,000,000; $1 par. Listed on Boston Curb January 10, 1920.

Property: 8 claims and 3 fractions, 170 acres, between the Arizona Silver, Cons. Silver, Inc., and Silver Reef Mines Co., in Buena Vista district, near Unionville, Pershing county. Reported on by J. S. Coupal on December 1919. Ground was worked in the 60's and 70's and is said to have yielded $20 in silver.

Geology: flat bedded limestones between two rhyolite dikes, contain flat orebodies that are partly developed. A fault-fissure running N. W.-S. across the property also shows some good ore. Deposits are stated to be "blanket" and "fissure" types.

Development: includes merely a dozen short tunnels, three of them one blanket vein. An 80' shaft cut this same vein 300' from the outcrop, the total work on this orebody, assuming an average thickness of 12", is said to block out [illegible] tons of 12.1 oz. The "fissures" carry more gold than blanket.

The [illegible] looked for 200' below the Silver [illegible] than the other two properties. [illegible] publicity campaign, he published [illegible] son of Frenzied Finance [illegible]



'Y' MAP OF THE ARROWHEAD DISTRICT, NEVADA.

who is said to have sent two engineers to the mine and subsequently given Va Riper the choice of selling to him 1,010,000 shares of Arizona Extension f $505,000 or of taking 1,010,000 shares of the final company (Cons. Silver, Inc.) provided Van Riper gave to Lawson's final company a 60-day option on t remaining 990,000 shares at 50 cents each. Van Riper accepted this second of

Lawson Van Riper, and others, were arrested in March, 1920, for alle fraud in this and allied promotions.

ARIZONA SILVER MINES CO. NEVAD

Office: 265 Russ Bldg., San Francisco, Calif. **Mine office:** Unionvil Nevada.

Officers: Edw. S. Van Dyck, pres.-mgr.; F. W. Lockman, v. p.-sup Chas. D. Olney, sec.; M. E. Pratt, engr., with A. L. Holbrook and J. J. Lo directors.

Inc. April, 1919, in Nevada. **Cap.,** $1,000,000; shares $1 par; 108 issued; 550,000 shares in treasury. National Security Co., New York, tra agents. Annual meeting, first Monday in May.

Dividends: initial of 3c per share on Dec. 15, 1919.

Property: 8 claims, 2 patented, about 120 acres, in Buena Vista can Pershing county, near Unionville, includes the Arizona mine, credited wit gross production of $5,000,000 from 1868-1880.

Geology: of the district is fully described in U S. Geo. Sur. Bull Ransome. The ore occurs in a solid blanket vein in limestone, averaging thickness. About 5,000' of work has been done, almost all of it in ore and re by Chas. D. Wilkinson, engineer for the Goldfield Cons. Mng. Co., made gives an average assay of 27.3 oz. silver per ton, with 26,600 tons in sight, taining about 728,900 oz. silver.

Equipment: includes air-compressor, drills, mill of 35 tons daily pacity with flotation unit, in operation since March, 1919, and reported ma an extraction of 90%, the concentrates from 20 to 30 oz. ore averaging 15 silver per ton. Treated 1,231 tons in 1919, yielding $8,075.

ARROW MINING CO. NEVA

Reorganized in May, 1918, as the Southeastern Mining Co., which see.

ARROWHEAD ANNEX MINING CO. NEVA

Address: Divide Brokerage Co., Box 416, Tonopah, Nev.

Officers: J. M. Gilfoyle, pres.; B. D. Luce, v. p.; Pat Mooney, treas., with F. H. Connolly and A. G. Raycraft, directors.

Inc. 1919, in Nevada. **Cap.,** $150,000; 10c par; 100,000 shares offere 7 cents each.

Property: 4 claims, a short distance N. of the Arrowhead Mining ground. In 1919, a shaft was sunk and a hoist erected.

ARROWHEAD BONANZA MINING CO. NEVA

Address: Tonopah, Nev.

Property: in the Arrowhead district of Nye county.

ARROWHEAD CONSOLIDATED MINING CO. NEVA

Address: Ely, Nev.

Property: 1 mile S. of the Arrowhead Mining Co.'s ground. Inc tions are reported to be good, and by mid-November, 1919, a shaft was d 75' showing some ore. Shaft is being sunk 100' further. A head-frame an h. p. gasoline engine is used.

ARROWHEAD ESPERANZA MINES CO. NEVA

A company reported organized late in 1919 to develop claims in the ea part of the Arrowhead district.

ARROWHEAD EXTENSION MINING CO. NEVA

Office: 130 Main St., Tonopah, Nev.

Officers: J. B. Kendall, pres.; M. J. McVeigh, v. p.; H. B. Ches sec.; A. G. Raycraft, treas., with H. D. Budelman, directors.

Inc. 1919, in Nevada. **Cap.,** $150,000; shares 10c par; 100,000 sh offered for sale at 7½c each on October 18, but not to be released until a 100,000 was sold at 15c or hi

Property: about 100 unpatented ground adjoining the Ar

south and east. Surface showings "pronounced unusually us and reputable mining men." Assays yielded from $1.20 to per ton, the second and third sample being taken by W. H. B. Kendall, respectively. All reports furnished by company ic. A shaft down 50' by mid-December, said to be nearing the

MINING CO. **NEVADA**
P. Clendennin, Tonopah, Nev.
L. Johns, pres.; G. A. Gernick, v. p.; C. A. Blumen-Clendennin, treas., with J. D. Sloan, directors. Pete Fox,

19, in Nevada. **Cap.**, $150,000; 10c par.
aims in the new Needles district, 60 miles E. of Tonopah, miles S. of Twin Springs on the Lincoln Highway, between The general formation is andesite, and the ore is a silver similar to that of Tonopah. Examined in November, 1919,

919, a shaft was down 170', and has cut ore, and a winze evel cut 4' of $100 to $209 ore.

ILVER SIGNAL MINES **NEVADA**
', whose ground has good surface indications, is sinking a vein in the camp re-named Arrowhead district.

/ONDER MINES CO. **NEVADA**
. French, pres., 1865 Sacramento St., San Francisco, Cal. ims N. E. of the Arrowhead Mining Co. Early in 1920 k on two promising veins, one of which said to show 2' of 25 feet.

D MINING CO. **NEVADA**
. Oregon. Geo. D. Mathewson, lessee, or T. S. O'Brien,

orthwestern Humboldt county, 15 miles from Nevada- l to have 125,000 tons of $5 milling ore blocked out. Small ade in 1917-18. An old mine opened by 9 tunnels. A mill 1919.

GOLD MINING CO. **NEVADA**
11 Broadway, New York City.: **Mine office:** Atlanta,

McNamee, pres.; M. Justice, sec.; E. M. Bray, treas.; ot.
elaware. **Cap.**, $2,500,000; outstanding 500,000 shares. ized to take over the holdings of the Atlanta Cons. Gold

ims, patented, 180 acres, at Atlanta, Lincoln county, 47 ioche, show a contact deposit between porphyry and lime- average from $2 to $4.50 per ton in gold, and is 50' to 80' igth of 300' and depth of 200'. Ore reserves claimed to be

wo shafts sunk 300' apart, with drifts and crosscuts

udes a steam hoist and compressor.

CO. **NEVADA**
Box 791, Reno, Nev.
y Elffner, pres.-gen. mgr.; Chas. Madison, v. p.; P. Y. ith R. W. Stoddard and M. S. Gillson, directors. A. I.

Cap., $100,000; 10c par.
tented lode claims, in Mineral county, 5 miles S. E. of t rail point. According to Mr. D'Arcy, the ground l to 4' wide, in grano-porphyry. Veins contain high- . Two test shipments made to Western Ore Purchas-

ing Company ran $67.61 and $148.38 per ton, respectively, the gold conte averaging 1 ounce to each 20 ounces silver. Property is to be develop to prove extent of orebodies.

AURORA CONSOLIDATED MINES CO. NEVA

A subsidiary of the Goldfield Cons. Mines Co.

Office: Reno, Nev. **Mine office:** Aurora, Mineral county, Nev.

Officers: Geo. Wingfield, pres.; J. H. Miller, v. p.; with H. M. Ho Chas. E. Knox, E. A. Julian and F. M. Manson, directors.

Inc. in 1912, in Utah. **Cap.**, $100,000; shares 10c par; assessab 685,550 shares issued. June 30, 1914, 87% of the issued stock of the Aurora Co Mines Co. was sold to the Goldfield Cons. Mines Co. for $763,000, by Jesse Kni and associates.

Annual report for 1918 shows: Total earnings, $297,114; total operating penses, $386,103; operating loss, $83,988; deficit, Dec. 31, 1918, $305,548.

Property: at Aurora, is a group of claims in the Sierra gold belt, back Hawthorne, containing several old and well known mines, with gold qu veins in sheared andesite, slate, etc.

Development: 400′ vertical shaft, connecting with main working t nel, 4,500′ long.

Mill and cyanide plant: 40 stamps with daily capacity of 500 to weight of stamps 1,580 lb since dismantled.

Production: in 1916, 173,270 tons; in 1917, 175,447 tons; in 1918 (to S tember), 104,086 tons. Operations showed a loss of 65c per ton in 1918, against a loss of 10 cents in 1917, and a profit of 43 cents in 1916. Total duction for last five years amounted to 633,332 tons, yielding $1,842,482 cost of $1,856,624.

All operations ceased October, 1918, as company could not make a p owing to increasing high cost and low tenor of ore. The assets of the Au Cons. are to be liquidated and the proceeds applied on its indebtedness to Goldfield Cons., amounting to $457,500, December 31, 1918.

Mill sold, 1919, to Goldfield Dev. Co. and moved to Goldfield.

AURORA MINES CO. NEVA

Property sold and company out of business. Fully described, Vol. XIII

AUSTIN DAKOTA DEVELOPMENT CO. NEVA

Address: Valley City, North Dakota. **Mine office:** Austin, Nev.

Officers: C. E. Garvin, pres.; A. B. Cox, supt.-v. p.; with C. A. S man, H. R. Bruns, S. H. Nelson and T. Carter Griffith, directors. F. W. S berg, sec.-treas.; C. F. Littrell, supt. G. J. Babcock, cons. engr.

Cap., $1,500,000; shares $1 par; 1,200,000 shares issued.

Property: 800 acres in the Reese River mining district, at Austin, N der county, Nev. Ore is gold-silver in chlorite zone, in 2 parallel ledges, thick and cut by several mineralized dikes in granite. Workings for abo expose a quartz vein varying in thickness from 6 to 24″, and averaging $ per ton.

Development: by the X-Ray 2-compartment shaft, 330′ deep with of laterals; the O. K. incline shaft, 350′ deep, the 250′ Dalton shaft, sunk 6′ vein of milling ore and the 150′ Tesora shaft, sunk about 800′ from the Drifting on 300′ to reach the main or Dike vein, in April, 1919.

Equipment: pump, 80-h. p. hoist, ore bins, compressor, storehou stable. Construction of a mill was under consideration in August, 1919.

Production: reported to aggregate $1,000,000.

AUSTIN GOLDFIELD MINING CO. NEV

Owns the Watt mine, operated by H. Lemaire, under lease, at last

Property: on N. side of York canyon, Reese River distric der county, Ne

Deve with 3 levels. Vein in dark quartz containing te dip 25° to 45° N. E.

d of 1915 over $15,000 worth of ore shipped by lessees is said to
out $125 per ton, chiefly in silver.
includes a 25-h. p. gasoline hoist.

HATTAN CONS. MINING CO. **NEVADA**

Ianhattan Cons. Silver Mines.

HATTAN CONS. SILVER MINES **NEVADA**

he Austin Manhattan Cons. Min. Co., successor to the Man-
g. Co.
n. A. Marshall, res. agt., Austin, Nev.
Ianhattan company purchased the principal mining properties,
he early 60's and credited with a production of $19,000,000, in
ustin, Nev., in 1908, and started development work, but on too
nensurate with the limited money on hand. See Copper Hand-
l Bulletins 208 and 408, U. S. Geol. Survey. Result was a re-
1911, culminating in a public sale of the property 3 years later.
by one of the largest creditors, H. C. Fownes, German Nat'l
urgh, Pa., who organized the present company after expira-
tion period.
claims, 1,200 acres, 73 claims patented, in the Reese River
Austin, Lander county, shows in the Lander Hill section, a
fissure veins in granite, or quartz monzonite, N. W.-S. E.
50° N. E. Maximum width of veins is 6'. Ore, sulphide of
nticular shoots. Examined by A. W. Daw, of London.
6,000' tunnel, shafts and miles of crosscuts and drifts.
e ore blocked out. Workings were largely caved and inac-
ctober, 1919, W. A. Marshall had found rich ore and was
s. preparatory to resuming development work, and ore ex-

DA CONS. MINES CO. **NEVADA**

G. Richardson, Austin, Nev., pres.-gen. mgr.
a. **Cap., $3.000,000.**
stin-Nevada group on Lander hill section of Austin, Lan-

by over 3,000' of tunneling, including a new tunnel, 600'
50' further to cut the main vein, said to be 73' wide at surface
to $20 per ton in gold and silver. A compressor plant and
in 1919 and a mill is planned for 1920.

G CO. **NEVADA**

Berry, sec.-treas., Union Oil Bldg., Los Angeles, Calif.
Cole, pres.; S. E. Vermilyea, v. p.; with John Wood-
nter, directors; Dee W. Minier, supt., at last advice.
; shares issued, 700,000.
aims, 8 miles N. W. of Platina, Yellow Pine district,
ng a vein in limestone, containing zinc-silver ore, for 3,000'.
incline shaft which passed over the ore ,said to be 6' thick
th of 30'. Operated under lease by C. E. Cree in 1917.
lso developing a group of 9 claims about 1 mile below the
n the Cerro Gordo mining district, Inyo county, Calif, where
iven to reach the contact. No recent returns.

NG CO. **NEVADA**

. McFatridge, mgr.-sec.-treas., 941 W. 35th St., Los
e address: Goodsprings, Clark county, Nev.
Black, pres. and purch agt.; T. D. Knights, v. p.; pre-
Erwin, M. M. McFatridge and Samuel Yount, directors.
11, in Nevada. Cap., $1,000,000; $1 par; 60,769 issued.
ims 174 acres and a 3-acre smelter site, in the Yellow
26, 27, 34 in T. 24 S.; R. 57 E., 12 miles from Goodsprings
the Salt Lake Route. The mines adjoin the Boss mine
ey bought the Nevada Copper Realty property, February 7,

Geology: carries plumbojarosite, a very rare mineral, carrying gol and platinum (see U. S. Geol. Survey Bull., 620). Ores carry gold, silver, co per, lead, zinc and platinum, lowest assay at the Azurite copper mine said to \$3.60 gold, \$4.50 silver, 27% copper, .03 oz. platinum. Ores occur in replaceme orebodies of irregular size and shape, the largest 35x40' and 8 to 10' thick thick-bedded limestones cut by porphyry dikes.

Development: by 3,160' of workings, including several tunnels, estimate to block out 8,800 tons of 20% copper ore and 30% lead ore.

Shipments during 1914-'16 returned \$38,000. In 1918-'19 the mine w operated by lessees on a 15% royalty basis.

BAMBERGER EXPLORATION CO. NEVAD

Name changed in November, 1919, to Simon Bamberger Co., owns th Gusset Patch group at Pioche, Lincoln county, leased until February, 192 to Black Metals Mines, Inc., which see.

BATTLE MOUNTAIN MINES & DEVELOPMENT CO. NEVAD

Office: 617 Merritt Bldg., Los Angeles, Cal. **Mine office:** Battle Mou tain, Nev., F. E. Perry, manager.

Officers: M. H. Whittier, pres.; F. B. Sutton, sec. Is a close corpor tion and no details of organization are made public.

Property: 20 claims, 9 patented, in Lewis mining district, Land county, 16 miles south of Battle Mountain. Ore carries silver as stephani in shoots in quartz vein. Average value reported as 20 oz. silver and tra of gold and copper.

Development: by tunnels, from 700' to 4,670' long with a total 28,000' of underground work, said to have blocked out 50,000 tons of ore.

Equipment: included 200 h. p. Diesel engine, compressor and 125 t mill, with flotation unit.

No work done during past 2 years, and equipment to be sold and m leased.

BELCHER MINING CO. NEVAD

Merged with Jacket-Crown Point-Belcher Mines Co. (which see), Ma 10, 1915.

BELMONT BIG FOUR MNG. CO. NEVAD

Address: Carlin, Nev.

Officers: F. W. Spear, pres., P. O. Box 5, Santa Monica, Calif.; P Dairs, v. p.; A. A. Willison, sec.-treas.; with Geo. W. Jacobs and W Maul, Wm. Painter, directors. Frank Fagan, lessee, Carlin, Nev.

Inc. 1916, in Nevada. **Cap.,** \$125,000; 10c par; 800,000 shares o standing.

Property: 16 claims, 320 acres, 7 miles west of Belmont, Nye coun Claims show granite cut by a N. S. fissure vein, which is 20' wide, s dips at 30°. Molybdenite occurs disseminated through quartz and averag 2% MoS_2 besides silver and copper values.

Development: 150 and 400' tunnels. Mine operations were resum July, 1919, under 5-year lease to Frank Fagan on a 20% royalty basis.

BELMONT MILLING CO. NEVAD

Dissolved February, 1917, and all property and assets taken over by Tonopah Belmont Dev. Co., which see.

BEN EZRA COPPER & GOLD M. & S. CO. NEVAD

Address: Santa Paula, Calif., or Searchlight, Nev.

Officers: H. P. Balcom, pres.; J. L. Crane, v. p.; A. H. Stovall, se Wm. Mackenzie, treas.-mgr.; with Wm. Schiells, E. A. Chase, Chas. Be with and A. Everett, directors.

Inc. Sept. 3, 1909, in Nevada. **Cap.,** \$1,000,000; \$1 par; 883,000 outsta ing. Annual meeting 3rd Saturday in August.

Property: 15 claims, 10 patented, 300 acres in Nob Hill section of E dorado mining district, Clark county, 17 miles N. of Searchlight.

Ore: occurs in fissure vein and porphyry dike said to be 100 se wide. Values are mainly in silver, with some copper and gold averaging to \$20 per ton.

it: by 2,400′ of workings, including 660 and 500′ adits. A

)FORD-SMITH GROUP **NEVADA**
. I. D'Arcy, Goldfield, Nev. A. L. Bocherding, mgr.
i Nevada. Cap., $40,000. Is an association of 20 members.
lacer claims in Tule canyon. Esmeralda county, contain-
g gravel at a depth of 20′ with some $6 material at 7′.
worked by drifting.

[LVER MINING CO. **NEVADA**
L. Colburn, 341 Bush St., San Francisco, Cal.
i Nevada. **Cap.**, $150,000; $1 par.
l claims near Beowawe, Eureka county.
t: by 140 and 180′ shafts. From mid-1917 to Aug., 1919,
$85,000 worth of ore, with two cars ready at that date.

'NGSTEN MINES CO. **NEVADA**
na, Nev.
B. Spencer, pres.-mgr.; C. E. Noble, sec.; with F. J. Sie-

0; 10c par; assessable; 1,300,000 outstanding. Operating
3 amounted to $5,000.
claim, 20 acres, in the Gold Range mining district, Min-
iiles S. W. of Sodaville.
as scheelite in a quartz fissure vein in diorite, said to
ngsten. **Development:** by 200′ tunnel. **Ore reserves:** esti-
is of 2% tungsten ore.
ing to depth of 400′.

,EASING CO. **NEVADA**
Nev.
operty of the Big Casino Mining Co., under lease and
itle.

IINING CO. **NEVADA**
Widener Bldg., Philadelphia, Pa. **Mine office:** Search-

W. Johnson, pres.; H. C. Gibson, v. p.; Samuel Rosen-
relstein, treas., with John M. Sailer, J. H. Shinn, A. M.
D. Lewis, W. A. L. Barker and Geo. Flint, directors.
ps, mgr., 719 Drexel Bldg., Philadelphia, Pa.
1914, in Delaware. **Cap.**, $1,500,000; shares $1 par; non-
00 shares outstanding.
contiguous lode claims and 2 millsites, situated about
rchlight, Clark county. A zone of altered andesite cut-
iyry contains a fissure vein, 5′ wide, carrying gold, sil-
and zinc ore.
main shaft about 550′ deep, with 4 levels at 100′ inter-
)0′ of workings. Ore reserves are estimated at 5,000 tons
r ton.
ncludes compressor, hoist, pump and 50-ton mill with
unit, installed 1918, by the Big Casino Leasing Co.,
Casino property under lease and bond. The mill ran
week, June, 1919, owing to water shortage. Concentrate
? oz. gold; 14.1 oz. silver, 17.9% lead, 5.5% coppr, 19.4%

NS. MINES CO. **NEVADA**
Clarence and Frank Berry, 250 First St., San Francisco.
lan, supt.
Nevada. **Cap.**, $2,000,000.
sing Link, Rico, Jackson, and General Grant group, in
Elko county. **Ore:** carries gold in quartz in the Jack-
the Missing Link. A 15′ orebody proved for 250′ on

the 150′ level of the General Grant is said to assay as high as $105 p ton. Examined in August, 1919, by L. K. Kennedy, of San Francisco.

Development: 250′ shaft and drifts. Equipment installed April, 19 A cyanide mill is planned as an addition to 1920. Recent developments ported satisfactory.

BIG PINE MINING CO. NEVA

Idle. Formerly operated by Mushett and Wittenberg.

Property: Big Pine claim at Manhattan, Nye county, covering mineralized schist belt for 1,000′.

Development: the Mushett & Wittenberg 200′ vertical shaft, sunk from north end line of chain. Dimensions of the glory-hole show ore eq to 240,000 tons from surface to the 200′ level. South of the shaft the kno extent of the ore zone to the 200′ level is 400′ long and 60 to 75′ wide, eq to 370,000 tons.

Mill: equipped with a 5x20′ tube-mill, plates, classifiers, etc. He averaged $5.60, gold tailing 40c per ton. Tube-mill consumes 170 pebbles per day.

BILL NYE MINING CO. NEVA

Address: Goodsprings, Nev. W. E. Allen, pres.;

A report for the year ending December 31, 1918 showed: rece $2,121; cash on hand $1,476; expenses, $1,225.

Property: the Akron group in Goodsprings district, Clark county, ported held under 3-year lease from November, 1918, with an optio purchase at $40,000.

BI-METALLIC MINE NEVA

Idle. Owned by M. G. Bradshaw, Crown King, Yavapai county, A and P. A. Simon, Mina, Mineral county, Nev. Mine is located at C laria,, Columbus district, Mineral Co., Nev.

Property: 3 claims, 47 acres, unpatented, shows a vein in slate, co of vein is N. 5° W., dip 65°. Ore occurs in shoots and lenses, and is to average 28 oz. silver.

Development: 2 incline shafts, 280′ deep, equipped with gasoline h Mine was operated by leasors in 1917, who closed down in 1919, but ow plan resuming operations. Is a promising property.

BISCUIT MINING CO. NEVA

Property: in Cherry Creek district, White Pine county, an old ducer credited with a production of $1,000,000 in silver. Develope 1,100′ incline shaft.

The mine was reopened in 1919, together with various adjoining erties that have patiently waited for a return of high silver prices.

BLACK DIAMOND COPPER MINING CO. NEVA

Dead. Fully described Vol. XIII.

BLACK EAGLE MINING CO. NEVA

Henry Johnson, mgr., Rawhide, Nev.

Property: Black Eagle mine and mill at Rawhide, Mineral county said to show gold ore. Treating 50 tons daily at the mill at last re Presumably idle, 1918-'19.

BLACK METALS MINES, INC. NEVA

Main office: 516 Felt Bldg., Salt Lake City, Utah. **Mine office:** Nev.

Officers: W. F. Snyder, pres.; Chas. Read, v. p.; J. C. Jeans treas., with E. H. Snyder and H. H. Fields, directors. Geo. W. mgr.; Fritz Erickson, supt.

Inc. May 5, 1918, in Nevada. Cap. $ 640,000 shares outstanding. Stock listed Annual meeting 1st Tuesday in January.

Prope about 250 acres, 6 unpatent also Co., held

Exploration Co., held under a 5-year lease from February,

ne, formerly owned by the Day Bristol Cons. Mines Co. Vol. XI) and credited with a production of $2,000,000, was eral years ago because of threatened apex litigation with Exploration Co. (now the Simon Bamberger Co).
occurs in a replacement deposit of irregular dimensions mineralized area extending to depth of 900′. Values are with a little copper. The ore is desirable as a smelter

: about 2 miles of workings, including 600′ tunnel and

ncludes hoist, 50-h. p. oil engine, drills, and compressor. oping 50 tons daily in 1919, mainly from the 700′ level of Twenty men employed.

S MINING CO. **NEVADA**

old silver producer in Black Metal canyon, 3 miles N. in Cherry Creek district, White Pine county, reopened d under lease by F. W. Fletcher.
bout 800 tons during 1918.

ER EXTENSION MINING CO. **NEVADA**

odson & Carson, fiscal agents, 440 Gazette Bldg., Reno,

Carson, pres..; E. H. Abrams, v. p.; Marle Woodson, sec.-Finch and R. H. McIntosh, directors.
1920. 20,000 shares were offered at 5 cents each.
aims, 3½ miles N. of Reno, Washoe county, said to carry e Black Panther vein.

ER MINING CO. **NEVADA**

. Duborg, Reno, Nev.
. Duborg, pres.; B. M. Lewis, v. p.; Marle Woodson, sec.-arson and I. T. Weir, directors. Al Marsal, supt.
per-bearing claims 3½ miles N. of Reno, Washoe county. by 150′ shaft, to be sunk to 300′. Chalcocite was opened t 150′ the shaft was in andesite. Some 12% copper and 1.4 cut during sinking. Mine is equipped with an electric

INE **NEVADA**

ain St., Racine, Wis. Mine 6 miles east of Yerington, vately owned by Wm. D. Thompson, of Racine, Wis.
tented claims, 52 acres, in Mason district, Lyon county, sure veins in quartz-monzonite 2 of which of 6 to 10′ traceable 2,600′. Developed by shafts, 80′ and 120′ deep, la and chalcopyrite said to give returns averaging 6%-

s to be equipped and active work started in 1920.

SOLIDATED MINING CO. **NEVADA**

Rost, pres., Reno, Nev.
old Mexican mine at Ellsworth, Nye county, 11 miles nd 14 miles N. of the Simon mine. A large production rmer operations and dumps are said to contain 17,500 ore. Tailings are said to be worth treating again—the

500′ tunnel connecting with old shaft.

NING CO. **NEVADA**

H. Petty, mgr., Hilltop, Nev.
Dick mine at Hilltop, 20 miles S. E. of Battle Moun- reported to be shipping about 10 tons of 42 oz. silver 1918. An air-compressor and machine drills were

Shipments of fluxing ore also made to Mammoth smelter, Kenn Calif.

BLUE LIGHT COPPER CO. NEVA

Address: care C. W. Marsh, pres., Washington, D. C. **Mine o** Mina, Mineral county, Nev.

Officers: Henry L. Dollman, v. p.; F. M. Baker, Carson City, Ne sec.; Wm. C. Osborne, treas.; preceding officers, Chas. N. Van Cle Chas. E. Test and Richard Stegemeier, directors.

Inc. Oct., 1907, in Nevada, as successor of Blue-Light Mining **Cap.**, $2,500,000; shares $1 par; non-assessable.

Property: 14 miles from Mina, Mineral county, developed by 600′ sh from which several carloads of rich carbonate ore have been shipp Shaft reached sulphide zone in 1917, but workings have not yet pas through leached material. Mine is equipped with hoist, buildings, etc. amined by R. W. Hadden. No recent returns secured.

BLUESTONE MINING & SMELTING CO. NEVA

Office: 42 Broadway, New York City. **Mine office:** Mason, Nev.

Officers: D. M. Steindler, pres.; S. W. Cohen, v. p.-gen. mgr.; J. B. Woddell, C. D. Kaeding, and Sir M. B. Davis, directors. H Thompson, sec.-treas.; M. V. Summerhayes, supt.

Inc. May 18, 1917, under laws of Maine. **Cap.**, $2,000,000; $10 p 100,000 outstanding.

Property: 440 acres, 380 patented, including the Bluestone mine an group of 20 claims adjoining the Mason Valley mine in Lyon cou Formerly owned by the late J. D. DeLamar. The Bluestone is the ol property in the district, claims having been patented previous to 1890.

Geology: ore is mainly chalcopyrite, associated with considerable dote, in a garnet-limestone gangue, there being practically no oxidized o even at the outcrop. Ore is uniform in character, and after a light roa well adapted to magnetic separation. Drill-holes proved that ores ex to 750′ depth.

Development: mine has been opened to a depth of 540′ and has 2 m of workings, including a 1,300′ main haulage tunnel, cutting an ore-sh about 300′ wide and 500′ long at a point 300′ below the apex. This sh is said to carry an 80′ paystreak of high-grade ore, ranging up to 20% tenor, with balance of ore carrying 2.5% copper. Management estim 1,600,000 tons of ore in sight, averaging 2.6% copper, in 1917.

Equipment: includes a 50-h. p. hoist, 25-drill electric air-compres and 800-ton flotation plant, which supersedes the old magnetic plant. Company built 2½ miles of railroad from Mason to the mine in 1

Production: in 1919, up to time of stopping work, due to the ma monthly output was about 1,750,000 lb. of copper. Operations resu September, 1919, but suspended in March, 1920.

BLUSTER CONSOLIDATED MINING CO. NEVA

Address: Pavlak, Nev.

Officers: T. B. Beadle, pres. and gen. mgr.; Frank Benan, v. p.; H Rummel, sec.; J. D. Goodwin, treas.

Property: at Jarbridge, Elko county, shows gold ore in 7′ veins, to assay $10 to $40 per ton.

Ore reserves: management estimated 100,000 tons of milling ore, va at $12 per ton, blocked out and on dumps, January, 1915.

Equipment: 10-stamp mill, sawmill, aerial tramway, electric po Tailing were impounded for cyaniding at a later date. No recent in mation.

BONANZA MINING CO. NEVA

Mail returned 1919 from former mine office, Winnemucca, Hum county, Nev. Company was controlled by Chas. Baagoe and D. F. Shir at last accounts.

Property: 5 claims, 5 miles from Winnemucca, shows a contact fo

and proved for length of 115', between diorite-porphyry
d lime shale footwall. Development includes 3 shafts,
crosscuts, a tunnel driven east from No. 2 shaft, 37' deep
all in ore. Mine has no equipment.

ION MINING CO. **NEVADA**

E. Buys, gen. mgr., Goodsprings, Nev.
1914, in Nevada. **Cap.**, $1,000,000; $1 par; 558,500 issued.
6, company sold 100,000 shares, which were offered to the

claims, 60 acres, adjoining the Boss mine and between
\migo mines in the Yellow Pine mining district, Clark
ıims, whose a porphyry dike, whose mineralized contact
said to carry platinum gold ore, similar to that of the

by 40' shaft and 2 tunnels (250'). No recent returns.

INING CO. **NEVADA**

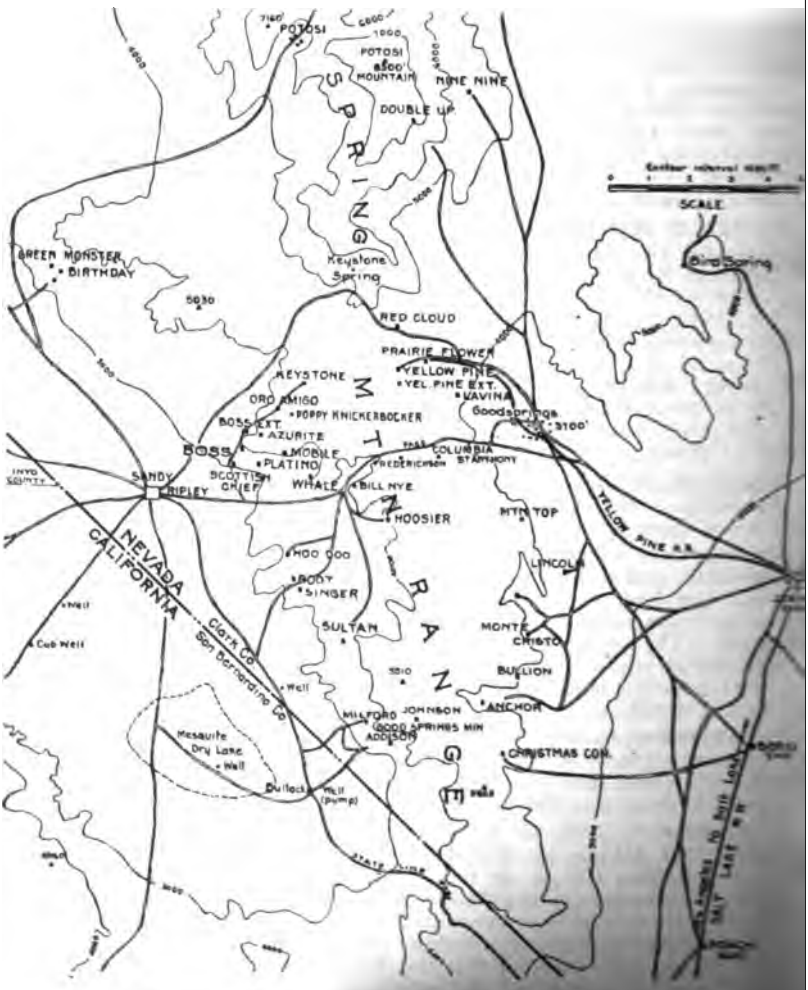
dsprings, Nev.
. Yount, pres.; O. J. Fisk, v. p.; Lane C. Gilliam, sec.-
N. K. Potter and F. J. Kent, directors.
Nevada. **Cap.**, $1,000,000; $1 par; 408,500 outstanding.
hird Wednesday in January.
ement January 1, 1918, showed cash in bank, $3,725; Li-
00; due from smelters, $1,149. Smelter returns: in 1916,
70,806; in 1918, $17,546. Revenue from January to June,
aled $15,327. In July there was $11,096 on deposit plus

170 in 1916; $32,680 in 1917; $20,425 in 1918.
aims, 85 acres, unpatented, 12 miles W. of Goodsprings,
'latina.
odies consist of oxidized copper ore, mostly chrysocolla
of gold-platinum-palladium ore in fine-grained silicious
- ores contain a small quantity of bismuth plumbojaro-
ulphate of iron and lead). The shoots can be mined
rebodies occupy a nearly vertical zone of fracturing in
ıta of dolomite. The zone is 30' wide on surface, 100'
metal shoots confined to the 12' resting on the footwall.
see 'Eng. & Min. Journ.' of August 20, 1919.
by tunnels and over 6,000' of workings. Reserves in one
W. L. Uglow, were 1,000 to 2,000 tons, averaging 3.46 oz.
0.70 oz. platinum, and 3.38 oz. palladium. During first
was 330' of work done.
1916, 451 tons copper ore and 295 tons platinum-bear-
tons of ore yielded 107 oz. platinum (0.24 oz. per ton), and
(0.9 oz. per ton); in 1918, 605 tons copper ore and 90 tons
ore, netting $6,040; in 1919, two cars of copper ore realized
s of platinum-palladium ore $22,365.
nill proved a failure, and the cost of handling the ore was
ın expected that the Palau Co. ceased operations early in
s since been dismantled.
ıagement has been prospecting for new orebodies during 1919,
ss to date.

: MINES CO. **NEVADA**

', Churchill county, Nev. Arthur Howe Carpenter, cons.
e., Crafton, Pa.
laims, 1,000 acres, also a 10-acre millsite and 160 acres
oyer, about 30 miles from Wonder, Nev., and 75 miles south
ıt Winnemucca, in the copper belt of the Piute mountains,
n Umacke, of Reno, Nev., at last accounts.

Geology: covers a mile of the western end of a contact between whitis andesite and an underlying greenstone, or andesite, which shows copper pyri peppering the rock. The ore bed has a dip of but 20° and a thickness of 1 and is much altered, the footwall being a hard, silicious band. The lower 3 carries 5% copper, but the orebody developed was figured by Prof. Carpent and A. H. Carpenter to assay 1.7% copper and about 70 cts. per ton in go



MAP OF SOUTH-EASTERN NEVADA, INCLUDING YELLOW PINE

High-grade ore occurs in small iron-[illegible] which porphyry and carry a breccia of [illegible] cement bornite.

Development: by [illegible] about 500′ of work [illegible] length, 100′ width [illegible] promising when [illegible]

SOLIDATED MINES & SMELTING CO. NEVADA

ginally owned 21 or more patented claims in the Bristol mining Lincoln Co., Nev. In 1911 practically all this property was e Day Bristol Cons. Mines Co. In 1914 the latter company rs' hands and the property passed to the Cons. California- h company was succeeded in 1915 by the Uvada Copper Co. ine was leased to the Black Metal Mines, Inc., which see.

LS MINING CO. NEVADA

l and Jos. H. Arthur, owners. Property in Broken Hills Fairview, Churchill county, 70 miles from rail.
sulphide in a 4' vein with streaks of high-grade ore, carrying l values.
: by 150' shaft, all in ore, with drifts on the 50, 100, and 150'

ment by owners since 1913, and reported to have shipped about ore to Hazen sampler. Small force employed.

INING CO. NEVADA

S. Shields, sec.-treas., 125 W. Broadway, Butte, Mont. t. Elko county, Nev. S. V. Kemper, pres.; W. A. Kemper,

Montana. **Cap.**, $500,000; shares $1 par; 213,000 shares

laims, 75 acres in the Contact district, with ore deposits contact between limestone and porphyry. This ore belt is is E.-W. for several thousand feet, dips at 75° and is said to with about 2 oz. silver and $1 gold per ton.
by 196' shaft with 600' of workings, said to have devel- ore. Idle for several years, awaiting the advent of railway, way. Equipped with 25 h. p. boiler, 15 h. p. gasoline engine

NES CO. NEVADA

v. Property shut down permanently, Feb., 1916. Plant **ess:** George Wingfield, owner Reno, Nev.

NDICATE NEVADA

. Bronson, 111 Broadway, N. Y. City.
roup of claims, 30 miles north of the Tonopah-Ely stage silver ore in a deposit in porphyry. Developed to depth of winze. Claims have abundant water and pine timber, and est of the Stone Cabin Valley.

'IONAL GOLD MINING CO. NEVADA

. Bell, National, Humboldt county, Nev.
he S. end of the National gold district, under develop-

LEY MINES CO. NEVADA

dock, Nev. John T. Reid, mgr.; O. P. Richards, supt.,

16, in Arizona. **Cap.**, $500,000; shares $1 par; 225,000

claims, 500 acres, about 18 miles S. of Volney. Ore vein in limestone is 1 to 25' wide with N. S. course, and ... 100' long and said to average $7.75 in

... reported to prove ore reserves of 25,000

... resumption of operations as soon as

CO NEVADA

... 61 S. Main St., Salt Lake

Officers: F. L. Copening, pres.; R. P. Morris, v. p.; A. O. Jacob... mgr., with H. W. Pingree and Willard Scowcroft, directors. M. C. Morris, ...
Stock assessable. Four 1-cent assessments levied in 1918.

Property: at Goodsprings, Clark county, 8 miles from rail.

Ore: occurs in ledges between white and blue lime on bedding pl... carrying lead and zinc, and about 10 oz. silver to the ton.

The mill was closed down September, 1917, and no ore shipments m... only development work being done; 8 men employed. Late in 1919 there ... change of control, and operations were to start at once.

BULLSHEAD MINING & SMELTING CO. NEVA...

Address: 221 I. O. O. F. Bldg., Reno, Nev., or P. O. Box 67, W... Nev.

Officers and directors: C. E. Mack, pres; Mrs. M. M. Johnson, ... treas.; L. E. Johnson, sec.; Herman Davis, mgr., Clover City, Nev.

Inc. Nov. 29, 1918, in Nevada. **Cap.**, $10,000; 1c par; assessable; 61... issued.

Property: the Bullshead mines, 10 claims, 4 patented, in Spruce M... mining district, Elko county, 16 miles from W. P. Ry., said to show lead-... ore in fissure vein in carboniferous limestone cut by igneous rocks. Ores a... 4.8% lead and 28.4 oz. silver. Waste dump samples average 3.1% lead, 15... silver per ton.

Development: by 1,900' Scorpion tunnel No. 2 and 4,200' of workin... Reserves were estimated Oct., 1919, at 10,000 tons, worth $600,000.

Equipment: complete; a 50-ton smelter commenced operations in N... 1919, using a fuel consisting of 60% mountain mahogany and 40% of ... The first campaign produced thirty-two 100-lb. pigs of lead-silver bullion, ... 8-hour shift.

Appears to be a meritorious promotion according to report of Herman D...

BURLINGTON-NEVADA COPPER CO. NEVA...

Idle. Property at Mason Pass, a few miles from Yerington, is develo... by a 100' shaft, from which ore was shipped to the Mason Valley smelter.

BUTTE & YERINGTON COPPER CO. NEVA...

Office: care W. E. Wright, sec.-treas., 410 Phoenix Bldg., Butte, M... Mine at Yerington, Lyon county, Nev.

Officers: at last accounts, were W. C. Siderfin, pres.; preceding ... Dr. Thos. B. Moore, Dr. Donald Campbell, John D. Pope, and Wm. M... directors; L. W. Trankle, supt.

Inc. Jan. 29, 1907, in Montana. **Cap.**, $1,000,000; shares $1 par ... paid; issued, $351,520. Annual meeting, third Wednesday in January.

Property: 2 groups of patented claims, one of 14 claims, about a ... east of and across the valley from Yerington and south of the Copper M... mine. The land has attractive surface showings, but is without deep ... ment work.

The second group of 9 claims, is in the heart of ... Mason Valley mine and the Yerington Malachite Co's ... is well located and has attractive showings of ... surface outcrops. It has been idle since 1914.

CACTUS CONSOLIDATED SILVER MI...

Address: J. B. Kendall, Goldfield, Ne...

Inc. Dec., 1919.

Property: the Cactus View claims ... the N. W. corner. Surface exposures are ... to $900 per ton. Work was to be started ...

CACTUS NEVADA SILVER MINES ...

Controlled by Jos. B. Nenzel, Roche... Sol Camp, mine supt.

Officers: Jos. B. Nenzel, pres.; F. M... zie, William Koenig, and E. O. Lindblom...

Inc. 1919.

Property: Bailey group of 7 claims, ...

nty, 24 miles east of Goldfield and 29 miles southeast of
rs in contact deposit of rhyolite and andesite, with the
rm. Several shallow shafts sunk by former owner show
ng and from 2½ to 6′ wide, said to average $25 per ton
with a little gold.
y 150′ shaft to be deepened to 500′; management also
work.
)19, it was announced that an Eastern syndicate, headed
d Albert H. Cutter of 149 Tremont Street, Boston, had
$280,000 for development and equipment of the property.
ficient work has been done to ensure a production of over
metals for each 100′ of depth gained, which is "going

'ER CO. **NEVADA**

l Broadway, New York. Mine near Luning, Mineral Co.,

Bronson, pres.; B. E. Page, Los Angeles, Calif., v. p.;
: H. A. Geisendorfer, Luning, Nev., mgr., with H. Rich-
Bender, Philadelphia; and W. D. Kent, directors.
aware. **Cap.**, $2,500,000; $5 par; 35,000 shares held in
ansfer & Registrar Co., New York, transfer agent.
it of March 1, 1917, showed mine development, $114,435;
21; development fund, $90,000; accounts receivable and
mine accounts, $7,000; profit and loss were given as
1919, $364,044 had been spent on property.
r Mountain group, 24 patented and 10 unpatented
Sante Fe mining district, 8 miles E. of Luning, Mineral
o. P. R. R., and the Darwin Unit, 9 patented claims, 180
ounty, Calif. This group is not being developed at present.
occurs as oxide and carbonate in vein, 40′ to 150′ wide,
th, in contact deposit between granite and limestone.
ore has been developed between the 700′ and 1,000′ levels
gh-grade to mine and ship at a profit under normal condi-
om development work were shipped to the Tooele smelter
om 6 to 10½% copper with small amounts in gold and

00′, [redacted] Mtn., 100′ Cyclone shaft and pros-
ou[redacted] 4,000′. Since February, 1915, 4,900′
lr[redacted] from the 700′ down; cross-
r[redacted] 700′ and 1,000′ levels, and a winze sunk 400′ below
body of commercial ore was found.
hoist, air-compressor, mine and office buildings,
shaft. Temporarily closed down.

CO **NEVADA**

[redacted] Candelaria,

[redacted] mgr.; W.
[redacted] T. D.

[redacted] $25,000.

[redacted] unty,
[redacted] with
[redacted] Hill
[redacted] Code
[redacted] 15

granite-porphyry intrusions, ranging from quartz-diorite to true granite, overlain by a thick series of Paleozoic beds. These rocks are extensively truded by dikes and masses of granite porphyry. The vein system is extens and well defined with outcrops traceable for thousands of feet on the surfa and underground workings proving continuity downward, and large size oreshoots.

Development: the Lucky Hill mine is partly developed by a cross tunnel 350′ long intersecting two veins, whose width is stated to vary from 8 40′, and by a shaft 300′ deep, showing good milling ore to a depth of 60′ be the tunnel level, at which point vein dips out of shaft. Old workings con much milling ore of fair grade, estimated at 100,000 tons of 15 oz. ore. Dur 14 months in 1917-18, shipped 6,000 tons unsorted ore averaging 22 oz. si per ton.

The Argentum mine has been developed to a depth of 1,460′, and from 1 to 1893 is said to have produced 300,000 tons of $50 silver ore from a contin ore shoot. The Mt. Diablo is developed to a depth of 1,000′. Ore: the p cipal value is in silver, occurring as chlorides and bromides with about $1 p per ton. Recent developments on the 200′ level on the Baldwin vein at Lucky Hill mine have opened a shoot of shipping ore 4′ to 11′ wide and 100′ l

Reserves: the company's engineers estimate reserves, including or place, fills and dumps as follows:

Lucky Hill, 157,000 tons, average 15 oz.; Argentum, 381,000 tons, ave 14 oz.; Mt. Diablo, 478,920 tons, average 15 oz.

Equipment: Lucky Hill mine is equipped with compressor plant, t chine-drills, motor-trucks, and 40-stamp mill to be enlarged to 500 tons daily.

Production: prior to August, 1918, the Argentum and Diablo are e mated to have produced 445,000 tons of high-grade ore, and the Lucky H 9,000 tons shipping ore. Since August, 1918, the Lucky Hill mine has m tained weekly shipments of 50 tons of ore averaging 20 to 40 oz.

In July, 1919, the mine was reported undergoing a thorough examin previous to the formulation of plans for future development work and ins tion of equipment. In December, about $550,000 had been secured from sa treasury shares, and machinery had been installed.

CARRARA MINING, MILLING & LEASING SYNDICATE NEVA

Dead. Fully described in Vol. XIII.

CARRIE SILVER-LEAD MINES CORPORATION NEVA

Address: C. R. Murdock, First National Bank Bldg., Tonopah, Ne

Officers: W. W. Travis, pres.; L. A. Rose, v. p.; C. R. Murdock, cons. eng.

Inc. in Nevada. **Cap.**, $100,000; 10c par. Listed on Salt Lake an Francisco Exchanges, and New York Curb.

Property: 5 claims, 10 miles N. W. of Millers and 8 miles from T. & G. railway. Mine is an old one (1897). An incline shaft has been su 230′, and drifting reported under way in good ore. Assays returned up t oz. silver, 16% lead, 10% copper, and $8 gold.

Equipment: 40-h. p. engine, hoist, compressor, etc.

CARSON FREE GOLD MINING & MILLING CO. NEVA

Address: E. E. Roberts, Carson, Nev.

Officers: E. E. Roberts, pres.; B. A. Boucher, v. p.; E. M. Perry, with Theo. Peterson and R. G. Affleck, directors.

Property: the Lucky Strike gold claims in Muldoon canyon, 1M W. of Carson, Ormsby county. A shaft 80′ deep in July, 1919, showed rich ore; development work is in progress.

CHARLESTON HILL GOLD MINING CO. NEVA

Address: J. P. Clough, National, Nev.

Property: company was operated under lease by the C ton Hill Nat Co. in 1914, and under bond and lease in 1917. nal Lea a Geor am Rice promotion, which 1918 1919, a f 5 tons sent to Selby, 0 ore.

MINING CO. **NEVADA**
dsprings, Nev.
917. One-half of the issued stock is owned by the Yel-
Co.
aims, 36 miles from Las Vegas, said to show a 3' vein of
eloped by shallow shafts, and worked under lease by Jas.
royalty basis, 1918-19

NSOLIDATED COPPER CO. **NEVADA**
V. Jeffs, pres.; W. P. Silver, v. p.; R. T. Thurber, sec.-
ing and R. A. Brown, directors, all of Salt Lake City.

patented claims and a millsite in Lincoln county, Nev.,
Caliente and six miles east of Leight Station on the Salt

three shafts, 150, 90 and 250' in depth.

K SILVER MINING CO. **NEVADA**
Hooper Bldg., Salt Lake City, Utah. J. H. Moyle, pres.;
at last accounts.
y Ann silver mine at Cherry Creek, White Pine county,
d to the Exploration Syndicate No. 2, which see.

DA TUNGSTEN CO. **NEVADA**
H. M. Byllesby & Co., 208 La Salle St., Chicago, Ill.
Ragged Top and Besson group, 11 miles from Toulon,
station on the S P. R. R., shows tungsten deposits. Ore
ill planned to be put up at Toulon on the shore of Humboldt

) tons in May and June, 1916. The mill handled custom
ormation.

& SILVER MINING CO. **NEVADA**
ish St., San Francisco, Calif.
in California. **Cap.**, $1,120,000; $10 par. Stock listed on
inactive.
e Comstock Lode, Virginia City, Storey county, leased
tock Leasing Co., which see.

LING CO. **NEVADA**
r, 1917. Plant taken over by Nevada Wonder Mining Co.
in December, 1919.

ADA MINING & MILLING CO. **NEVADA**
lescribed in Vol. XIII.

ALS, INC. **NEVADA**
Bldg., Salt Lake City, Utah. **Mine office:** Pioche, Nev.
Read, pres.; E. H. Snyder, v. p.-mgr.; J. C. Jensen, sec.-
yder and Frank Nichols, directors. R. T. Godbe, supt.
Cap., $50,000; 5c par; assessable; 800,000 issued.
anaca group of the Amalgamated Pioche Mines & Sm.
ms, 110 acres, at Pioche, Lincoln county, held under
1 veins and as a bedded deposit in limestone, averaging

about 4,000' of drifts, crosscuts and raises. Reserves
00 tons of refractory ore, assaying 0.04 oz. gold, 8.2 oz.
zinc, 14.0% iron. This ore cannot be profitably marketed
anagement plans erecting its own plant in 1920.
ides 200-h. p. steam hoist, 700 cu. ft. compressor.
egun in 1916. Shipments of 7,400 tons up to July, 1919,
f $144,000. Shipping 500 tons per month in 1919.

NES AND MILLING CO. **NEVADA**
attan, Nye county, Nev. Operates under lease the Stray
rescent and Riley fractions, also the Eagle mill of 20
mill.

COMO CONSOLIDATED MINES CO. NEVA

Address: Como, via Dayton, Nev.

Officers: S. F. Taylor, pres.; Gurney Gordon, v. p.-mgr.; W. R. G Sec.; J. W. Davey, asst. sec.-treas., with H. G. Humphrey, directors. Le Kamp, gen. supt.

Inc. October, 1916, in Nevada. **Cap.**, $1,500,000; $1 par; issued 1,00 Listed on San Francisco Exchange. U. S. Corp. Co., transfer agents registrar. Annual meeting, October 1.

Property: 260 acres at Como in the Silver City-Palmyra distric Lyon county, 12 miles S. E. of Dayton and 14 miles S. W. of Virginia City.

Geology: ore is mixed oxide and sulphide, carrying gold and silv a quartz vein in andesite. The quartz is hard, and contains calcite in amounts.

Development: by incline and vertical shafts to a depth of 350'; a tunnel 4,000' long. A rich shoot was opened in Oct., 1919, on 100' level o Lucky Sunday claim. A new tunnel to open mine at depth of 600' is driven.

Equipment: complete for mining, and a 100-ton cyanide mill (desc in Min. and Sci. Press of Jan. 10, 1920, by F. Borzynski), employing crush stamps, ball-mill, agitators, Oliver filter, etc. A good recovery is made cost of $2 per ton.

Company is producing, but no reports have been secured.

COMO GROUP MINING CO. NEV

Address: 20 Fordonia Bldg., Reno, Nev.

Officers: C. P. Ferrel, pres.; W. S. Schuyler, v. p.; with W. G. Ed sec.-treas., and J. H. Rae, and J. H. Rae, Jr., directors.

Inc. 1919, in Nevada. **Cap.**, $150,000; 10c par.

Property: 6 claims, 120 acres, four adjoining Como Cons. on the in Washoe county. A strong vein traverses three of the claims for 4,5 a large quantity of ore is said to be opened.

COMSTOCK FRACTURE MINES CO. NEV

Incorporated December, 1919, in Nevada, by C. A. Garrett, T. B. G Gurney Gordon, F. M. Kleppe, and O. R. Vaughn. Cap., $75,000; 20c. par.

No information has been received as to property.

COMSTOCK LEASING CO. NEV

Address: Virginia City, Nev. H. B. Bulmer, mgr.

Property: 2 patented claims on the Comstock Lode, at Virginia Storey county, held under lease from the Potosi Gold & Silver Mng. Co the Chollar Gold & Silver Mng. Co., both old and inactive companies.

Ore: occurs in fissure vein with diorite foot and andesite hanging veins run N. E.-S. W. and contain gold-silver ores.

Development: by 2,000' tunnel to depth of 400'.

Equipment: includes electric hoist, 100-ton cyanide mill.

COMSTOCK-PHOENIX MINING CO. NEV

Office: Provo, Utah. Mine at Six Mile Canyon, Virginia, City, N

Officers: Jesse Knight, pres.; Geo. H. Drysdale, v. p.-mgr.; with D Starr Jordan, J. Wm. Knight, and F. M. Manson, directors. W. L. M sec.-treas.

Inc. 1909. **Cap.**, $1,000,000; $1 par; all outstanding.

Property: 3 patented claims in the Silver Star district, 2 miles railroad, on what is believed to be a cross fissure, about 1 mile from the stock lode. The main vein has a N. E.-S. W. course. Several distinc shoots have been encountered that vary from 1 to 8' in width, and a 50 oz. silver, with some gold.

Development: by 800' shaft, tunnel and raises. A drift was tended westward on the 800' level in 1919, in the direction of the Co

Equipment: electric hoist, compressor, tram and buildings.

Production: shipments from 1909 to 1914 amounted to $40 net returns of $250,000. Old company paid dividends of $102,516. Pres

eorganization in January, 1917, of the old company, has not

s being made by the company and by lessees operating in old

PERIOR MNG. CO. **NEVADA**
Gazette Bldg., Reno, Nev.
lirectors: G. S. Clack, pres.-mgr.; LeRoy Keene, v. p.;
eas.
1919. **Cap.**, $200,000; 10c par; assessable; 200,000 issued.
ly 1.
aims, 110 acres, 7 miles S. W. of Virginia City, Storey
w a contact deposit between granite and limestone schist,
2% copper, and 50 oz. silver. Four feet of $23 silver has

by 100′ tunnel and 70′ shaft. A 600′ tunnel is being

ctric power, 75-h. p. compressor, etc.
start in 1920.

INEL CO. **NEVADA**
uel Trotta, sec., 25 Broad St., New York, N. Y., and

; shares $2 par; $2,769,000 bond issue outstanding, on
been paid since 1892. Stock was traded on N. Y. Exchange
to 20c. per share. Company is controlled through stock
onard family.
niles of tunnel, draining the Comstock mines to depth
f company has been reduced from time to time owing to
ines on the Comstock lode, who pay 4% royalty on all ore
stock Tunnel Co. for drainage and ventilation.
9, the Protective committee announced that if 80% of the
with the Security Transfer & Registrar Co. of 66 Broad-
rustee, the mortgage would be extended for 10 years, and
dingly. This avoids selling the property under terms of

'ER CO. **NEVADA**
le & Co., 50 Congress St., Boston, Mass. Purchased
Neversweat mines at Luning, Esmeralda county, in 1917.
developed and have produced shipping ore. Neversweat
ol. XIII.

CALIFORNIA-NEVADA MINING CO. **NEVADA**
St., New York; and Pioche, Nev. Company is in re-

e over the Day Bristol properties, bought in by bond-
sheriff's sale in 1915. Company started work at Gypsy
id shipped 800 tons copper-silver ore in November, 1915,
t ,and installing engine, hoist and compressor at Hillside
Company had 8,300′ rope tramway in operation.
ing to inability to ship ore already mined and to secure
of, mines closed down and company went into receivers'

a Copper Co. was organized to take over the Day group,
rations. The mine was transferred to the Black Metals
ase and bond agreement in 1918, and daily shipments are
e.

CORTEZ SILVER MINES CO. **NEVADA**
St., New York City, Russ Bldg., San Francisco, and
y, Nev.
anson, pres.-treas.; F. C. Hunter, sec.
vada. **Cap.**, $2,000,000; $1 par; 1,500,000 outstanding,

Property: the Cortez group at Cortez, Nevada, in Eureka and La counties. The group consists of 49 claims, 38 patented, 790 acres. Co also owns water-rights and millsites all formerly owned by the Tenabo ing and Mining Co. It includes the old Garrison, Mt. Tenabo, St. L Fitzgerald and Arctic mines, which have yielded over 7,400,000 oz. of s and $500,000 gold from 125,000 tons of ore, since 1864. Milling was sto in 1892 and all operations in 1895. Lessees extracted the remaining ric during 1901 to 1916.

Geology: the orebodies occur as irregularly sinuous replacement uptilted limestone, overlaid by massive beds of quartzite, whose out forms cliffs along the mountainside. A porphyry dike deflects one body. See description and illustrations by Emmons, U. S. Geol. S. Bull. p. 103.

Development: by 4,000′ Garrison main tunnel, attaining a vertical d of 800′, with 7 levels and a total of 15 miles of workings.

Reserves: estimated at 68,000 tons of 17 oz. ore on dumps and in a blocks underground; also 120,000 tons of tailings, carrying 7 to 10 oz. s

Equipment: includes an old mining and milling plant, and dwell shops, etc.

Management is unusually competent, Mr. Manson being head of Western Ore Purchasing Co., and chairman of the Rochester Nevada S Mines Co. The re-working of old stope-filling and the exploration of l of virgin ground below the old workings offer excellent speculative p bilities.

CONSOLIDATED MAYFLOWER MINES CO. NEV

A reorganization of the Mayflower Bullfrog Consolidated Mng. Co., e 1917.

Address: 701 Storey Blk., Los Angeles, Calif. **Mine office:** Pio Nevada.

Officers: Jos. B. Kendall, pres.-mgr.; John H. Miller, v. p.-sec.-t with Frank M. Manson, P. H. O'Neill and Wm. J. Tobin, directors.

Cap., $250,000; shares 10c par; assessable; 1,964,371 shares outsta Four assessments, 1c. per share, levied April and October, 1918, and Oct Dec., 1919. Listed on New York Curb and San Francisco Exchange. Corporation Co., New York, registrar.

Property: 11 patented claims, 200 acres, in Bullfrog district, P Nye county. Oxidized and free-milling ore occurs in veins with N.-S. and dip of about 20° E., carrying mainly gold with a little silver and The vein is 4′ wide, and assays said to average $8 to $12 per ton. Exam J. B. Kendall and R. C. Cameron.

Development: about 3,000′ of workings, including 1,925′ in 1919. A 530′ Mayflower shaft work was in progress on the 200, 300, and 500′ le 1919, exposing 8′ of commercial ore. Reserves estimated in Nov., 19 80,000 tons of $10 ore.

Equipment: 4,000′ water pipe-line, hoist, compressor, and 100-to consisting of 15 stamps, ball-mill, amalgamating plates, concentrator, and mill. Test runs gave a recovery of 80%.

Production: in 1918, under previous management, 10,000 tons ing $14 per ton from the 200 and 300 levels. Shipments are sent to the Ma smelter at Kennett, Calif.

CONSOLIDATED NEVADA-UTAH CORPORATION NEV

Office: 63 William St., New York. Mine at Pioche, Lincoln Nev., and Frisco, Beaver county, Utah.

Officers: Chas. H. Clarkson, pres.; Wm. B. Randall, treas.; W Roberts, sec.; Jos. W. Kay, F. A. Dillingham, W. J. Palmer, directors Van Wagenen, supt.

Inc. 1913, in Virginia. **Cap.,** $6,000,000, shares $3 par; issued $3,9 in treasury, $1,163,604; reserved for bond conversion, $900,000; authori issue $90,000, 1st mtge., 6%; issued, $499,867. Company without funds unable to meet interest on outstanding bonds, May, 1919. Propert

Shares listed on New York Curb. At public auction in 10, 1919, 1,200 shares were sold at $60 the lot, and $1,400 ot.

organization of the Nevada-Utah Mines & Smelters Corpo- into bankruptcy in 1912, and whose holdings were sold ceedings for $100,000 to the new company. Stockholders in) subscribed 50 cts. in cash for each share held, and deposited ived bonds for the cash paid by them and 200 shares of npany for each $100 subscribed.

oups of mines, owned through control of subsidiary he group at Pioche, including several productive mines that d: the Imperial group at Frisco, including the Comet mine e at Bingham, Utah.

ed Pioche Mines & Smelters Corp., organized to operate Cons. Nevada-Utah has been inactive since 1917. Part of ed to Uvada Copper Co. and sub-leased to the Black Metals, ied Metals, Inc., which see.

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SILVERS, INC. **NEVADA**

option on share control of the Arizona Silver and Silver h see; it is the prospective merger of these two. Company . be merged with Universal Silvers Co. Properties are near county. Caveat emptor.

SPANISH BELT SILVER MINING CO. **NEVADA**

t'l Bank Bldg., Tonopah, Nev.

V. Barndt, pres.-mgr., Nicholas Bldg., Toledo, Ohio; : Jay H. Maish, sec.: John V. Wilson, treas., with John A. ll, John Siefert and Albert Rees Davis, directors. Robt. M. s Kirchen, cons. engr.

16, in Nevada. **Cap.**, $1,000,000; $1 par; 600,000 shares meeting, first Monday in June. Operating expenses for ,000. A total of $150,000 is reported having been expended

ms, 2 patented, 140 acres, formerly known as the Bar- h Belt mining district, Nye county, 7 miles from Manhattan onopah.

y rock is limestone and granite. Ore occurs in fissure . strike and dip of 42°. Drifting east and west from the s opened several veins claimed by the management to be owing copper-silver ore assaying between $30 to $35 per gh-grade silver ore running from $50 to $600 per ton.

000′ of workings by former operators includes 1,280′ aft, which is to be extended to depth of 600′ with drifts workings were cleaned out and retimbered, and the shaft ber, 1919.

oline hoist, compressors, drills and a 10-ton concen- in 1919.

ed with past production of $500,000. Examined by Chas. who recommends further development.

ise $50,000 for further work, the president claims "Spanish e richest silver mine in Nevada today. We will develop ie greatest bodies of milling ore in the State of Nevada."

VIRGINIA MINING CO. **NEVADA**

s Bldg., San Francisco, Cal., and Virginia City, Nev. in Symmes, pres.-supt.; Frederic Vincent, v. p.; with cDado, and Zeb Kendall, directors. A. P. Swan, sec.

a California. **Cap.**, $216,000; shares $1 par; assessable; sferred at company's office in San Francisco. Listed on San Francisco Exchange. In July, 1919, the company was or the first time in 30 years.

Property: a considerable part of the California claim and the C Virginia claim, covering 1,310′ along the Comstock Lode at Virginia City, same management and operated in conjunction with the Ophir Silver, U Cons., and Mexican Gold & Silver companies, which see.

Development: under present management work on the 2,700′ and 2 levels was stopped and exploration pushed on the 2,150′ and above to the l level. Ore varies from narrow veins up to quartz 15′ in width and rang value from $10 to $50 per ton in gold and silver. A new shoot at 2,150′ yielded up to $72 ore.

The ore is treated at the Mexican mill, the return amounting to a $35,000 per month. The first week in Oct., 1919, yielded 457 tons of ore w $12,000.

CONTACT COPPER CO. NEVA

Address: Hutchinson, Minn., and Contact, Elko county, Nev.

Officers: S. G. Anderson, pres.; Wm. Schultz, v. p.; Sam G. Ander Jr., sec.-treas., with J. A. Lindenberg and J. A. Jorgenson, directors.

Cap., $1,000,000; shares $1 par.

Property: two groups, the Lucie, 11 patented claims, and the l Rock, 8 patented and 5 unpatented claims, at Contact, said to show copper bonate ore in veins.

Development: the Lucie group has a 145′ shaft, said to show or the way to the bottom. The Blue Rock has 2 shafts, 50′ and 30′ deep, bot to show ore. No production to date.

COPPER CANYON MINING CO. NEVA

New York office: 25 Broad Street, N. Y. **Mine office:** Battle Mou Nevada.

Officers and directors: R. M. Atwater, Jr., mgr.; C. C. Burger, v. p E. Whicher, treas.; F. Sommer Schmidt, gen. mgr. H. Pelz, sec.

Inc. November 4, 1916, in Delaware. **Cap.,** 1,000,000 shares at $1 value. 500,000 issued. **Transfer office:** 25 Broad St., New York; N Trust Co., 26 Broad Street, registrar. Stock listed on N. Y. Curb. A meeting, third Tuesday in November.

Property: (1) Copper Canyon group and (2) Copper Basin group. first named comprises 16 patented claims of about 300 acres in Copper Ca Battle Mountain, Nevada. Formerly owned by the Glasgow & Western M Co. Purchase price was paid out of first year's production. First work

Claims said to show 3 veins, the Virgin, Superior and Estes, varying 10′ to 30′ in width; the first two with a N. S. course and dip of 60° to 80° ore shoots of about 150′ in length. The Estes ore body found by presen agement is 100′ long, and 20′ wide of high grade ore. The ore is a sulphide and oxide of enargite, chalcocite, chrysocolla, malachite and assaying from 5%-15% copper.

Development: by two old incline shafts, 200′ and 600′ and by a ve shaft started in 1917. The extent of underground workings is 3,500′ greatest depth of 570′. Mine is worked by the fill-stope method.

Equipment: 60 h. p. gasoline hoist; 100 cu. ft. compressor, centr pump, 250-h. p. distillate engine.

The Copper Basin group, 9 miles from Battle mountain, covers a r hilly tract of granite porphyry and altered shale, containing veins and d nated deposits of copper ore. Development at numerous points by shaft underground work has proven a large amount of commercial ore, whose is as yet unknown.

Production: April, 1916 to January 1, 1919, about 3,000,000 lb. copp

Copper Basin is a very promising property, and the Copper Canyon w further deep development.

COPPER METAL MINES CO. NE

Idle. Mail returned from former address at Goodsprings, Nev.

Officers and directors: C. B. Stewart, pres.; Peter Clegg, v. Jensen, sec.-treas., at last accounts.

Inc. Dec. 20, 1916. **Cap.,** $1,000,000; s r; 400,000 shares

laims, 220 acres, in Ivanpah district, about 35 miles S. W.
rk county, only slightly developed and claimed to show a 3'
ı granite and porphyry, assaying 6% copper and 6 oz. silver
d.

MINING CO. **NEVADA**

rings, Nev.
Andrus, pres.-treas.; W. E. Allen, v. p.-mgr.; P. H.
P. S. McClanahan, directors, all of Goodsprings, Nev.
ı Nevada. **Cap.**, $1,000,000; $1 par; outstanding 520,000

for 1916 were $13,000 and operating expenses were about
tons of ore were shipped.
ims, about 120 acres, on the south and east slopes of
Pine mining district, ten miles north of Goodsprings, Clark

grade copper carbonate occurring in chambers and kid-
ıestone. The highest assay of the 5 cars sorted ore shipped
vest was 14% copper.
›y 6 adits with total of 600', the longest being 150'.
vorked intermittently for a number of years and efforts
ıance some consistent plan of development.

MINING CO. **NEVADA**

ınd County Bldg., Salt Lake City, Utah. W. W. Bar-

of Austin, Lander county, developed by 235' tunnel.
levied up to July, 1918, but company gives out no report
A prospect.

MINING CO. **NEVADA**

econd St., St. Lake City, Utah. **Mine office:** Contact,

I. Douglas, pres.; U. U. Hiskey, v. p.; C. R. Strock,
elds, mgr., and J. A. De Valley, directors.
vada. **Cap.**, $1,000,000; shares $1 par; issued, 610,000.
ıd Tuesday in April.
ims, 200 acres, in the Salmon River district.
y 4 shallow shafts, deepest 73', and several tunnels,
f workings, showing 4 veins in monzonite porphyry dikes
to carry up to 40% copper and 2 to 6 oz. silver per ton.
ilroad is 37 miles distant. Presumably idle.

NE **NEVADA**

rtz & Renaux, owners, Goodsprings. Nev. Otto F.

›s in Yellow Pine mining district, Clark county, shows
n 1 to 8' thick, and to average 25 to 30% copper. With
s and practically no equipment the mine is reported to
! worth of ore in 1917, which netted the owners $3,940

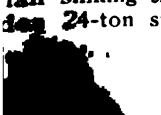
,LEHELEN SILVER MINE **NEVADA**

M. & M. Co.

'AN MNG. CO. **NEVADA**

'omeroy, owner, Denio, Ore.
s, 3 miles S. of the Oregon line, in Humboldt county,
granite cut by a quartz vein 6 to 48" wide, running $5

tunnels to depth of 500'. Estimates give 1,500 tons
'lan sinking shaft 200' and drifting.
[redacted] 24-ton stamp mill. Reported to have produced



CRAVEN COPPER CO. NEV

P. H. Craven, pres. Property near Winnemuca, Humboldt county, s developed, said to carry high-grade copper ore. Idle during the war, but tions to be resumed.

CROWN GOLD & SILVER MINING CO. NEV

Address: Room 320, Gazette Bldg., Reno, Nev.

Inc. Dec., 1919, in Nevada, by Rudolph Danmyer, C. M. Cross, Judd and V. R. Grant. **Cap.**, $150,000; 10c par.

No information available as to property.

CROWN MINES NEV

Address: Golconda, Nev. Owned by Jos. H. Playter, mgr., and ter G. Urige.

Property: 15 claims, about 200 acres, 12 miles S. of Golconda, boldt county, said to carry a fissure vein in andesite, from 25-60′ in width. occurs in shoots, 40-300′ long, said to average $8-$12 in gold and silver.

Development: by about 2,000′ of underground work, including a tunnel, which is being extended to gain further depth. Management re ore reserves of 150,000 tons, averaging $6-$10 per ton in June, 1919.

CROWN POINT GOLD & SILVER MINING CO. NEV

Succeeded by Jacket-Crown Point-Belcher Mines Co., which see.

CUNAPAH MINING CO. NEV

Address: Montello, Nev.

Officers: P. O. Perkins pres.; S. C. Sherill, v. p.; G. W. Lynch, treas.; J. M. Bowker, mgr.

Inc. 1916, in Utah. **Cap.**, $50,000; shares, 10c par; 205.000 Listed on Salt Lake Exchange.

Property: 5 unpatented claims in Lucin district, Elko county, near Utah border. Is in same hill as Salt Lake Copper & Tecoma Consol. and shows limestone intruded by porphyry and granite. Ore occurs in in limestone near contact.

Development: by 250′ shaft and several tunnels, said to show a silver vein in limestone. Several carloads of ore shipped to June, 1917, ing 25% lead and 2 oz. silver per ton.

Company installed compressor, hoist and power plant, and was to shaft in 1918. No recent returns.

CUPRITE COPPER CO. NEV

Supposedly dead. No recent returns. Described in Vol. XII.

CUPRITE SULPHUR CORPORATION NEV

Office: 50 East 42nd St., New York City. J. E. Bowman, pres., G wich, Conn.; F. S. Taggart, v. p.

Inc. 1917, in Delaware. **Cap.**, $2,000,000.

Property: a sulphur deposit near Cuprite, Nevada. Output of 1 per day was shipped to Coast. Retorting plant was to be installed i No recent returns.

DAHL PLACERS NEV

Address: Jas. Dahl, owner, Copper Canyon, via Battle Mountain,

Property: 25 claims, 1,500 acres, 700 patented, at Copper Canyon, der county, credited with a production from 1910 to 1919, of $485,000 i gold. Gross earnings in 1918 were $74,381.

Gravel occurs in small narrow channels of unknown extent.

Development: by 1,500′ tunnel and 60′ vertical shaft. The gi a daily capacity of 200 yards.

DARKEY MINE [redacted]

Owned by W. S. Holmquist and M. W. Johnson. W. S. Elliott, Walter Geddes, supt., at last accounts.

Property: 9 claims, 180 acres, in Elko county, about 9 mi Decoy, developed by 65′ shaft, shows a blanket deposit of manga limestone formation. Owners shipped 562 tons of ore, averaging Oct., 1916, to March, 1917.

Property leased to W. S. Elliott and W. Geddes, for 2 years f

hoist and planned shipping 15 tons per day from Decoy on
ern R. R.

NING CO. **NEVADA**

n county, Nev. Holdings taken over by Prince Cons. M.
18.

CONSOLIDATED MINES CO. **NEVADA**

Jan., 1915, and transferred to Consolidated California-Nevada
after a brief struggle, went into receivers' hands. The Day-
passed into the possession of the Uvada Copper Co., and in
erated under a 2-year lease by the Black Metal Mines, Inc.,

ER RECOVERY CORPORATION **NEVADA**

Greenleaf, 609 Kearns Bldg., Salt Lake City, Utah.
Hansen, pres.; B. Binnard, v. p. and treas.; E. B. Critch-
C. McIntyre, directors. G. W. Wood, cons, engr., at last

, in Utah. **Cap.**, $500,000; $1 par; 435,000 issued.
ilings at Dayton, Nev., and reported to be making a 90%
d 50% mercury extraction.
n in voluntary bankruptcy in March, 1919. Assets total
es, $48,760, including $3,314 for unpaid wages.
timated 500,000 tons of tailings available with average assays
z. silver and 3 lb. mercury, or about $7 per ton. Total cost
t $1.25.
50-ton all slime cyanide mill. Started operations in August,

NING CO. **NEVADA**

unter, mgr., Lovelocks, Pershing county, Nev.
acres, in Seven Troughs district, near Vernon, Humboldt
ccurs in veins 5-7′ wide, said to average $18-$20 per ton.
ludes the Darby mill 4½ miles from the mine. Manage-
o explore the Delaware veins at depth at last accounts.

SOLIDATED MINING CO. **NEVADA**

vings & Trust Co. Bldg., Salt Lake City, Utah. Mine
ounty, Nev.
W. Price, pres.; J. Thomas, v. p.; W. M. McCrea, sec.-
Bailey, F. E. Parish, O. P. Soule, directors.
shares; 10c par; assessable. Assessment No. 9 levied
ed on Salt Lake City Stock Exchange.
ims, 7 patented, 2 miles W. of Pioche, said to show
The ore is making into the lime from the hanging wall of
l varies from 1″-2′ in thickness. A selected sample assayed
r and 0.12 oz. gold. The main vein traversing the property
l dips to the E. Mineralization, though persistent, is not in
save in narrow streak noted.
00′ shaft, drifts, crosscuts and winzes to the 500′ level.
st. air compressor and all necessary machinery. Small
915. Property closed down and resumption of work in-

INES CO. **NEVADA**

m former office, room 1007, 20 Broad St., New York, N. Y.
accounts, J. W. Barbrick, pres.; Chas. S. Witwer, v.
v. p.; Wm. R. Ruhl, treas.; V. M. Schmitz, sec., with Wm.
Prof. J. H. Weber, cons. eng. J. W. Walker, supt.
Cap., $1,000,000; shares $1 par; U. S. Corporation Co.,
.

ims, 280 acres, at Cherry Creek, White Pine county,
rom 5′ to 50′ wide and traceable for about 1 mile. Man-
erage silver contents of the ores at $26.50 per ton.
1,200′ tunnel, 100′ shaft, several drifts and open-cuts.

Equipment: includes compressor, drills, engines and several buildin Planned installing 100-ton mill with proceeds from sale of 300,000 shares treasury stock. No record of the materialization of these plans obtainable. property presumably idle.

DEXTER-UNION MINES CO. NEVA

Address: Manhattan, Nev.

Officers: S. R. Moore, pres.; H. H. Brown, v. p.; C. T. Lawrence, treas., with C. F. Wittenberg and R. Fred Brown, directors.

Inc. 1912 in South Dakota. **Cap.,** $1,000,000; shares $1 par; 80 shares issued.

Property: 16 patented claims, 270 acres, in Manhattan mining dist Ore contains gold and silver and is said to average $15 per ton. Lessees re to have produced $40,000 worth of ore from the Union No. 4 claim. Idle several years.

DOYLE MINING CO. NEVA

Dissolved June 26, 1917. Was controlled by Atkins Kroll Co. See XIII.

DUNLAP COPPER MINE NEVA

E. S. Chafey, lessee, Mina, Nev. Property at Mina, Mineral county, o by Nevada Copper Co., which see.

DUPLEX MINING CO. NEV

Idle. **Office:** 501 P. E. Bldg., Los Angeles, Cal. **Mine office:** Sea light, Clark county, Nev.

Officers: Geo. L. Craig, Long Beach, Cal., pres.; C. W. Ennis, v. Geo. R. Colton, sec., with G. F. Colton, directors at last accounts.

Inc. May 7, 1915, in Nevada. **Cap.,** $500,000; shares $1 par. All issued is assessable.

Property: 7 patented claims, 101 acres, is a well-known gold mine, veins in quartz monzonite, carrying gold-silver ores, changing to copper, and zinc at depth. Orebodies from 2.5 to 5′ in width.

Development: by 600′ vertical shaft, a 45° incline shaft 400′ deep, a 74° incline shaft 300′ deep, with about 2,500′ of underground workings. results from carload lots are 0.9 oz. gold, 4.9 oz. silver, 8.6% lead, 2.3% 1.3% zinc. Company claims that on the lowest levels the amount of le diminishing and copper increasing. The first copper ore mined in comm quantities in the Searchlight district was shipped from this mine.

DUPONT COPPER MINES CO. NEV

Office: N. H. Wheeler, gen. mgr., 7 E. 42nd St., New York City. **address:** Dupont, P. O. Searchlight, Nev.

Officers: S. J. Kistler, pres.; Wm. D. Miller, v. p.; Chas. M. W sec.-treas., with C. S. Clark, directors. G. B. Hartley, J. V. Priest, a W. Wishon, mining and consulting engineers.

Inc. Feb., 1916, in Arizona. **Cap.,** 2,500,000; $1 par; 1,500,000 Security Transfer & Registrar Co., N. Y., transfer office. Metropolita Co., N. Y., registrar.

Property: the Sazarac group, formerly owned by the Gold Co ing Co., defunct 1907, and the Bornite group. These holdings com claims, 8 patented, 410 acres, at Camp Dupont, 18 miles from Searchlig county, Nev.

Company also owns a stock interest in the Queen Calumet Copper Mining Co. of Bisbee, Ariz.; also options on 30 mining claims, about 60 near the Dupont mines, a 51% stock interest in the Assets Realizing Mine California (which see), the entire mill equipment of the Hartley M. M. & tion Co. at Mazuma, Nev., a defunct English concern, and "the prospect of ing" 44 patented lode claims, developed by 5,000′ of tunnel, crosscut carrying more than 100 fissure veins yielding 10 to 7,000 oz. silver per estimated to contain more than two hundred millions of tons of silver-lead ores.

Geology: the Sazarac or Dupont mines show mineralized veins cutting a quartz-monzonite porphyry, intrusive in a pre-Cambrian

y Tertiary volcanics. A basic granite is cut by great tongues
itite dikes paralleling the N.-S. vein system.
d quartz-porphyry with specular and spathic iron and carries
lues. In the N.-S. Sazarac vein, 5′ wide, the ore is specular
ed quartz-porphyry, the vein being 15′ wide on the 200′ level.
E. W. vein 5′ wide, claimed to average $15 to $20 per ton for
depth of 60′. Four per cent. Hill is a stockwerk of veinlets,
isseminated or porphyry orebody. Ore said to assay 10.4 oz.
er, and $6 to $300 gold per ton.
by a 225′ main shaft on the Sazarac, 92 and 111′ shafts
100′ shaft on the Copper Queen claims.
Carl Anderson, Walter M. Brown, and by W. W. Wishon

ılar, company claims to own, control, or was negotiating for,
us districts and claimed that ore valued at about $14,000,000
ng; also that the future mine possibilities have a valuation
.000, and mine and mill equipment is worth $600,000. This
when these properties are in full operation the company
)0 per month for many years, which is interesting if true.
:garded.

'ER CO. **NEVADA**

ırned from former office, 805 H. W. Hellman Bldg., Los
32 Broadway, New York City. **Mine address:** St.

Lathrop, pres.; J. K. Turner, v. p.; C. P. Campbell, sec.-
ıg, supt., with W. F. Vidal, directors. J. K. Turner, cons.

rizona. **Cap.**, $1,500,000; $1 par; 734,100 shares issued.
York Curb, June, 1918. Security Transfer & Registrar Co.,
gistration Surety Co., S. F., transfer and registry agents,

laims, 240 acres, in Gold Butte mining district, Clark
s east of St. Thomas, the nearest railway point.
a fracture zone in limestone and carries copper in the
nd malachite.
Lathrop recommends sinking a shaft. Leases have shipped.
ast, some of it reported to have carried 29% copper.
ich needs deep development.

E GOLD & SILVER MINING CO. **NEVADA**

Earle, sec., Newhouse Bldg., Salt Lake City.
hares 10c par. Listed on Salt Lake Exchange, and of-
re in June, 1919.
ims adjoining Prince Consolidated in Ely mining dis-
ı county, believed to have extensions of the Prince Con-
iron-manganese deposits, carrying a little silver, lead, zinc

MINING CO. **NEVADA**

ucca, Humboldt county, Nev.
nhart, pres.; Chas. F. Spilman, v. p.; L. G. Campbell,
l Craig and R. S. Bolam, directors.
'evada. **Cap.**, $1,500,000; shares $1 par; outstanding,

ns, 70 acres, in Gold Circle mining district, Elko county,
l quartz vein, in andesite.
30′ incline shaft with levels at 75′, 160′ and 240′.
udes two 25-h. p. engines.
report by a mining engineer estimated 5,000 tons of ore in
ton. Idle.

E. & F. MINING CO. NEVA

Idle. **Address:** care Walker Bros. Bank, Salt Lake City. Utah. **M office:** Pioche, Lincoln county, Nev.

Officers: A. C. Ellis, Sr., pres.; A. Levy, sec.; Walker Bros. Ba treas. Arthur Murphy, mgr.

Inc. March 17, 1902, in Utah. **Cap.**, $100,000; shares 50 cts par; asse able.

Property: 12 claims, 11 patented, 240 acres, in the Bristol and Jackrab districts, 1½ miles from a railroad. Mine has a 450′ incline shaft and 2 tunn one of 350′, with several hundred feet of lateral workings.

Equipment: includes a 25-h. p. gasoline hoist and necessary s buildings. Mine produced a little copper ore, with excess of iron, but was down 1907. Development work in lower tunnel resumed in 1914. Prop operated under lease by Arthur Murphy in 1918, who shipped 7 tons of h grade ore daily in September, 1919, and opened a new orebody 200′ below tunnel level.

ELDORADO ENTERPRISE GOLD MINING CO. NEVA

E. P. Jeanes, pres., Las Vegas, Nev. Company reported to have mad discovery of platinum ore on their property, 1916. No recent returns.

ELDORADO-FLAGSTAFF M. & M. CO. NEVA

Address: Nelson, Nev.

Officers: C. R. Welch, pres.; Alex. Mead, v. p.; G. A. Duncan, s mgr.; I. W. Bennett, treas, with Peter Anderson, Clark Moore, Duane M directors.

Inc. Sept., 1917, in Nevada. **Cap.**, $500,000; $1 par; 161,000 outstan

Property: 11 patented claims, 173 acres in Eldorado mining dist Clark county, carries gold-silver ore in a mineralized dike of monzonite-porp said to average 70 oz. silver.

Production: about 16,000 tons reported to have averaged $14 per Idle, owing to diversion of water supply.

EL DORADO GOLD STAR MINING CO. NEVA

Operating claim in Nob Hill section of El Dorado mining district. C pany offered 40,672 shares for sale, August, 1917, proceeds to pay off $15,000 on purchase, and to pay for development. No later returns.

ELKO MINING CO. NEVA

H. L. Hollis, cons. engr., 1025 People's Gas Budg., Chicago, Ill.

Property: Alpha mine at Jarbidge, Elko county, contains vein gold-silver ore in Tertiary volcanic rocks. See Bull. 497, U. S. Geol. Sur 1912, by F. C. Schrader, for geology, etc. Property under lease with optio purchase, June, 1919.

Development: crosscut tunnel, several hundred feet long.

Equipment: 5-stamp mill.

ELKO PRINCE LEASING CO. NEVA

Out of business. Operated property of the Elko Prince Mining Co (s see), and when indebtedness to J. N. V. Dorr was paid off, the mine reve to original owners.

ELKO PRINCE MINING CO. NEVA

Main office: 501 Fifth Ave., New York City. **Mine office:** Midas, N

Officers: L. L. Savage, pres.; R. P. Jackson, v. p.; Henry E. Hawe treas., with J. V. N. Dorr and F. F. Sharpless, directors. L. D. Dougal,

Cap., $1,150,000; $1 par; 1,108,566 shares issued.

Annual report to Jan. 1, 1919, shows: total assets, $1,376,023, and liabi accounts payable, $416,236; reserve for depreciation, $104,570; reserve for de tion, $137,308; surplus, $9,342, after deducting $77,599 for dividends. Inc was $427,757, of which $426,206 was from mine bullion; expenditures amo to $186,646, leaving net profit of $177,911 before deducting $97,850 for depl reserve.

Dividends: begun October, 1917, total about 30c per share, the last 3½ cents, being paid in Oct., 1919.

Property: 9 patented claims at Midas, Gold Circle district, Elko co

EMPIRE-NEVADA COPPER MINING & SMELTING CO. NEV

Address: Yerington, Nev. Wm. Gelder, pres.; G. B. Garrison, J. E. Gelder, supt.

Inc. in Arizona. **Cap.,** $5,000,000; shares $5 par. Property taken by Walker River Copper Co., under a lease which provides that when the ties paid amount to $500,000, the title will pass to the leasing company. General Development Co. (Lewisohns) is a small stockholder in the E Nevada company.

Property: about 500 acres on Copper Flat in 2 groups: 1 about I W., the other 2½ miles N. W. of Yerington, Lyon county. Ore occu bunches and disseminated throughout a body of monzonite-porphyry, said opened for 3,000 in length and 1,000′ wide, carrying copper in the form o cates, carbonates and oxides, a considerable part of it averaging 2.65% c

Development: by 5 shafts from 80 to 160′ in depth, several tu and open cuts and also by diamond drilling. Mine is said to have produced $150,000 from surface workings. Shipped 6,000 tons of 6% ore to M Valley smelter, 1912, and 2,900 tons in 1914 Property has small smelting assay office, hoist, boarding house, etc. The leasing company was pushin velopment work in 1919.

ESMERALDA COPPER & SILVER CO. NEV

Successor to Esmeralda Copper Co.

Address: Luning Nev., and 6 Montrose Ave., Verona, N. J.

Officers: Mayor D. H. Slayback, pres.-treas.; Jas. Calvert, v. p.-J. W. Parker, sec., with J. W. Van Schoick, directors. L. B. Spencer, cons.

Inc. 1907, in Nevada. **Cap.,** $1,200,000; par $1; non-assessable.

Property: 9 claims, 180 acres, at Luning, Mineral county, devel by shafts and crosscuts, to depth of 300′. Assays reported to averag copper and 4 to 5 oz. silver. Stock was offered for sale (1919) below pa on a "liberal payment plan" to furnish funds for further development.

EXCELSION MOUNTAIN COPPER CO. NEV

Mail returned from former office: Hawthorne, Mineral county, Nev.

Officers: at last accounts, Frank D. Qualey, pres.-gen. mgr.; J Suits, sec.-treas., Lick Bldg., San Francisco; George Brodigan, W. R. Jack W. B. Tait, directors; Wm. Winkelman, supt.

Inc. Aug., 1907, in Arizona. **Cap.,** $1,000,000; shares $1 par. An meeting, June 7.

Property: Qualey mine, 13 claims, 260 acres, 16 miles S. E. of H thorne, in Whiskey Flat district, Mineral county, Nev., said to have su showings of copper along a contact between granite and limestone. H shallow shafts and one 1,500′ tunnel, said to show 4% copper ore. Total w ings about 3,000′ to a depth of 600′.

Equipment: includes 50-h. p. gasoline engine and 6-drill compre Property closed down since 1914.

EXCHEQUER LEASING & MINING CORPORATION NEV

Mine sold in Sept., 1919, to the Exploration Syndicate No. 2, which see

EXPLORATION SYNDICATE No. 2 NEV

Office: 42 Broadway, New York City. **Mine office:** Cherry Creek. J. W. Walker, mgr.

Property: (1) a lease on the Mary Ann mine at Cherry Creek, W Pine county, owned by the Cherry Creek Silver M. Co. The mine con irregular orebodies in fissure veins in monzonite, with ore reported to a from 35 to 100 oz. silver per ton. Also (2) the Exchequer and Imperial gr 1 mile N. of Cherry creek, White Pine county, formerly owned by the Exch Leasing & Mining Corp. Ore occurs in fissure veins in quartzite, 2 to 5′ with N. E.-S. W. course, reported to run 45 oz. silver and from 60c. to $3 per ton.

Development: at Mary Ann includes 500′ main tunnel, 400′ of sto along the vein, and 2 winzes, 100 and 160′ deep, being deepened in 1919.

Equipment: includes 35-h. p. gas. engine, compressor, hoist, drills. Reserves are reported as 7,000 tons of 24 oz. milling ore in sight.

Production: in 1918, about 700 tons of ore shipped to the Garfield, Ut smelter ran 30-40 oz. silver, and 85c. gold per ton.

Development: at Exchequer-Imperial includes 250′ vertical shaft 1,200′ tunnel. The mine is credited with a past production of **$3,000,000.** Op tions were resumed in 1913, but did not prove profitable. Encouraged unde edly by prevailing high price of silver, present management started operati in 1919, and plans extensive development work. Three carload shipm hauled by wagon to Cherry Creek in May, 1919, said to have assayed 60 oz silver.

FAIRVIEW EXTENSION MINING CO. NEVA

Address: L. D. Gordon, 1011 First National Bank Bldg., San Franc

Property: 14 claims south of the Fairview Round Mountain mine, Fairview P. O. A shallow shaft yielded 50 tons of $30 ore. A head-fr electric hoist, 6-drill compressor, etc, erected in September, 1919.

FAIRVIEW RED ROCK CONSOLIDATED MINES NEVA

Office: J. A. Wright, financial agent, Exchange Bldg., Denver, C H. A. Riedel, pres.

Inc. in Arizona. **Cap.**, $2,500,000; $1 par. Stock offered at 5c per s cash, or 5½c. per share in 10 equal monthly payments, March, 1917.

Property: the Red Rock group, 15 claims, 230 acres, near Fair P. O., in the Fairview mining district, about 42 miles E. of Fallon, Chu county, the nearest railroad point. The mine shows 2 parallel contact w about 400′ apart, between limestone footwall and porphyry hanging wall, to be from 2-8′ wide at surface for about 1,500′ and to carry ore averagin per ton in gold-silver-copper. The veins have an E.-W. strike, dipping at 65°.

Mine without equipment and property as yet a prospect.

FAIRVIEW ROUND MOUNTAIN MINES CO. NEVA

Main office: 1011 First Natl. Bank Bldg., San Francisco, Cal. office: Round Mountain, Nev.

Officers: L. D. Gordon, pres.-mgr.; C. J. Berry, v. p.; H. G. Ma sec.-treas., with H. R. Cooke and J. R. Davis, directors. Gibson Berry, supt.; R. J. Ledwick, mine supt.; E. Michal, mill supt.

Inc. June 25, 1906, in Nevada. **Cap.**, $1,000,000; shares $1 par; 95 shares issued; 200,000 held by Round Mountain M. Co.

Annual report for the year ending Dec. 31, 1918, shows: assets, $1,05 which includes mining properties, $946,061; Liberty bonds, $19,121; cash, $7 income from ore sales, $178,801; total operating costs, $63,103, including m and development, $35,822; milling, $18,539; marketing and misc., $8,741, operating profit, after deducting for depletion and depreciation was $

Dividends: 2c in 1918; 14c in 1919. Total is $153,715.

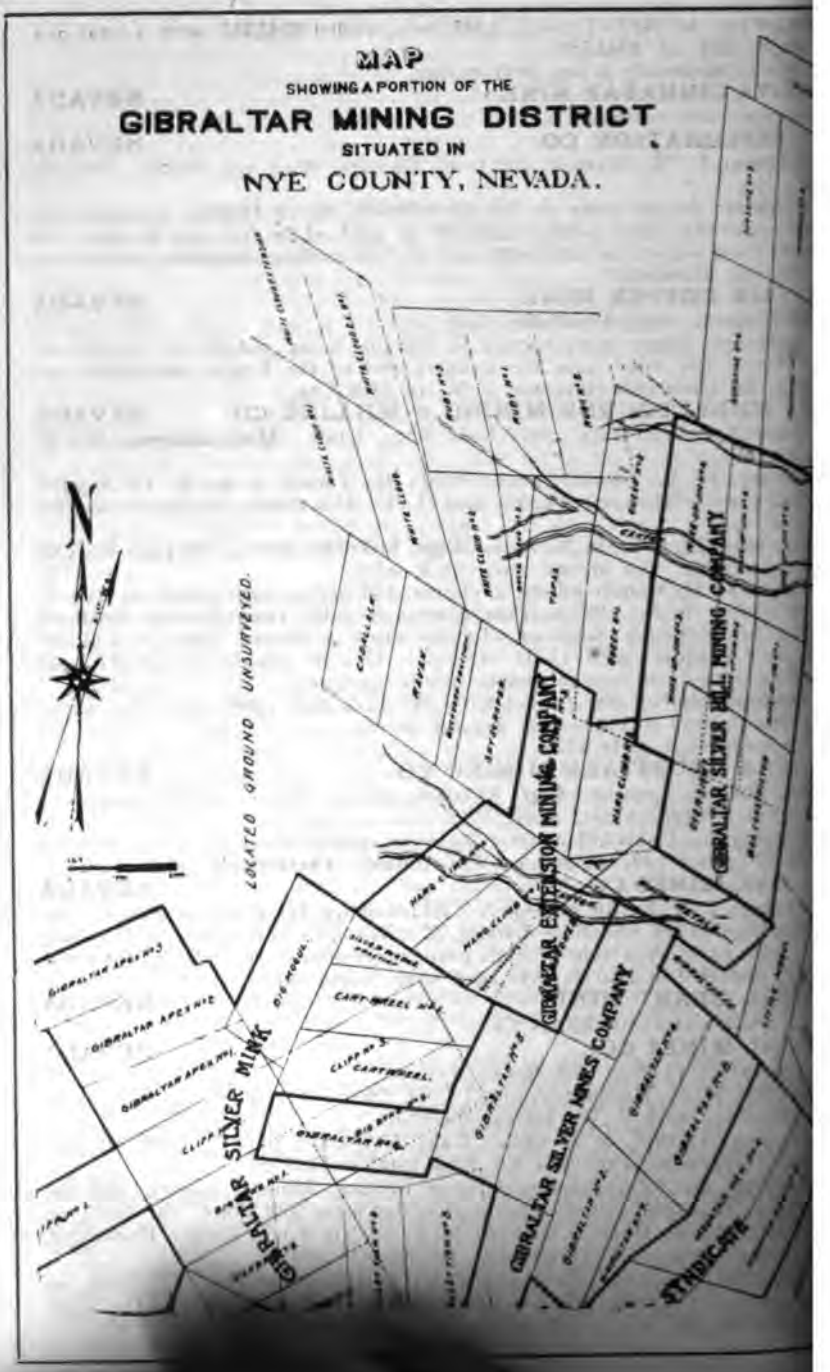
Property: 10 claims, 170 acres, in Round Mountain district, Nye co includes the Fairview patented claim, 19.54 acres and the adjoining Daisy g 40.9 acres (surveyed for patent), purchased in 1917 from the Round M Mng. Co., for 200,000 shares of Fairview treasury stock.

Ore: occurs in sheeted zones and fissures in rhyolite, the mill averaging $21.79 in gold and silver.

Development: by 500′ tunnel to depth of 250′, with 3,000′ of work In 1918, 1,546′ of work was done at a cost of $13,973, or $9.04 per foot. O tions were mainly confined to the south segment of the Fairview vein on the level, reported to be 15′ wide and to average $10 per ton in gold.

Ore reserves estimated July, 1919, at 10,000 tons, running from $15 per ton.

Equipment: includes 25-h. p. gas. hoist, compressor, electrical 6-stamp amalgamating mill of 30 tons daily capacity, taken over with the mine.


MAP
SHOWING A PORTION OF THE
GIBRALTAR MINING DISTRICT
SITUATED IN
NYE COUNTY, NEVADA.
N
LOCATED GROUND UNSURVEYED.
GIBRALTAR EXTENSION MINING COMPANY
GIBRALTAR SILVER HILL MINING COMPANY
GIBRALTAR SILVER MINES COMPANY
GIBRALTAR SILVER MINE
SYNDICATE

GOLCONDA NEVADA MINING CO. NEVA

Address: Golconda, Humboldt county, Nev. J. B. Tomlinson, m had 3-year lease from September, 1915, on the Kramer Hill mine of G conda Gold Ledge Mining Co.

Equipment: 20-stamp mill for sampling and testing. No recent r turns.

GOLD CANYON DREDGING CO. NEVA

Address: G. F. Hitton, Dayton, Lyon county, Nev.

Property: a lease of 1,000 acres of placer ground that had been work in a small way for years by King and Rae. Estimates of 40,000,000 cu. of gravel ore based on 45 shafts and 30 drill-holes. A 9 cu. ft. dredge being constructed in September, 1919. Bedrock is at depth of 18 to feet.

GOLD CIRCLE BUICK MNG. CO. NEVA

Address: Louis Reymond, Midas, Nev.

Inc. July, 1919, in Nevada. **Cap.**, $150,000; 10c par.

Property: 3 claims in the Gold Circle district of Elko county. Devel ment work not yet started.

A prominent San Franciscan is reported to have said in August, 1 that "outside of the Tonopah Divide mine there is more ore in sight in one of four groups of claims in Gold Circle than all the Divide distr It seems remarkable that there has not been a boom in Gold Circle be this time," which is most interesting if true.

GOLD CIRCLE COALITION CO. NEVA

Address: Midas, Nev.

Officers: M. J. Paisley, pres.; J. W. Cody, v. p.; J. I. Peterson, treas., with J . A. Langworth, directors.

Inc. 1919, in Nevada. **Cap.**, $150,000; shares 10c par.

Property: Golden Fissure group, at Midas, Elko county. Ore is milling and occurs in a ledge 10′ wide on 150′ level when it is sa average $12 per ton in gold.

A lower tunnel to cut the vein at a greater depth was driven in 19

GOLD CIRCLE QUEEN MINING CO. NEVA

Address: Midas, Elko county, Nev.

Property: a group of claims between the Gold Circle Coalition Elko Prince mines, shows veins in which high-grade gold-silver ore found, August, 1919.

GOLD CIRCLE QUEEN MINING CO. NEVA

Address: L. G. Campbell, Winnemucca, Nev.

Officers: J. E. Pelton, pres.; R. S. Bolam, v. p.; L. G. Campbell treas.; with G. S. Pelton, directors.

Cap., $1,000,000, increased to $1,500,000 in December, 1919; $1 par; $ outstanding.

Property: 5 unpatented claims in Gold Circle district, Elko co Nev., held under lease.

Geology: lodes and fractured zone in rhyolite, containing shoots to 40′ width. Ore carries gold, silver, and some manganese, avera $16.40 per ton.

Development: by 130′ shaft, and 2 tunnels 180′ and 210′, with total ings of 1,100′.

Ore reserves: estimated at 4,000 tons above 132′, worth $65,000.

Equipment: 15-h. p. gasoline hoist. Propose to erect 30-ton mill deepen shaft, 1920. **Production:** ore sales in 1916, $8,006; to 1917, $1 Recovery by amalgamation alone was 80%.

GOLD DEPOSIT MINING CO. NEVA

Address: Logan, Utah. **Mine office:** Battle Mountain, Nev.

Officers: Robt. Murdock, pres.-treas.-mgr.; John A. Crockett, S. Cole, sec., with E. S. Larsen, Robt. Murdock, Jr., directors. F Swindlehurst, supt.

Inc. May 27, 1916. **Cap.**, $100,000; shares 10c par; 600,000 shares

GOLD TOP MINING CO. NEVAI

Address: 519 H. W. Hellman Bldg., Los Angeles, Calif.

Officers: D. L. Keyes, pres.-treas.; John J. Graf, v. p.-mgr.; Walter Kean, sec., with W. H. Sexsmith and M. C. Keyes, directors. W. R. Cox supt.

Inc. in Nevada. **Cap.,** $500,000; $1 par; 50,000 shares outstanding.

Property: the Pedro group, 6 claims, 120 acres, in Copper Basin, L der county, 9 miles from Battle Mountain, developed by 585' tunnel a 135' vertical shaft. Ore occurs in a fissure vein, said to contain gold, silv and copper.

Equipment: includes steam power, hoist, compressor, drills, pump, a Gibson crushing mill. A double-compartment shaft is being sunk to pro extent of orebody.

GOOD SPRINGS ANCHOR CO. NEVAI

Office: 1202 Hollingsworth Bldg., Los Angeles, Calif. Mine at Jea Clark county, Nev.

Officers: Frank A. Keith, pres.; Philip Wiseman, v. p.; R. I. Roge treas.; I. Mattern, sec.; with Seeley W. Mudd, directors. Roy W. Moo mgr.

Inc. Dec. 20, 1913, in Nevada. **Cap.,** $1,000,000; $1 par; 550,000 issu Annual meeting, second Monday in May.

Gross earnings in 1916, $111,359; in 1917, $105,589; in 1918, $71,0 Total dividends to January 1, 1919, $180,258.

Property: 7 patented and 1 unpatented claims at Jean, said to co lead-zinc ore occurring as replacement deposits in limestone, strike N dip 50°. Developed by 212' winze from a 110' tunnel; greatest depth workings 400'; total workings, 2,500' of drifts.

Equipment: 15-h. p. oil hoist, 3-drill compressor, 2,000' gravity tra 50-ton dry mill.

Production: in 1917, 745 tons of 38.28% zinc ore, 368 tons of lead carrying 47.14% lead and 5.3 oz. silver, and 592 tons lead concentrate saying 57.85% lead and 16.5 oz. silver; in 1918, 282 tons of 41.27% z ore, 217 tons of lead ore carrying 53.78% lead and 8.4 oz. silver and tons lead concentrate assaying 63.34% lead and 12.8 oz. silver.

GOODSPRINGS MINING CO. NEVA

A Jesse Knight corporation. **Offices:** Provo, Utah, and Goodspri Nev.

Officers: at last accounts, Jesse Knight, pres.; J. Wm. Knight, v. R. E. Allen, sec.-treas.; C. L. Hyde, mgr., with W. Lester Mangum, dir tors. E. J. Delano, supt.

Inc. 1919, in Utah. **Cap.,** $100,000; shares 10c par.

Property: the Milford and Addison groups, on the California-Nev boundary line, in Yellow Pine district, near Goodsprings, Clark county, opened and shipping in 1918. A 15' vein of high-grade lead-zinc ore ported under development.

Equipment: hoist, compressor, etc., installed in 1919.

GOULD & CURRY MINING CO. NEVA

Office: 264 Russ Bldg., San Francisco, Calif.

Officers: Wm. Bannan, pres.; Herman Zadig, v. p.; J. B. Shaw, Wells Fargo Nev. Natl. Bank, San Francisco, treas., at last accounts.

Inc. Nov., 1904, in California. **Cap.,** $2,160,000; $10 par; assess Registration Trust Co., registrar. Listed on New York Curb.

Property: a famous group of claims on the Comstock lode, near V ginia City, Storey county. Is one of the old time Comstock lode prope now controlled by Zadig and associates.

GOWGANDA COPPER CO. NEVA

Probably dead, as letters sent company's officers are returned Goldfield, Nev.

Officers: C. A. Braconier, pres.; Herman Krieger, sec.; S. H. To son, Reese Wampler, W. H. Brock, directors, at last accounts.

GOLD TOP MINING

Address: 5[illegible]

Officers: D[illegible] EXTENSION MINES CO. NEVA

Kean, sec., with [illegible] Clara College, Santa Clara, Calif. [illegible] O'Neal, v. p.; M. J. Rankin, [illegible] Beattie, and W. C. Ralston, cons.

supt.

Inc. in 'N[illegible]

Property[illegible] treasury shares offered at $1 each in Dec., [illegible]

der county, [illegible] acres, in the Silverzone district, being reope[illegible]

135' vertical [illegible] late in 1919. Shipments were to be started e[illegible]

and copper

Equir NEVA

Gibson [illegible] MINE

extent [illegible] Silverzone (Hannapah), Nevada.

GOOI [illegible] Frederick E. Browne. The mine has an old shaft reco[illegible]

O [illegible] which is reported to expose $150,000 worth of ore above [illegible]

Clark [illegible] Nevada has been re-christened Silverzone (q. v.) as a [illegible]

trea [illegible] the renaissance of the old silver camps of Nevada, brought ab[illegible]

mg [illegible] increased price of silver. The mineral deposits of the camp h[illegible] many years, but after working out the richer oxidized o[illegible]

[illegible] was not considered profitable and aside from some lea[illegible]

A [illegible] camp has long been idle. In 1919, the activity of Divide, [illegible] reopening of the Old Hannapah mine, and the incorporation [illegible] companies to develop and operate other properties in [illegible]

HARVEY GROUP NEVA

Address: Stindl & Donohue, lessees, Pioche, Nev.

The mine is 1 mile east of Pioche, Lincoln county, and in April, [illegible] Shoebody 9' wide was cut that consisted of galena averaging $80 to [illegible] per ton. Shipments were made in 1919, but no record is obtainable.

HAYSTACK MINES CO., INC. NEVA

Address: Winnemucca, Nev.

Officers: Pete Egoscue, pres.; F. L. Reber, v. p.; C. T. Smith, [illegible] B. J. Loinaz, treas.; with Y. Arrascada, and Jose Ugariza, directors.

Inc. June, 1914. **Cap.**, $1,000,000; none issued. Annual meeting [illegible] Tuesday in January.

Property: 5 unpatented claims, 35 miles W. of Winnemucca and 7 m[illegible] S. of Jungo, Humboldt county, on the Western Pacific R. R. Ore ca[illegible] free-milling gold in fissure veins in granite and quartzite, said to aver[illegible] $22 per ton.

Development: by 3 shafts, deepest 100'. Machinery installed in 19[illegible]

HIDER NEVADA MINING CO. NEVA

Officers: Fred Redmond, pres.; J. J. Morris, sec.-treas., with Mrs. F. Pitt, E. O. Lee and T. E. Fitzgerald, directors.

Cap., 1,000,000 shares; 347,980 issued.

Property: about 23 miles south of Battle Mountain, Lander co[illegible] said to show several veins carrying copper ore.

Development: includes 125' incline shaft and a tunnel.

Management shipped some ore from the dumps in 1917. No re[illegible] returns.

HILLTOP MILLING & REDUCTION CO. NEVA

Hilltop, Lander county, Nev. **Officers and directors:** Frank L[illegible] pres.; Chas. E. Beach, v. p.; E. Ross Carver, sec.-treas. and mgr.

Inc. in Nevada. **Cap.**, $50,000; shares $10 par; all outstandin[illegible] nual meeting in January. Company operated a 75-ton 10-stamp [illegible] plant at last accounts.

HOLDEN MINING & MILLING CO.

Address: 1482 Broadway, New York City, and Tuscarora, N[illegible] Harrington, pres. C. C. Griggs, mgr.

Inc. 1916, in Nevada, to take over lease and bond on 2 [illegible]

HANNAPAH DIVIDE EXTENSION MINES CO. NEVADA

Office: M. J. Rankin, Santa Clara College, Santa Clara, Calif.

Officers: W. R. Porter, pres.; Louis O'Neal, v. p.; M. J. Rankin, sec.-treas.; with I. E. Chapin, D. A. Beattie, and W. C. Ralston, cons. eng. directors.

Inc. in Nevada; 300,000 treasury shares offered at $1 each in Dec., 1919.

Property: 9 claims, 176 acres, in the Silverzone district, being reopened and rich silver ore struck late in 1919. Shipments were to be started early in 1920.

HANNAPAH MINE NEVADA

Address: Silverzone (Hannapah), Nevada.

Owned by Frederick E. Browne. The mine has an old shaft recently retimbered, which is reported to expose $150,000 worth of ore above the 150′ level.

Hannapah Nevada has been re-christened Silverzone (q. v.) as a result of the renaissance of the old silver camps of Nevada, brought about by the increased price of silver. The mineral deposits of the camp have been known for many years, but after working out the richer oxidized ores deep exploration was not considered profitable and aside from some leasing work, the camp has long been idle. In 1919, the activity of Divide, led to the reopening of the Old Hannapah mine, and the incorporation of several new companies to develop and operate other properties in the district.

HARNEY GROUP NEVADA

Address: Stindl & Donohue, lessees, Pioche, Nev.

The mine is 1 mile east of Pioche, Lincoln county, and in April, 1919, an orebody 9′ wide was cut that consisted of galena averaging $80 to $100 per ton. Shipments were made in 1919, but no record is obtainable.

HAYSTACK MINES CO., INC. NEVADA

Address: Winnemucca, Nev.

Officers: Pete Egoscue, pres.; F. L. Reber, v. p.; C. T. Smith, sec. B. J. Loinaz, treas.; with Y. Arrascada, and Jose Ugariza, directors.

Inc. June, 1914. **Cap.,** $1,000,000; none issued. Annual meeting first Tuesday in January.

Property: 5 unpatented claims, 35 miles W. of Winnemucca and 7 miles S. of Jungo, Humboldt county, on the Western Pacific R. R. Ore carries free-milling gold in fissure veins in granite and quartzite, said to average $22 per ton.

Development: by 3 shafts, deepest 100′. Machinery installed in 1919.

HIDER NEVADA MINING CO. NEVADA

Officers: Fred Redmond, pres.; J. J. Morris, sec.-treas., with Mrs. A. F. Pitt, E. O. Lee and T. E. Fitzgerald, directors.

Cap., 1,000,000 shares; 347,980 issued.

Property: about 23 miles south of Battle Mountain, Lander county, said to show several veins carrying copper ore.

Development: includes 125′ incline shaft and a tunnel.

Management shipped some ore from the dumps in 1917. No recent returns.

HILLTOP MILLING & REDUCTION CO. NEVADA

Hilltop, Lander county, Nev. **Officers and directors:** Frank LeBa pres.; Chas. E. Beach, v. p.; E. Ross Carver, sec.-treas. and mgr.

Inc. in Nevada. **Cap.,** $50,000; shares $10 par; all outstanding. Annual meeting in January. Company operated a 75-ton 10-stamp cyanide plant at last accounts.

HOLDEN MINING & MILLING CO. NEVADA

Address: 1482 Broadway, New York City, and Tuscarora, Nev. J. L. Harrington, pres. C. C. Griggs, mgr.

Inc. 1916, in Nevada, to take over lease and bond on 2 claims of the

IROQUOIS COPPER CO. **NEVAD**

Address: Mina, Nev.

Officers: H. B. Lind, pres.; M. A. Lind, v. p.; J. L. Fenwick, se treas.

Inc. in Nevada. **Cap.,** $12,000; par $1; 8,000 shares issued and own by the Nevada & Boston Copper Co.

Property: the Iroquois Copper Co. hold title to a group of 9 l mining claims adjacent to the Wall Street mine, and midway between Mi and Luning, Nevada. The property covers a contact-metamorphic zo 3,000' long and 50' to 300' wide, of garnetized limestone with porphyry trusions, but no definite contact; course of zone, N. E.-S.W. This mater carries ore in fractures and cross fissures, the garnet material being ported to carry a large body of 1½ to 2% copper ore.

Development: by 1,300' of workings, including the 125' Mary and M Mastadon shafts on a 18 to 48" strong vein of oxidized ore.

During 1916-1918, property was worked by lessees who shipped ore th averaged 7% copper, 2 oz. silver and gave a return of $50,000.

JACKET-CROWN POINT-BELCHER MINES CO. **NEVAD**

Office: Mills Bldg., San Francisco, Cal. Mine near Virginia Ci Storey county, Nev.

Directors: M. B. Forman, C. L. Moore, J. L. Brainard, H. W. Glens and L. M. Bliss. Wm. P. Miller, supt., Virginia City, Nev. Company is merger of 3 of the big Comstock mines.

Inc. Feb. 11, 1915, in California. California Corporation Commissi authorized issue of 360,000 shares common and 12,000 shares preferred the Yellow Jacket G. & S. Mng. Co.; 208,000 common and 10,400 prefer to Belcher Mng. Co., and 150,000 common and 10,000 preferred to the Cro Point G. & S. Mng. Co. Above stock is in payment for all properties these 3 companies subject to debts of $80,962; 217,600 shares were sold par, and money used for development.

Property: the bonanza mines that made the fortunes of Flood, Mack Lucky Baldwin, and D. O. Mills. The mines are in the southern part the Comstock lode, a great fissure vein 4 miles long, filling a fault plane the andesite-diorite rocks of Mt. Davidson, near Virginia City. The o is quartz carrying silver-gold. Geology described in Monograph 3, U Geological Survey.

The merger made it possible to install modern pumps, to unwater 1,700' and 1,800' levels of the mines where good ore was worked until great influx of hot water stopped mining.

Equipment: 125-ton mill and cyanide plant erected 1917.

Production: for 1915 and first half of 1916 came from old stopes a and workings on the 1,600' level and above, the average production fro both mines reported at about 1,000 tons per week. No recent report work received, but property was being operated 1918-19.

JARBIDGE CENTRAL MINES CO. **NEVAD**

Closed down.

Officers: J. P. Duncan, pres.; Angus McDonald, v. p.; W. W. Fi sec.; with John MacRae, Ira Brackitt and H. O. Milner, directors.

Inc. Oct. 5, 1911, in Nevada. **Cap.,** $1,500,000; $1 par; 1,250,000 issue

Property: 9 unpatented claims in Jarbidge district, Elko county, n to show a quartz vein in rhyolite, dipping 85° S. W. and pitching S. 32° Average gold assay is $15 to $20 per ton.

Development: by vertical shaft to 65' and by 2 tunnels 175' and 2 long. Work in 1916 cost $5,000, done on an option. A prospect.

JEFFERSON GOLD & SILVER MINING CO. **NEVAD**

Address: S. H. Brady, mgr., Reno, Nev.

Property: the old Kanrohat mine in Jefferson canyon, 8 miles fro Round Mountain, Nye county, developed by 4 tunnels to depth of 1,0 An orebody 14' wide reported exposed on the bottom level. Ore carri gold and silver.

JULIA CONS. MINING CO. NEVA

Address: 315 Bush St., San Francisco, Calif.

Cap., $550,000; shares $5 par. Listed on New York Curb, but lifel

Property: on the Comstock Lode, Storey county, is practically worked. Assessments made at intervals. Idle.

JUMBO COPPER MOUNTAIN MINING CO. NEVA

Office: Goldfield, Nev.

Officers: Chas. Sprague, pres.; J. K. Turner, v. p.-cons. engr.; Gill, sec.-treas. L. L. Dellinger, supt.

Inc. Nov., 1917, in Nevada. **Cap.,** $2,500,000; shares $1 par; assessal Assessment of 2c per share levied April, 1918. Company is a subsidiary of Jumbo Extension Mng. Co. (which see), whose shareholders received one sh in this company for each Jumbo Extension share held, free of charge. Vend of the Copper Mountain mine took $25,000 worth of shares in the new comp at 25c. each as part payment for mine.

Property: 5 patented, 12 unpatented claims, 340 acres, 18 miles fr rail at Nolan, Mineral county.

Development: by 3 shafts, with over 6,000' of workings. A cross from No. 1 shaft opened 3' of 7% and 5' of 4% ore, and from No. 2, 3' of and 4' of 4% ore in 1917. No. 3 shaft at 385' depth passed through the con zone (porphyry and limestone) exposing 8' of sulphide ore assaying 5% cop Recent work has been devoted to development on the 275' level of No. 3 sh By September, 1919, the drift was out 635', it having been in ore for 150'.

Production: shipments to September, 1919, by company and less amounted to over $100,000.

Reported in November, 1919, that company was about to abandon mine the owners, Ed. La Patt, Ed. Schultz and Mrs. J. L. Woodward, deman $50,000 due on purchase price. Company spent $130,000 to date.

JUNE BUG DEVELOPMENT CO., INC. NEVA

Office: Ogden, Utah. **Mine office:** Las Vegas, Clark county, Nev.

Directors: Lester S. Scoville, pres.; Milton J. West, v. p.-mgr.; Fra L. Scoville, sec.-treas., with John Hochett and Walter B. Scoville.

Inc. Jan., 1916. **Cap.,** $100,000; shares 10c par; 825,000 issued. Ann meeting, January 4.

Property: 9 claims, surveyed for patent, 18 miles N. W. of Las Veg in the Goodsprings district, Nev., said to show gold, silver and zinc ore. ore occurs in shoots 30' long, and 6-10' wide and from 14" to 5' thick, reported assay 40% zinc, $1.50 gold and $4 silver per ton. The ore is a zinc silicate. Ve are in limestone formation.

Development: by shallow shafts and about 1,200' of workings. Sh ments of 650 tons for 4 months ending June, 1916, to the Utah Ore Sampling C returned $35,000. Three cars of ore shipped in March and April, 1917, retu $2,811. No shipments since. Driving a new tunnel in 1919, which was expe to cut the ore at a greater depth.

JUSTICE GOLD & SILVER MINING CO. NEVA

Address: 264 Russ Bldg., San Francisco, Calif.

Officers: Franklin Leonard, Jr., pres., 25 Broad St., New York C Wm. Bannan, v. p.; J. B. Shaw, sec.

Inc. 1904, in California. **Cap.,** $105,000; $1 par, reduced from assessable; last assessment levied March, 1917.

Property: a group in the Gold Hill mining district, Storey county, south end of the Comstock lode. The company is sinking a new shaft down over 200', and said to be in ore.

JUSTICE GOLD MINING CO. NEVA

Address: Goldfield, Nev.

Officers: O. M. Justice, pres.; John La Foe, v. p.; Mrs. A. B. H sec.-treas.; C. W. Hays, gen. mgr., with J. R. West, directors, at last acco

Inc. 1914, in Nevada. **Cap.,** $1,000,000; shares, $1 par. Stock l on San Francisco Stock Exchange.

Property: the Gold Coin Extension claim in the Diamondfield sec

Equipment: includes air-compressor, electric hoist and necessary bui
ings.

KENTUCK MINING CO. OF NEVADA NEVA

Office: 264 Russ Bldg., San Francisco, Calif.

Officers: Wm. Bannan, pres.; E. G. Fisher, v. p.; J. B. Shaw, s
Wells Fargo Nev. Natl. Bank., treas.

Inc. Jan. 6, 1912, in California. **Cap.,** $1,050,000; shares $10 par. Lis
on New York Curb.

Property: at Gold Hill, Storey county, has been idle many years.

KEYSTONE CHROME MNG. CO. NEVA

Address: Mina, Nev.

Inc. June 24, 1919, in Nevada, by J. M. O'Brien, B. E. Bonner, C
Goodnight, and Zeb Bonner. **Cap.,** $100,000; 10c par.

KIMBERLY CONSOLIDATED MINES CO. NEVA

Office: 1200 Liberty Bldg., Philadelphia, Pa. **Mine office:** Hill
Nevada.

Officers; Frank LeBar, pres.; Geo. A. Ford, v. p.; B. A. Miller, s
treas.-mgr., with Chas. A. Beach, S. P. Curtis and John L. Cox, directors. J
Fenstermaker, supt.

Inc. 1910, in South Dakota. **Cap.,** $5,000,000; shares $1 par; 4,297,
shares issued. Stock listed on the San Francisco Exchange. Annual mee
in May.

Property: 18 claims, all patented, 360 acres, at Hilltop, Lander cou
shows gold, silver, copper and lead ore in quartz veins. The vein runs N.
dips W., and is said to have been proven for 5,000′ in length. A crosscut dri
on the 350′ level reported to have cut a 12′ vein assaying $9.48 per ton. De
oped by 5,000′ tunnel and several shafts.

Equipment: included compressor, ½ mile tram and 25-h. p. gaso
engine. 50-ton mill and cyanide plant.

No recent returns received.

KIMBERLY SHIPPER MINING CO. NEVA

Office: 1337 Roosevelt Ave., Salt Lake City, Utah.

Officers: W. S. Gilsey, pres.; F. L. Sumpter, v. p.; C. W. Fleck, s
Salt Lake City, Utah; C. L. Shelley, treas., with G. H. Gould, directors.

Inc. in Utah. **Cap.,** $50,000; shares 5c par.

Property: 60 acres at Hilltop, Lander county, 20 miles E. of Ba
Mountain, shows gold-silver ore. Developed by 800′ tunnel and drifts. A s
ment to the U. S. smelter in December, 1915, yielded $75 per ton. No re
returns.

KINSLEY DEVELOPMENT CO. NEVA

Idle, and probably dead.

Officers: at last accounts, John D. Kendall, pres., Felt Bldg., Salt L
City, Utah; W. M. Bradley, v. p.; Newton A. Dunyon, sec.-treas. and mgr.;
J. Deighton, asst. sec.; preceding with B. F. Beaur and Wm. Pischell, direc

Cap., $1,000,000; shares $1 par.

Property: 28 miles from Currie, Elko county, on Nevada North
railroad, shows limestone cut by parallel N.-S. fissures, which carry copper
at the south end of the property and lead ore 1½ miles north. Worked in
mittently by lessees. Had steam plant, 3 hoists, compressor and a concentra
mill erected 1909.

KIRCHEN MINES CORPORATION NEVA

Property: St. Patrick group at Luning, Mineral county, sold at sheri
auction, September, 1918, to satisfy a judgment for $2,168.

KIRK MINE NEVA

Address: Chas. J. Wilson, owner, Hilltop, Nev.

Property: 2 claims, 40 acres, in Hilltop mining district, Lander cou
developed by 140′ tunnel to depth of 70′. Ore is a sulphide, occurring as
deposit in porphyry and gneiss, with shoots of ore reported to assay 30%
mony.

Gross returns from shipments in 1918 were $1,400, and expenditure $

LIBERTY GROUP NEVA

Address: Jas. G. Lindsay, owner, Commercial Trust Bldg., Philadelphia, Pa. W. H. Aubrey, mgr.

Property: a mine at Liberty, 20 miles from Tonopah, Nye co which was worked in the 70's, the old workings reaching a depth of 700'. cent work said to have opened an orebody 10' wide at depth of 60', assayi oz. silver and 6½% lead. Operated intermittently.

LINCOLN HILL MINING & MILLING CO. NEVA

Office: Lower Rochester, Nev.

Officers: C. D. DeLorme, pres.-mgr.; F. L. Reber, v. p.; F. B. Lorme, sec.-treas., with John M. Adams and Adam Patterson, directors.

Inc. April 8, 1913, in Nevada. **Cap.**, $1,750,000; $1 par, increased from $1,000,000.

Property: Lincoln Hill mine, 2 claims and a fraction, 45 acres, on coln Hill, Rochester mining district, Pershing county.

Ore: occurs in well-defined fissure veins. Samples from a 40' under development in the east end of the tunnel assayed $62 in gold and

Development: by 1,600' of tunnels, raises and winzes.

Equipment: includes electric power, compressor, power drills, 2-stamp mill of 12 tons daily capacity. Management plans enlarging mill a stalling electric power. Over 500 tons of ore have been milled to date, av ing better than $100 per ton.

LONE MOUNTAIN MINING CO. NEV

Operated under bond the Rip Van Winkle mine of the Alaska Improv Co., which see.

LONGFELLOW GOLD M. & M. CO. NEV

Address: Carman Heights, Gardnerville, Nev.

Officers: W. I. Boardman, pres.; H. H. Fisher, v. p.; E. W. Ca sec.-treas.-mgr., with Dr. M. A. Albe, J. M. Albe, C. L. Hale and J. R. directors.

Inc. 1903, in Nevada. **Cap.**, $1,500,000; $1 par; 1,325,000 issued.

Property: 8 claims, 150 acres, in Red Canyon district, Douglas co said to show quartz veins in monzonite averaging $10 in copper, gold, silver lead.

Development: by 265' shaft and 845' tunnel to depth of 415'.

Equipment: includes gasoline hoist, compressor, pump, 30-ton mill

Management plans further development work and enlarging equipment.

LORING NEVADA MINES CO. NEV

Address: Lovelocks, Pershing county, Nev.

Inc. Sept., 1919, by W. A. Huston, A. Bermedetti, and J. C. Fe **Cap.**, $150,000; 10c par.

Property: a group of claims in the Loring district.

No other information available.

LORING TREASURE HILL MINES CO. NEVA

Address: Weir Bros. & Co., 25 Broad St., New York City.

Property: a group of claims southeast of the Honeybee mine a ing, Pershing county. Surficial indications said to be good. Ore carri gold. A carload sent to smelters yielded $68 per ton. Dumps contain hundred tons of $10 ore.

LOUISIANA CONSOLIDATED MINING CO. NEV

Offices: 25 Broad St., New York City; and 305 Nat'l Bank Bldg., pah, Nev.

Officers: Julius Siegbert, pres.; Herman Rawitser, v. p.; L. A. J sec.; R. S. Nichols, treas., with Jas. E. Osborn, Wm. V. Creighton a Housman, directors. Fred W. Draper, gen. mgr.

Inc. May 17, 1912, in Nevada. **Cap.**, $100,000; 10c par; increa $2,500,000; $1 par; 1,590,325 issued. Bonds authorized $250,000; o $95,000. Listed on New York Curb and San Francisco Exchange. Q 50c, October, 1919. Registrar & Transfer Co., New York, registrar.

Property: 43 claims and a fraction, 808 acres, including the T

Equipment: includes air compressor, electric motors, machine dri and useless 10-stamp mill.

Lessees are reported to have mined ore worth $100,000 during the 12 mont ended October, 1919. Their work has not revealed any new orebodies. November, the Haller lease shipped 15 tons of 350 oz. silver and 18% lead o In October, the company decided to resume operations, and levied an assessm of 1c per share. The Mills property adjoining, and the townsite and wa supply of Hawthorne was acquired, a total of 2,000 acres.

LUCKY DEPOSIT MINING CO. NEVAD

Officers: L. G. Hardy, pres.-gen. mgr.; J. P. Cahoon, v. p.; C. W Knudsen, sec.-treas., with A. N. Olsen, directors, at last accounts.

Inc. March 1, 1914, in Utah.

Property: 9 unpatented claims at Aurum, White Pine county, said show copper ore with some silver-gold values, running $45-$50 per ton.

Development: by 175' crosscut tunnel cut along a porphyry dike s to measure 200' across. The tunnel being driven to reach depth of 300'.

A little ore was shipped in 1917. No recent returns.

LUNING CONS. SILVER MINES CO. NEVAD

A merger, early in 1920, of the Luning Gold Mines Co. and R. B. Todd M ing Co. and controlled by L. A. Browne and associates of San Francisco New York.

Address: Gazette Bldg., Reno, Nev., and 1482 Broadway, New Yo A. E. Lowe, supt., Luning, Nev.

Officers: L. E. Browne, pres.; A. E. Lowe, v. p.-treas.; with E. P. Bal R. B. Todd and Frank Dunn, directors. C. D. Olney, sec.

Property: 23 claims, 460 acres, in the Luning district of Mineral coun Country rock is quartz diorite. Ore is partly sulphide, carrying gold silver. Mr. Lowe's report says veins average 3' of $25 ore, two-thirds it silver; one-third gold.

Development: by 300, 100 and 120' shafts, also by several tunnels, t being 700' long. Workings amount to over 5,000', blocking out ore valued $250,000.

Equipment: steam power, hoists, aerial tram, orebins, dwellings; to be built in 1920.

Production: $30,000 during past 15 years, under management of R. Todd.

LUNING GOLD MINES CO. NEVA

Merged early in 1920 into the Luning Consolidated Silver Mines Co. of vada, which see.

LUNING-IDAHO MINING CO. NEVA

Office: Reno, Nev. **Mine office:** Luning, Mineral county, Nev. **York office:** 1482 Broadway.

Officers: Robt. B. Todd, pres and gen. mgr.; R. G. Withers, G. M. Todd, sec.-treas., with A. D. Cox and W. T. Erickson, directors.

Inc. April 29, 1910, in Nevada. **Cap.**, $1,500,000; $1 par; 1,116,533 Operating expenses for 1916, $20,000; 1917, $24,505; 1918, $5,282.

Property: 13 claims, 260 acres, in the Pilot range in the Santa Fe ing district, shows several fissure veins in granite and quartzite, said to 2½% copper, 2 oz. silver and about 60c gold per ton.

Development: by shafts, open cuts and tunnels, with about workings to depth of 200'. Longest tunnel driven about 682' across the ized zone is near the hanging wall granite.

Equipment: includes hoists, compressor and drills.

Last shipments made in 1917. A flotation mill is planned. Prope ed on by M. H. Jacobs, J. C. Skuse, S. B. Parish and Wm. G. O tions during 1918-'19 were limited, owing to lack of working capital.

LYNN BIG SIX MINING CO.

Office: McIntyre Bldg., Salt Lake City, Utah. Mine

MANHATTAN CONS. MINES DEVELOPMENT CO. NEVAD

Address: P. O. Box 921, Tonopah, Nev. **Mine office:** Manhattan, Nev.

Officers: J. H. Miller, pres.; W. J. Douglass, v. p.; E. J. Erickson, 2d v. p.; C. C. Boak, sec.-treas., with C. F. Wittenberg, F. M. Manson and W. Webster, directors. M. N. Page, supt.

Inc. 1913, in Nevada. **Cap.**, $1,500,000; $1 par; assessable; 1,350,0 issued. Assessment No. 10 of 1c levied January, 1919. Listed on San Francis Exchange.

Property: 5 patented claims, 82 acres, in Manhattan district, N county, Nev. Litigation with White Caps company was settled in 1917, after years.

Geology: ore occurs as shoots up to 42′ wide in contact and chamb deposits in lime-shale. Assays from $18 to $30 per ton.

Development: by 565′ shaft and 3,500′ of workings, said to ha blocked out 40,000 tons of $16 ore. On the 3rd level an 8′ orebody was r ported to have been opened up for a distance of 25′, in May, 1919.

Equipment: 50-h. p. electric hoist, 6-drill compressor, and triplex pum

MANHATTAN COPPER MINING & MILLING CO. NEVAD

Idle. Pioche, Lincoln county, Nev. Company succeeded the Manhatt Gold & Copper Mining Co. and is owned by the Cons. Nevada-Utah Corporati successor of the Nevada-Utah Mines & Smelters Corporation.

Property: 7 claims, one in the Ely mining district, developed by 1 shaft, showing manganese, iron, silver, lead ore. The other 6 claims are Stampede Gap in the Highland district of Pioche and show small veins of silv lead and copper ore. Developed by 130′ shaft.

MANHATTAN DEXTER MINING CO. NEVAD

Address: Manhattan, Nev.

Officers: S. R. Moore, pres.; C. F. Wittenberg, v. p.; C. T. Lawren sec.-treas.

Inc. in South Dakota. **Cap.**, $1,500,000; shares $1 par. Stock listed San Francisco Exchange.

Property: 1 patented claim, at Manhattan, Nye county, Nev., operat intermittently by lessees in 1915-'17. Union No. 9 claim has 2 sets of lesse who are mining gold ore.

MANHATTAN MORNING GLORY MINING CO. NEVA

Property: adjoins holdings of the White Caps Mining Co., near M hattan, Nye county. Apex suit brought against the latter company decided versely for the claimants, March, 1918.

Stock listed on San Francisco Exchange.

MANHATTAN MUSTANG MINING CO. NEVA

Manhattan, Nye county, Nev. Property mostly held by Tram-Chase les who reported mining rich ore, at last accounts.

Stock listed on San Francisco Exchange.

MANHATTAN RED TOP MINING CO., REORGANIZED NEVA

Office: 126 Russ Bldg., San Francisco, Cal.

Officers: H. Zadig, pres.; W. E. Colburn, v. p.; C. E. Hudson, treas.; also directors. N. K. Franklin, supt.

Inc. Oct., 1912, in Nevada, as successor to the Manhattan Red T **Cap.**, $1,500,000; shares, $1 par; 1,000,000 issued; assessable. Two asse ments of ½c each levied December, 1917, and June, 1918.

Property: 60 acres in Manhattan district, Nye county, Nev.

Development: by 200′ shaft with crosscuts and drifts on the 110 l

Equipment: 40-h. p. hoist, compressor, drills, etc., electric power

A prospect whose shares have been extensively traded in on the San F cisco Stock Exchange.

Work was discontinued March, 1918, owing to a heavy flow of wate inadequate equipment.

MANHATTAN SU NING CO. NEVA

MASON VALLEY EXTENSION MINING CO. NEVAD

Re-organized under name of Mason Valley-Bluestone Extension Mi which see.

MASON VALLEY MINES CO. NEVAD

Office: 14 Wall St., New York. **Mine office:** Thompson, Lyon coun Nevada.

Officers: Wilber Judson, N. Peter Rathvon, David E. Thomas, Fra W. Holmes and E. O. Holter, v. p's.; Henry E. Dodge, sec.-treas.; presi with John F. Alvord, C. A. Corliss and C. F. Ayer, directors. A. J. McNab, mgr.

Inc. Jan. 14, 1907, in Maine. **Cap.,** $2,500,000; $5 par; increased Ma 14, 1910, from $1,000,000, shares $1 par; all issued. Bonded debt is $612,50 authorized $1,000,000 first mortgage 10-year 6% gold bonds, convertible into s on the basis of $10 per share and redeemable on 31 days' notice at 102½ a accrued interest.

The mortgage contains a sinking fund provision, by which the compan required to pay to the trustee within 60 days after January 1, each year, beg ning 1912, 20c for each net dry ton of ore treated during the year preceding, a provision whereby the sinking fund payments may be reduced proportionate as outstanding bonds are retired.

Guaranty Trust Co., New York, and United States Trust Co., Boston, re trars. Bankers Trust Co., New York, and Boston Safe Deposit & Trust C transfer agents. Shares listed on Boston Stock Exchange and New York Cu

Annual report for year ending December 31, 1918, shows: Current ass $1,723,767, and current liabilities, $205,558, compared with $1,639,347 and $214, in 1917. Net profit for 1918 amounted to $178,202, compared with $358,277 1917, and a deficit of $71,762 in 1916.

Property: 9 claims, patented, 170 acres, and a fractional claim of acres, known as the Spragg mine, lying south of the Bluestone and about miles west of Mason. Company also owns a smelter and 1,320-acre smelter near the railway.

The Gray Eagle property, 14 patented claims, 256 acres, near Happy Ca Siskiyou county, Cal., was acquired in September, 1916, for 144,250 fully- Mason Valley shares, said to be worth $721,250. The title to the property the name of the Gray Eagle Copper Co., all of which shares are held by Ma Valley. In 1912, Henry Krumb estimated ore reserves as 450,000 tons, aver ing 4.64% copper and $1 gold per ton. In 1916, O. R. Whitaker estimated follows:

	Tons	Copper, %	Gold, Oz.	Silver,
Semi-oxide	50,000	5.00	0.06	0.2
Mineralized walls	600,000	1.13	0.025	Tra
Chalcopyrite	440,000	4.68	0.50	0.0

Up to June, 1918, about 8,000' of underground work and 7,500' of diam drilling was reported to have proved 930,000 tons of ore averaging .025 oz. and 3.04% copper, and 500,000 tons averaging 0.01 oz. gold and 1% copper.

The Majuba Hill group, 20 miles E. of Imlay, Humboldt county, has developed under option since 1916. During 1917, 1,752' of work was done in 1918, 2,650'; said to have opened promising ground in the No. 3 tunnel. total of $142,509 had been expended on the Majuba group to December 31, 1 Shipments amounted to 788 tons of 11.51% copper ore in 1918, and in 1917 tons averaging 10% copper. The total to September, 1919, was 2,000 tons, a ing 12% copper and 1.4 oz. silver.

In Apr[illegible] the company was reported to have taken an option on [illegible] Northe[illegible] near Schurz, and to have started sinking a shaft.

Ge[illegible] county [illegible] garnet deposit between [illegible] tuffs. The latter rocks are [illegible] escarpments and sharp gul[illegible] altered limestone of [illegible] le cuprite, succeeded, at [illegible]

McCONNELL MINES CO. NEVA

Office: care O. H. Sonne, pres, Yerington, Lyon county, Nev. **M**
office: Mason, Lyon county, Nev.; S. B. Elbert, sec. and mng. engr.; **w**
Mrs. O. H. Sonne and Mrs. S. B. Elbert, directors.

Inc. Sept. 14, 1912. **Cap.,** $500,000; shares $5 par; issued, 40,002 shar

Property: 10 claims, 160 acres, patented, adjoining the Yerington Ma
chite mine on the west. Claims show limestone, shale and granite with arg
tiferous contact deposits in the contact zone near the grano-diorite. Prope
has 4 orebodies, 2 developed, averaging 25′ in width and carrying about 3.
copper.

Development: by 400′ shaft and 3 tunnels. **Equipment:** includes a
h. p. hoist, 7-drill air compressor and 8 buildings.

Production: in 1918, shipments to Mason Valley smelter totaled 3,
tons ore averaging 3.88% copper, producing 304,332 lb. copper.

Property regarded as good.

M. & D. MINING CO. NEVA

Office: 903 Boston Blk., Salt Lake City, Utah.

Officers: U. Terasawa, v. p.-mgr.; P. A. Clark, sec.; S. Samota, tre
with H. A. Smith, A. T. Clark and H. A. Smith, Jr., directors.

Inc. Aug. 6, 1916, in Utah. **Cap.,** $10,000; shares 10c par; assessab
Annual meeting, August 6th.

Property: 17 unpatented claims in Eldorado canyon, Clark county, s
to carry gold-silver-copper ore. A prospect.

MENDHA-NEVADA MINING CO. NEVA

Idle and probably dead. **Mine office:** Pioche, Lincoln county, N
T. J. Osborne, pres.; M. C. Godbe, sec., Newhouse Bldg., Salt Lake City, Ut

Cap., $1,000,000; shares $1 par.

Property: is said to have produced $500,000 under its former own
ship. The mine is reported to have a vein 3 to 15′ thick, averaging 6′, p
tically vertical and showing silver and gold-bearing lead and copper ores on
level. Development is by a 900′ incline shaft.

MERCURY MINING CO. NEVA

Adddress: G. D. Abbott, sec., 1022 Crocker Bldg., San Francisco, C

Mine office: Ione, via Austin, Nye county, Nev.

Officers: C. A. Norris, pres.; F. W. Bradley, v. p.; G. D. Abbott, s
treas.; Clifford G. Dennis, mgr.

Inc. May 7, 1910, in Nevada. **Cap.,** $1,000,000, all outstanding; sha
$1 par. Annual meeting second Wednesday in January.

Balance sheet for 1918 shows assets: $1,079,364, which include property
plant, $1,042,541; supplies, $4,135; stock, $5,100; cash, $25,304; surplus, $2
Liabilities include operating accounts, $51,781; reserve account, $27,584.

Comparative Operating Statement:

	Gross Earnings	Operating Expenses	Operating Pro
1918	$51,363	$51,363	$26,702
1917	9,704	11,949	2,245*
1916	31,099	33,042	1,943*
1915	44,127	26,299	17,828
1914	16,110	17,868	1,758*

* Deficit.

Property: 10 patented claims near Ione, said to show cinnabar
Company has one 25-ton Scott furnace.

Production: in 1911-'12, 9,467 tons ore, 2,480 flasks mercury; in
7,715 tons ore, 1,013 flasks; in 1914, 2,100 tons ore, 384 flasks; in 1915, 5,
ore, 417 flasks; in 1916, 73.14 tons ore, 399 flasks; in 1917, 94 flasks, and in
10,147 tons ore, 775 flasks. Flasks contain 75 lbs.

MERRILL SILVER-LEAD CO. NEVA

Address: J. K. Turner, ... Gold ... A. H. Merr
New York is president, and ... ll of Go ... gely interested.

Property: 10 claim ... Gol ... vein cross

mitic limestone and carbonaceous shale. Ore carries silver, which occurs argentite, with some gray copper, galena and gold. There is about 2,000' underground development.

Samples of over 4,000 tons varied from 3.8 to 177 oz. silver and 0.5% 0.7% lead, averaging 53.5 oz. silver and 0.04 oz. gold. Presumably idle.

MINERVA TUNGSTEN CORPORATION **NEVAD**

Office: 330 Investment Bldg., Los Angeles, Cal., and Pioche, Nev.

Officers: Bryant Mathews, pres.; J. B. Van Winkle, v. p.; O. Wern sec.-treas., with K. G. Gillette, A. M. Chase, and O. A. Knox, mgr., directors.

Inc. 1918, in Nevada. **Cap.**, $350,000; par $1; 250.000 issued. Operati expenses for past year totaled $35,000.

Property: 17 claims, 340 acres, in Minerva district, White Pine coun 55 miles N. E. of Ely and 77 miles N. W. of Pioche.

Examined by F. L. Hess, F. B. Weeks, E. R. Pembroke, J. B. Winwo J. Nelson Nevius, S. R. Porter, O. A. Knox and M. van Sicklen.

Geology: scheelite ore occurs in a quartz vein in limestone dipping 5 with E. W. course and 9 to 50' wide. Shoots are up to 750' long. Ore carr 1 to 4% tungstic acid as scheelite.

Development: by 100' vertical shaft and tunnels 200 to 350' lon Greatest depth is 150'. Workings amount to 3,000'.

Ore blocked out is estimated at 25,000 tons, with 100,000 tons probable.

Equipment: gas engines, compresor, drills, 3½-mile pipe-line for wat 150-ton gravity concentrating mill, camp for 50 men, auto-trucks, etc.

Production: 10 tons of 70% concentrate from test runs.

Pending an improvement in the tungsten market, work is confined to develo ment and experimental work in the mill.

MINES DEVELOPMENT CO. OF NEVADA **NEVAD**

Address: Lovelocks, Humboldt county, Nev.

Officers: John T. Reid, pres., treas. and gen. mgr.; Paul G. Reid, v. sec. and supt., with R. C. Moore, J. Theis, Peter Anker and W. H. Raw directors, at last accounts.

Inc. Sept. 1, 1904, in Arizona. **Cap.**, $750,000; shares $1 par; issue $454,000.

Property: 5 claims, 100 acres, in the Juniper Mountain district, s to show various fissure veins, alongside of quartz porphyry dikes, intrusive monzonite. Veins run N. 20° W. and are nearly vertical. The vein develop averages 5' wide, is traceable for 2,000' and proven to 170' depth. Small sca of ore found at or near surface show chalcocite, bornite and tetrahedrite, giv average assays of 2% copper, 5 oz. silver and $1 gold per ton.

Development: by a 500' tunnel. An 800' shaft to explore surface posits at depth is proposed. Property has been idle for several years, owing lack of funds and speculative character of claims.

Company also has some claims under option in the Table Mountain distr Churchill county, Nev. Two cars of sorted ore shipped are said to have retur 22 and 26% copper. Mine is remote from rail and only assessment work done.

Company [illegible] 60,000 shares of the Buffalo Valley Mines Co., which se

MINNESO[illegible] **[illegible]PER MINES CO.** **NEVAD**

Formerly [illegible] Mines Co.

Addres [illegible] Nev.

Inc. in [illegible] $1 par.

Prope [illegible] county and [illegible] in Lyon coun near Wabu[illegible] deposit bel limestone [illegible] oxidized ore.

MONTEZUMA SILVER MINES CORPORATION NEVA

Office: Goldfield, Nevada.

Inc. Oct. 5, 1917, in Nevada. **Cap.,** $1,000,000; par $1; about 150,0 treasury

Officers: H. B. Nedham, pres.; J. G. Thompson, v. p.-res. agt.; Jo Hover, sec.; Robert Dixon, treas.; Duncan Cameron, asst. treas.; A. Cooper, mine supt.

Property; 9 patented claims, 178 acres, in the Montezuma district, meralda county, Nevada, about 16 miles S. W. of Goldfield (nearest point), and 30 miles S. W. of Tonopah. Properties were operated as vidual mines and produced heavily 40 years ago, the ore being haule mule teams 200 miles to Austin, Nevada, for smelter treatment. Oper of properties was resumed by present company, 1917, the new develop giving a noteworthy improvement in the physical condition of the pr ties. Prior to resumption of operations in 1917, about 9,000′ of develop had been performed in the various properties, the deepest working b a 300′ shaft on the Bullion mine, and many thousands of tons of valu mill ore placed on the dumps. Properties are traversed by 10 diffe veins varying in width from 1 to 10′. Ore assays upwards from $10 a in silver, lead, copper, gold, and a small amount of zinc. Three fee rich jamesonite ore (sulphantimonite of lead) was cut at 260′, in new s this ore carries high silver values.

MONTGOMERY-SHOSHONE MINES CO. NEV

Address: W. G. Benham, asst. sec., 30 Church St., New York Cit

Property: in Rhyolite mining district, Nye county, is an old operated intermittently.

MORRIS SYNDICATE MINES NEVA

Address: W. C. Losey, Paulsen Bldg., Spokane, Wash.

Property: 6 unpatented claims, 23 miles N. E. of Mina, Mineral co Nev., and near the Olympic Mines Co.'s property, a producer.

Geology: shoots 2 to 20′ wide reported to occur in contact vein in r lite and andesite. Ore said to assay $30 gold per ton. Developed by 60′ in 1917; no later data.

MT. VERNON M. & M. CO. NEV

Address: G. A. Bice, pres., Box 166, Sparks, Nev. T. K. Byers. S. O. Trescott, sec.-treas., Box 1004, Tonopah, Nev. Joseph Vernon, supt.

Property: 23 claims at Tokop, 30 miles S. of Goldfield and 8 mil of Hornsilver, Esmeralda county, 9 miles from the T. & T. railroad. claims were owned by Le Champ D'Or, a French company.

Production: is variously reported to be as high as $70,000, from a of 75′. There has been no systematic development. Dumps contain over tons of gold-silver ore. Some rich ore was reported found in December. and a small mill was to be erected.

MUNCY CREEK MINING CO. NEV

Offices: Judge Bldg., Salt Lake City, Utah, and Aurum, Nev.

Officers: C. D. Ray, pres.; S. A. Greenwood, sec., with Jos. Cr directors. H. L. Parker, gen. mgr.

Property: 23 claims, a millsite and the Muncy Creek ranch at A White Pine county.

Ore: in the Grand Deposit mine the main vein shows carbonat ore on the footwall and lead-silver ore on the hanging, with an inte lens of copper sulphide. Ten known oreshoots are claimed to have 6% copper, 8 oz. silver, and 10-60% lead.

Development: by 240′ Grand Deposit incline shaft. Equipme cludes 25-ton mill, calcining plant, hoist, office and other buildings. T employed.

NATIONAL LEASING CO. NEV

A George Graham Rice promotion which went the way of all things Inc. 1917, in Delaware. Cap., $2,000,000; $1 par.

Company had a 5-year lease on property of the Charleston Hill Gold Co., at National, Nev. It was claimed that the gold-bearing vein of the

wide contact vein between granite and limestone, the material giving good p tests. A 135′ tunnel shows 60′ of ore, assaying from $9 per ton up in gold. second tunnel, 375′ long in December, will be continued until the ore is reach

NEVADA BLACK HAWK SILVER MINING CO. NEVAD

Office: 232 North Virginia St., Reno, Nevada.

Officers: C. C. Flagg, pres.; Chas. G. Sadlier, v. p.; A. D. Bird, se treas.; O. W. Whiting, E. M. and H. M. Hamlin, directors.

Inc. July, 1919, in Nevada. **Cap.**, $75,000; par 5c; 750,000 shares promotion stock outstanding.

Property: consists of 6 claims, viz: Black Hawk, Gray Hound, Glan Glance No. 1, Hamlin No. 1 and 2 with all claims joining. The Black Ha claim was worked in the 70's and early 80's, and has produced over $250,00 silver, lead, and gold. All of these claims have large outcrops, and samples r as high as $250 to $300 per ton. The property is in Black Hawk mining distr at Marietta, 17 miles S. W. of Mina, Mineral county, adjoining the Indola mine on the south, and the Silver Gulch Mining Co. on the southeast, 2 mi north of Marietta.

Development: by 200′ of shaft and tunnel work; 500′ of tunnel w crosscut the Black Hawk vein, and Hamlin vein at a depth of 300′.

No equipment, but contracting for engine and compressor for tunnel wo in October, 1919.

NEVADA BONANZA COPPER CO. NEVAD

Main office: 159 S. Main St., Salt Lake City, Utah. Mine at Morn star City, Lyon county, Nev.

Officers: Freeman Morningstar, pres. and gen. mgr.; Sereno B. Tut v. p.; Fred C. Dern, sec.-treas.; Walter C. Tuttle, asst. sec.-treas., with Robt. Deighton, H. P. Clark, W. D. Mathis, Thos. J. N. Nippur, M. S. Woolley P. L. Williams, directors.

Inc. 1906. **Cap.**, $2,100,000; $1 par; 1,448,000 issued.

Property: 12 claims, 7 patented, 250 acres, adjoining the Nevada D las ground, about a third of a mile from Ludwig, on Nevada Copper Belt road, in the Yerington district. J. C. Dick, E. M., of Salt Lake City, report fissure veins crossing property; the Green Dutchman vein being about 5′ and assaying well in gold and copper. The vein on the Copper King claim been developed by a 3-compartment, 115′ shaft, said to show copper ore its depth.

No record of recent operations obtainable.

NEVADA & BOSTON COPPER CO. NEVA

Address: care H. B. Lind, Mina, Nev.

Owns all the outstanding stock of the Iroquois Copper Co. (q. v.), has title to a copper property near Mina, Mineral county.

Inc. in Wyoming. **Cap.**, $2,500,000; par $1; 1,000,000 shares held intact by three stockholders; 10,000 sold; 1,490,000 in treasury.

NEVADA-BULLION MINES CO. NEV

Mine near Bullion, Elko county, Nev. Company often called the Nevada Mines Co., owns a group of claims adjoining the Nevada-Bu Mining Co. holdings and a half interest in the Kerr & Peterson lease company's ground.

Development: by a 1,980′ tunnel, which extended 300′ to cut the vein opened in old mine workings. but property is now tied up in litigation.

NEVAD[illegible]R HILL MINING CO NEV

Addr[illegible], Elko, Ne

Offic[illegible] Bride, p[illegible] W. W. Ba[illegible]

sec.-mgr., [illegible]on, tr[illegible] T. Wo[illegible]

Brown, [illegible] Davis[illegible] Ne[illegible]

Inc. [illegible] Nev[illegible]

in treasur[illegible]

Gross [illegible] $10[illegible]

NEVADA CHAMPION COPPER CO. NEVAD

Inc. 1907, in Arizona. Cap., $1,500,000; $5 par. Succeeded 1917 by t Pilot Copper Co., which see.

NEVADA CONSOLIDATED MINES & SELLING CO. NEVAD

Idle and probably dead.

Officers: Alex. Brown, pres.; Chas. L. Newton, v. p.; C. C. Matthew sec.; F. G. Carey, treas, at last accounts.

Property: about 1,000 acres, including a gold property formerly own by the Huntoon Valley Mining Co., 45 miles south of Hawthorne, Mine county, and copper claims 10 to 20 miles S. W. of Hawthorne, formerly own by the Walker Lake Expl. Co. The copper property, developed by 3 cross tunnels to 440' below the outcrop, was claimed by the company to have a v carrying disseminated pyrite and chalcopyrite, averaging 2½% copper and gold. This vein has apparently been lost in the lowest tunnel. Country rock granodiorite. The mine had 1,500' of workings.

NEVADA CO-OPERATIVE MINING CO. NEVAD

Address: Goldfield, Nev.

Officers: Chas. S. Sprague, pres.; J. K. Turner, v. p. and cons. en P. J. Somers, sec.

Inc. 1913. Cap., $2,000,000; shares $1 par; assessable; 1,500,000 sha in treasury. Company is a reorganization of Goldfield Mines Operating Co.

Property: 11 claims, 150 acres, including the Empress, in Gold Mou tain mining district, Esmeralda county, 37 miles S. E. of Goldfield, shows well-defined quartz veins, from 1-6' wide with numerous quartz stringers, runn N. E. The formation is Cambrian sedimentary rocks, quartz-monzonite p phyry, granite, rhyolite, and basalt.

Development: total work to June, 1915, was about 3,000', of wh 2,000 is on the Central or Liberty vein. A crosscut tunnel, driven 800', exp ore averaging $8.17 across a width of 1½'. Drifts run from a raise on the ha ing-wall from the 800' level, encountered a quartz vein, assaying $26.40 gold a 54c. silver per ton.

Equipment: includes several buildings and an old 10-stamp mill, wh is to be remodeled. Mine was inactive pending favorable opportunity for financing, but resumption reported in September, 1919.

NEVADA COPPER CO. NEVAD

Company inactive since 1910. Office: 572 Bullitt Bldg., Philadelph Pa. Mine office: Mina, Mineral county, Nev.

Officers: Jas. S. Austin, pres.; J. H. Whiteman, v. p.; C. A. Higbee, s treas. Company is controlled by the owners of the Tonopah Mining Co.

Property: Dunlap copper mine, 10 claims, 200 acres and millsite, Silver Star mining district, 10 miles E. of Mina, operated under lease in 1 by E. S. Chaffey.

Claims show quartzite and quartzite-breccia with mineralized zone 700' w and 2,000' long, carrying ore-bearing reefs with oxides, carbonates and s copper. Shipments made in 1919 reported to have assayed 6% copper.

Development: by several thousand feet of tunnel, open-cuts and win mostly in ore, but none showing sulphide, as water-level is not reached.

Equipment: includes compressor, blacksmith shop, etc.

NEVADA COPPER HILLS MINING CO. NEVAD

Idle, and possibly dead.

Office: 18 South Mulberry St., Mansfield, Ohio. Mine office: Lu Mineral county, Nev.

Officers: at last accounts, A. H. McCullough, pres.; F. W. Le v. p.; T. J. Foster, sec.; Chas. Ritter, treas.; Rowland Lea, gen. mgr.

Inc. Oct. 24, 1907, in Nevada. Cap., $1,500,000; $1 par; issued Farmers Savings & Trust Co., Mansfield, Ohio, registrars. Annual meeting Monday in December.

Lands: 10 claims, 200 acres, in the Fitting district, 9 miles s Luning. The property is reported, by Mr. Lea, to have replacement ore in limestone over a width about 600', with a N.-S. strike, and a dip of 6°.

During the first four months of 1919, the total loss on shipping ore w
$47,560 was $78,378.

Property: about 950 acres, with 2 millsites, 80 acres, and miscellane
lands, including water-rights, giving total holdings of about 1,070 acres on
western slope of the Mason mountains. Lands include former holdings of
Ludwig Copper Mng. Co., the Douglas C. Mng. Co., which succeeded the Dou
M. & S. Co., the Nevada Douglas Co. and the Moore Mng. Co. Holdings of
Nevada Douglas C. Co. consisted of 4 separate and distinct mines, the old Dou
mine, the Amalgamated group and the Casting Copper mine, being the orig
holdings of the company, and the Ludwig mine. Country rock consists of li
stone intruded by grano-diorite with large contact orebodies and fissure v
There is also one claim at Buckskin, 7 miles distant, which carries fluxing ore

The Moore Mng. Co. owned the Moore group of claims, a prospect
about 450′ of development work and "considerable oxidized ore blocked out
way that it cannot be measured." Property of the old Western Nevada Co
Co., described in Vol. X, has been fully paid for by Nevada Douglas.

Ludwig mine: is about a mile N. W. of the Douglas. The prop
comprises 2 mining claims and a 40-acre tract in Smith Valley, on which t
is a well and pumping station. The Ludwig was opened 1865, and was a shi
for some years of small quantities of high-grade ore, production including s
very handsome malachite and azurite, a portion of which was sold to lapida
and considerable bluestone was mined for the old mills of the Comstock
used the Washoe process.

Geology: the ore occurs in a fissure vein with a white limestone f
wall and a silicious limestone hanging wall, which changes to a garnetiferous li
stone, heavily impregnated with sulphides in places. Where crushing has
mitted surface waters to work downward, large bodies of carbonates and co
glance ores are found as replacements in the footwall limestone. The
proper has an average width of about 30′ and has been developed along
course for 1,300′ and to a depth of 800′ by levels, along hanging wall, every
The orebody on the 700 level is 50′ wide and 300′ long and runs 6% copper.
shoots, or pipes, of high-grade secondary ore, running from 16 to 30% in co
form chamber deposits in the limestone near the porphyry contact, proven d
to 800 level. Ore reserves were estimated at 200,000 tons of 2% copper or

In addition to copper ore, the Ludwig has a very large deposit estimate
contain 15,000,000 tons of gypsum, on the footwall, said to be 3,000′ long,
wide and 400′ deep, which figures seem high. This deposit of gypsum i
commercial value, and some has been mined and shipped.

Douglas mine: this has a typical contact metamorphic deposit in w
garnetized limestone carrying copper sulphides and their resultant oxi
ores occur in very irregular orebodies in limestone, which have a tend
towards a horizontal rather than a vertical extension. The mineralized
is about 700′ wide and 2,000′ long with numerous parallel fissures which see
control the mineralization. This mine has been developed by a main wor
tunnel and a deeper haulage tunnel with numerous crosscuts and drifts
the property. The working tunnel, 4,290′, has an average depth of 120′ be
the surface and the ore is in places continuous to the surface. Four 50′ w
show the downward extension of the ore. Claimed to have 75,000 tons of
blocked out.

The **Casting Copper mine** shows a large area of garnet-epidote lime
constituting low-grade carbonate ore, which will be extensively mined.
mine has a vertical 350′ shaft and a 500′ tunnel. Claimed to have 100,
blocked out. When shipments were being made to the smelter the ore
5% copper as compared with 3% in the Douglas mine.

At the Amalgamated mine little development work has been done, but
surface exposures indicate the existence of similar large contact meta
deposits.

Ore reserves: in all properties are estimated at 550,000 tons
out, and 2,000,000 tons partly blocked. A report says that "Engineers
probable ore several times the latter amount." In May or June, 19

Officers: W. C. Losey, pres.; S. S. Endslow, sec.-treas.

Property: 4 groups of claims, comprising 24 claims near Luning, M eral county. The Carbonate group is developed by 1,800′ of workings to d of 350′, and the Montreal group of 4,000′ of workings, said to have disc several orebodies containing gold, silver and copper values.

NEVADA HILLS MINING CO. NEVA

Address: Reno, Nev.

Officers: Geo. Wingfield, pres.; H. M. Hoyt, v. p.; E. A. Julian, mgr.; C. F. Burton, sec.-treas., with Chas. E. Knox and L. A. Gibbons, direct A. H. Westall, supt.

Inc. April 19, 1906, in South Dakota. **Cap.**, $6,250,000: $5 par: 1,065 shares issued. Reno National Bank registrar. Stock is listed on San Franc Exchange and New York Curb.

Property: the Fairview Eagle mine, about 107 acres, at Fairvi Churchill county, Nev. After a profitable career as a gold-silver producer mine was closed early in 1917 and company is looking for a new property.

Company's operations in former years were quite successful, the sur at end of 1916 being $351,140 or about 33c. a share. In 1918, company gave M on various sections of the mine, resulting in shipments of high grade ore to Hazen Sampler in 1918 and 1919.

NEVADA HUMBOLDT TUNGSTEN MINES CO. NEVA

Controlled by Humboldt Tungsten Mng. Co. (q. v.).

Address: Lovelocks, Nev., or Mill City, Nev. C. J. Jones, H. E. Lo and P. J. Murrish, incorporators.

Cap., $1,000,000; $1 par.

Property: claims near Mill City, Pershing county, said to show a posit 5′ wide of ore carrying 4% tungstic oxide, for length of 120′.

Equipment: a 100-ton mill was reported completed in Dec., 1918, the first shipment of three carloads of concentrates was made February, Power and water supplied by the Mill City Development Co., a subsidiary, a 34-mile power line; the water supply of 250 gallons per min. supplied thr a 22,000′ pipe line of 6″ wire wound redwood pipe carrying water in 2 st from a 24′ well. Two storage reservoirs of 100,000 and 50,000 gal. have b built. Mine worked 7 months in 1919.

In September, 1919, the company was taken over by the Humboldt Tun Mining Co. interests.

NEVADA LEAD MINING CO. NEVA

Address: H. L. Brooks, mgr., Cobre, Nev.

Officers: B. F. Woodward, pres.; H. C. Eldridge, sec.; with Ja Hall, Mathew Mesler, E. E. Fisher, directors.

Property: 11 miles from Cobre, Nev., and 7 miles from Loray, Southern Pacific R. R. said to show ore in limestone-quartzite contact. At of 80′ is said to be 18″ of ore assaying 40% lead, 20 oz. silver, and $3 gol ton. Several carloads had been shipped up to 1917, but no recent returns h been secured.

NEVADA LINCOLN MINING CO. NEVA

See Vol. XIII for details. About mid-1918, Frank Wilson, then presi sued company for services rendered, and secured judgment by default, and mine was sold to satisfy the judgment. Wilson bought it, and organized Wilson-Nevada Mining Co., to which the property was transferred. In S tember, 1919, the Lincoln company started suit against Wilson and his co to set aside the judgment and sale.

NEVADA LORING MINES CO. NEVA

Address: T. J. D. Salter, Tom Ward, or J. C. Foster, Loring, via Lo locks, Nev.

Property: the Mayday claims in the Loring (formerly Willard) d trict, Pershing county. In September, 1919, several veins had been ex assaying high in gold and silver.

Officers: A. G. Anderson, pres.; Geo. T. Rosengren, v. p.; I. Camer treas.; L. Mundorff, sec.

Inc. Sept., 1914, in Nevada. **Cap.,** $2,000,000; $1 par.

Property: 400 acres mineral land and 600 acres miscellaneous land Wellington, 8 miles from Masonic, Lyon county, said to show gold-silv lead ore. **Development:** by 2 shafts, 100 and 300' deep.

Company also owns and is operating the Silverado mine in Mono cou California, near Sweetwater, Mineral county, Nev. Shipments of silver made to Hazen sampler amounted to $33,281 in 1917 and $35,125 in 1918. Cya plant and new equipment installed in 1919.

NEVADA QUEEN COPPER CO. NEVA

Office: 404 Mining Exchange Bldg., Colorado Springs, Colo M near Yerington, Lyon county, Nev.

Officers: Duncan Chisholm, pres.; John A. Chisholm, v. p.; R. G dett, sec.-treas., with Geo. M. Irwin and D. P. Randall, directors.

Inc. Oct. 5, 1906, in Colorado. **Cap.,** $1,500,000; $1 par; issued 1,107, Is operated as a close corporation. Annual meeting second Monday in Octo

Property: 28 claims, patented, 467 acres, lying immediately north the Nevada Douglas and Yerington Central Copper companies. Developed shafts of 186' and 210', showing copper ore said to assay 1.5 to 28%. Idle several years.

NEVADA QUINCY MINING CO. NEVA

Address: 303 Judge Bldg., Salt Lake City, Utah.

Property: in Cherry Creek mining district, White Pine county. Co pany in process of dissolution.

NEVADA RAND MINES CO. NEVA

Address: Box 152, or 10 Fordonia Bldg., Reno, Nev.

Officers: C. G. McBride, pres.; Dr. C. F. Watkins, 1st v. p.; S. R terthwaite, 2nd v. p.; Wm. V. Rudderow, sec.-treas.-mgr.; C. E. Hymer, su

Inc. July 8, 1916. **Cap.,** $100,000; par 10c; 822,600 issued. June, Annual meeting second Monday in July.

Property: 7 unpatented claims, 110 acres, in Rand district, Min county, 17 miles from Nolan on the T. & G. railroad. Group carries a fis vein in hornblende-andesite, with an ore-shoot opened for 240' in length fractured mineralized zone approximately 100' wide, from which high-gr silver-gold ore has been shipped. This zone is said to extend into claims of Extension Company to the N. W. Ores are highly silicious and oxidized, w free gold and hornsilver. Examined, 1919, by S. E. Montgomery, J. C. Jo and Charles Kirchen.

Development: by 450' shaft, with total workings of 2,500'. Recent w on the 150 and 200' levels, south of the old workings, disclosed a new ore from which considerable high-grade and milling ore has been mined. M agement plans to continue work on the 250' level in 3 directions. Reserve estimated at 35,000 tons of $15 milling ore, and 1,400 tons of $17 ore on dum

Equipment: includes 18-h. p. gas. hoisting engine and assay plant June, 1919, a 40-50-ton mill was installed, which is driven by a 32-h. p. oil engine. A cyanide plant will be added, as tests show a 90% extraction be obtained.

Company appears to have a promising mine in a district that has pro very rich ore, and is following a conservative policy. The output totals $ 300 tons in 1919 averaging $57.92 per ton.

NEVADA REGENT MINES CO. NEVA

Inc. June, 1915, in Utah. **Cap.,** $1,000,000; shares 10c par.

Property: in Regent district, Mineral county, Nevada. No recor turns secured.

NEVADA SCHEELITE CO. NEVA

Mine address: Ely, Nev.

Property: S. E. of Ely, White Pine county, equipped with mi reported producing tungsten ore during 1918. No production figures obtai

Inc. May, 1906, in South Dakota. **Cap.**, $5,000,000; shares $5 par. St stricken from the New York Curb August, 1918. Empire Trust Co., New Yo registrar. Balance on hand, March 31, 1918, was $121.

Company realized $4,090 on 80,000 shares of Greenwater Copper Mi & Smelter Co. stock in 1914, retaining 272,000 out of the 3,058,775 issued sha of the Greenwater Co.; also owns a controlling interest in the Tybo C Mining Co., owning silver-lead-zinc properties at Tybo, Hot Creek district. N operated by the Louisiana Cons. M. Co., which see.

Stockholders of the Nevada S. & M. were given the privilege of exchan their stock on a basis of 10 shares of Nevada for 3 shares of Louisiana C This offer was withdrawn February 10, 1918, after more than 70% of the o standing stock had been exchanged.

NEVADA STANDARD COPPER CO. NEVA

Officers: Wilbert E. Marsh, pres., P. O. Box 24, Mina, Nev.; C. Korthe, v. p.; L. H. Marsh, sec.-treas., with B. H. Wyant and Matthew King, directors. Marsh sold his majority holdings in the company to G. Raessler of Luning in 1919.

Inc. 1912, in Nevada. **Cap.**, $100,000; shares $1 par; non-assessa 6,850 issued.

Property: the Green Mystery group of 11½ claims, the Tray Do group of 10 claims and a mill-site, near Luning in Santa Fe district, Min county, 8 miles N. E. of Mina, on the Goldfield branch of the S. P. R. R. Green Mystery claims cover low rounded hills at about 6,000′ elevation. rocks are leached porphyries underlain at 20′ depth by low-grade oxidized co ores. Ore contains bornite, chalcocite and chalcopyrite. Assays reported 1.1 to 25% copper, with small gold and silver values.

Development: by 192′ shaft on the Green Mystery claim, which at cut a fault plane fissure that widened to 20′ on the 104′ level. Crosscutting 1915 on the 192′ level to the North opened up 11′ of low-grade copper ore level at 104′ cut a 24′ shear zone carrying low-grade ore. Management c siders it a typical porphyry, or disseminated copper deposit. There is a bed copper-bearing conglomerate between porphyry and lime, extending for 4 along the contact. An incline sunk to explore this conglomerate is 60′ with drifts N. & S. for 160′. The Tray Dollar covers several lead-silver v containing ore assaying from $16-$40; a copper-silver contact vein betw lime and monzonite is said to assay $50-$134 per ton. Developed by 5 tunn 50-175′ on fissure veins and 335′ crosscut to contact vein with 175′ further t to reach the ore-shoots. Property examined by W. R. Brown, W. H. W and C. W. Clark.

Equipment: includes gasoline hoist, pump, blacksmith shop and bu ings for men. There are 3 springs, 2½ to 5 miles distant. Report $25 expended on property to March 1, 1919. No salaries paid.

NEVADA SUPERIOR MINES CO. NEVA

Probably dead, as mail is returned from former office at 625 D Bldg., Salt Lake City. **Mine office:** Jungo, Nev.

Officers: Otto Grantz, pres.; E. R. Reitsch, v. p.; John Geiger, s and gen. mgr.; Dr. Allen C. Eakin, treas., with D. R. Peterson, directors, at accounts.

Inc. 1905, in Utah. **Cap.**, $300,000; shares $1 par; assessable; 15 shares outstanding. Income for 1915 was $164 from royalties.

Property: 21 claims, 420 acres in Humboldt county, 23 miles fr Jungo on the W. P. R. R., shows gold-silver-lead-zinc ore in fissure veins t versing schist and slate. The main orebody, from 2-20′ wide, strikes N. and is said to give average assays of 8.6 oz. silver, 11.2% lead, 1% copper, zinc. Shipments of crude ore made by lessees in 1915 ran $15-$24 per Developed by 2 tunnels, 1,000′ and 2,500′ long, and 330′ vertical shaft.

Equipment: includes 75-ton concentrating mill, steam power, c pressor, pump and hoist. Company has been inactive since 1913 owing to l of funds.

waste-filling system as the walls in the lower levels are insecure, caving in la masses, thus making the shrinkage system of stoping used above the 400' le inadvisable in the lower workings.

Development: by shaft and winze, to depth of 2,000', with a total 66,438' of workings. Exploration in 1916 indicated favorable conditions depth and during the following year the sub-shaft was sunk from 1,600' to 1,9 Work done during 1918 totaled 8,872', mainly on the 1,900' and 2,000'. Cr cuts were driven on the 700 cutting the formation for 1,555' at right angles the strike of the vein. Results at depth were not encouraging and manager planned prospecting ground between upper levels in 1919.

A one-year lease from August, 1918, was procured on the holdings of Monitor Belmont Mng. Co., at Belmont, which see. This was relinquished no ore was found.

The 100-ton Churchill mill, now operated as a department of the Ne Wonder, ran in 1918 on ore that averaged $2.06 in gold and 13.20 oz. silver.

Production:

	Tons	Ag. oz.	Au. oz.	Total Value	Av. Rec. %	Cost per ton
1918.....	49,710	657,815	5,108	$742,306	91.82	$10.09
1917.....	55,800	929,284	7,882	822,940	89.10	10.78
1916.....	72,241	1,352,615	11,466	1,112,835	92.67	8.90

At the end of November, 1919, company ceased operations. Cash assets about $400,000.

NEVADA ZINC CO. NEVA

G. L. Bemis, Tobar, Elko county, Nev., gen. mgr., at last accounts.

Property: the Pola Star group near Tobar, has a zinc-lead dep 40' wide and opened for 600' on surface. Ore said to average from 30 zinc and from 4-5% lead. Developed by tunnel and 500' shaft. Reported ducing at the rate of 200 tons per month in 1917. No recent returns.

NEW BONANZA COMSTOCK MINES CO NEVA

Incorporated December, 1919, in Nevada, by C. A. Garret, T. B. Gu Gurney Gordon, F. M. Kleppe, and O. R. Vaughn. Cap., $75,000; 20c par. information as to property obtainable.

NEW JERSEY MINES CO. NEVA

Officers: 628 Hudson St., Hoboken, N. J., and Goldfield, Nev.

Officers: Henry V. Broeser, pres.; L. A. Opdyke, v. p.; J. H. Ste treas.; Geo. H. Snyder, sec., Jersey City; above, with 14 others form the dir rate; Harry Ernest, mgr.

Inc. Jan. 15, 1912, in Nev. **Cap.**, $1,250,000; shares $1 par; outstan 1,010,850 shares; assessable 1c per share per year. Registrar & Transfer New York, registrar.

Treasurer's report for year ending March 31, 1917, shows rece $18,017, which includes assessments, $6,912, sale of shares, $1,000, renewal of etc., $4,997. Disbursements amounted to $17,672, leaving balance on hand There were only $1,500 owing on the note. No later returns given out.

Property: 5 claims, 3 patented, 53 acres, several miles N. E. of field, said to show gold-silver ore.

Development: 507' shaft, with work done in 1916 on the 330' and levels. Conditions remain as in 1916, showing ore, but not in com quantities. Idle.

NEW TUSCARORA MINING CO. NEVA

Address: Tuscarora, via Elko, Nev. **Officers:** W. J. Craig, pres J. R. Austin, v. p.; W. J. Wolstenholme, sec.-treas., with E. L. Sco Barnhart and P. D. Fenkell, directors.

Cap., $50,000; shares 5c par; 500,000 issued.

Property: 4 claims in the old Tuscarora district, Elko county,

Development: a tunnel (in 750', Nov., 1918) being driven to vein. Shallow shafts said to show ore with high values in gold and

and generator, 525 cu. ft. compressor, 25-h. p. hoist, with smaller compressor a hoist, also necessary buildings, numbering 18.

Production: total to end of 1919, about 400 tons of ore said to ha averaged 31% copper and $12 gold and silver.

Property shut down most of 1919, as owing to high overhead charges, a lack of large reserves costs were too high to yield a profit. Mine needs furth development before it can become a substantial producer.

NONPAREIL MINING CO. NEVAD

Address: M. Helliere, sec., Reno, Nev. L. T. McAtee, pres.

Inc. 1919, in Nevada.

Property: Nonpareil group on Lincoln hill, Rochester mining distric Pershing county; mine is credited with a production of $30,000 in gold.

NORTHERN LIGHT COPPER CO. NEVAD

Property: 6 claims, 20 miles east of Yerington, Lyon county, producin some copper ore in August, 1919. The mine was closed for a considerable tim but late developments are said to be "surpassing expectations."

NORTH MOUNTAIN MINING CO. NEVAD

Controlled by John Dern, 515 Dooly Blk., Salt Lake City, Utah. Mine op ated under lease by Marion L. Thomas, 2 Rector St., New York City, and J. Walker, Cherry Creek, Nev.

Property: Gilligan group, 11 patented claims in the Egan district, ne Cherry Creek, White Pine county, first operated in 1870 under management General Rosencrans.

Ore occurs in veins cutting quartzite, that are from 4 to 5′ wide, run E.-W and dip steeply N. In 1884, a 1,600′ tunnel was driven which is reported to ha cut the vein 1,100′ from the portal at a depth of about 600′ on its dip. T demonetization of silver stopped further development until 1918, when oper tions were resumed. Management reports recently opening up 4′ of ore on t tunnel level running 25 oz. silver.

NORTH NEVADA MINES CO. NEVAD

Address: C. K. Jarvis, Reno, Nev.

Property: claims at Fairview, and 7 claims on Rebel creek, northe Humboldt county, acquired late in 1919. The latter have 600′ of tunnels a other work, ore carrying silver and gold.

NORTH STAR MINING CO. NEVAD

Address: G. F. Brown, Mina, Nev.

Property: 6 claims, 3 miles from the Simon mine and near the Olym A shaft was to be sunk to develop a gold-bearing vein, in the winter of 1919-

OLD IMPERIAL MINING & MILLING CO. NEVAD

Cherry Creek, White Pine county, Nev. Property advertised as sold for $ delinquent tax, January, 1916.

ONONDAGO MINES CORPORATION NEVAD

Office: 1209 Union Trust Bldg., Providence, R. I.; also 50 Broad New York City. **Mine office:** Elko, Nev.

Officers and directors: Homer L. Carr, pres.; Erik F. Carlson, v. E. L. Kerstetter, sec.-treas. M. F. Quinn, mgr.; Frank S. Connors, supt.

Inc. Feb. 16, 1917, in Nevada. **Cap.,** $300,000; par $1; all outstandi Listed on Boston Curb and traded in on New York Curb. Security Transfer Registrar Co., New York, registrar and transfer agent. Controlled by Mi Holding & Operating Corporation, New York, which owns 277,560 shares. Op ating expenses for 1918 amounted to $66,244.

Property: the Onondago and Zenoli mines about ½ mile apart, in S ford district, Nev. The Onondago group of 6 claims, 100 acres, 1½ miles fr Barth, Elko county, is developed by 800′ tunnel and 200′ shaft. Another pr erty of about 200 acres, near Elko and held under option is being develo Claims said to show 3′ of high-grade silver-lead ore near surface, with the outcrop traceable for 2,000′. Ore: sulphide, occurs in fissure vein in lime and said to average 40% lead and 4 oz. silver. Developed by 165′ incline sha

Equipment: power plant destroyed by fire to be re-built, and a 30-

Inc. 1915. Cap., $1,000,000; $1 par; 715,000 issued; 515,000 shares o by the Diamondfield Co.

Property: 9 claims, in process of patent, 180 acres, at Orizaba, county, shows veins carrying gold-silver-copper and lead ore. Veins are 2' wide, and occur on a contact between limestone and granite. The main strikes S. 20° E., and dips 70° S. W.

Development: by 1,300' of workings, including 150' shaft and 90 drifts.

C. D. Wilkinson, who reported on the property in October, 1915, esti 1,500 tons of $20 ore exposed in the mine and 1,200 tons of $12 ore on the d J. K. Turner reported, November, 1918, no ore in sight; $6,000 worth of able ore between the 35 and 65' levels; $8,500 worth of possible ore fro 85 to 65' level; ore on 3 dumps valued at $44,730.

Production: Sept. 1913, to April, 1918, amounted to $22,980 gro $16,156 net, the largest shipments being made when the price of silver per oz.

Further development, adequate modern equipment, and better railroad ties are necessary to insure profitable operations. The nearest railroad Millers, about 38 miles south.

ORLEANS MINING & MILLING CO. NEV

Address: J. W. Dunfee, lessee, Hornsilver, Esmeralda county, N

Inc. Sept., 1916, in Nevada, 1,000,000 shares issued.

Property: 5 unpatented claims, 120 acres, at Hornsilver, 28 mi of Goldfield, carries gold-silver ore in 8' fissure vein in diorite-lime-shal tact. Average assays given as $21 per ton and management claimed re of 15,000 tons of mill ore, at last accounts.

Development: by 600' incline shaft, being deepened in 1919.

Production: reported as totaling $260,000.

ORO AMIGO PLATINO MINING CO. NEV

Address: Goodsprings, Nev.

Officers: S. E. Yount, pres.; Geo. A. Fayle, v. p.; H. K. Riddell treas. and mgr., with N. B. Hunter, directors, at last accounts.

Inc. Nov., 1914, in Nevada. Cap., $1,000,000; shares $1 par; 5 shares issued. Listed on Los Angeles Exchange. Annual meeting, Januar

Property: 5 unpatented claims, 60 acres, in Yellow Pine mining d Clark county, about 2 miles N. E. of the Boss mine. Ore carries copper, platinum, palladium, and the rare mineral plumbojarosite, occurring in 6 to 4" wide.

Development: by 2 tunnels, 70' and 150' long, with 1,500' total ings. No recent returns secured.

ORO ZONA MINES CO. NEV

Address: Hawthorne, Nev.

Inc. June 12, 1919, in Nevada, by Eugene Grutt, Emil Grutt, and Platts.

Cap., $150,000; 10c par.

PACIFIC STATES MINING & MILLING CO. NEV

Office: Goldfield, Nev. Mine address: Bellhelen, via Tonopah, N

Officers: T. T. Cornforth, pres.; ex-Gov. W. A. Haggott, v. p. mgr.; Ben Gill, sec.-treas., with Chas. S. Sprague and J. B. Wainright, dir

Inc. 1919, in Nev. Cap., $1,500,000; par $1; 500,000 shares in tre 100,000 offered at 50c., June, 1919.

Property: 6 claims, 100 acres, in Bellhelen district, Kawich moun Nye county, 50 miles E. of Tonopah. Tract covers apex of veins for 1,50

Geology: claims show rhyolite lavas cut by a parallel veins ru N. E.-S. W.; Midvale vein, the only one developed, has 70° N. dip and sh quartz streaks 6 to 18" thick linked by splits and forks. This quartz is a grade ore, and the pyritized material between is milling ore. Values averag per ton for 131 samples, about 10% of value being gold.

Development: 2,300' of work, including 580' crosscut tunnel cutti 3 veins 260' below apices. One vein at 340' from portal has 4' of mill

St., San Francisco, Calif. L. D. L. Cebrian, treas.; Clyde P. Johnson and J. T. Murphy, mgr., Goldfield, Nev.

Inc. June 26, 1916, in Nevada. **Cap.**, $1,500,000; shares $1 par; 1,15[illegible] issued. Stock listed on New York Curb. Was operated as a close corporat[illegible]

Property: 25 claims, 12 patented, about 500 acres, 42 miles S. E. Goldfield in the Palmetto Mountains, Esmeralda county, credited with past p[illegible] duction of $6,500,000 in silver. Development by shafts, deepest 400'. The [illegible] is said to contain large bodies of ore carrying good values in gold-silver-co[illegible]

After an idleness of 20 years, the mine was to be re-opened, extens[illegible] developed and modern machinery installed, 1917-'18, but no confirmation of report received. Reported on by J. Pepperberg and W. D. O'Brien.

PANAMA CANAL MINING CO. NEVA[illegible]

Address: 104 E. Holly St., Bellingham, Wash., and Carson City, [illegible]

Officers and directors: Lorenz Neber, pres.; Henry Schupp, v. p.; A. Muller, sec.-treas.; Geo. H. Cress, mgr.

Inc. March, 1917, in Washington. **Cap.**, $100,000; par 10c. Income f[illegible] 150 tons of silver ore sold in 1918, was $3,300.

Property: 12 claims, 224 acres in Voltair district, Ormsby coun[illegible] miles from Carson City, developed by 550' tunnel. Quartz veins in gr[illegible] carry silver ore.

Management planned driving 300' of tunnel and installing small mill in [illegible]

PANTHER CITY MINING CO. NEVA[illegible]

Office: care M. R. Sanguinet, sec.-treas., 1st National Bank Bldg., [illegible] Worth, Texas. Wm. Bryce, pres.

Property: 7 patented claims in 2 groups, the Panther City and O[illegible] in Salmon River mining district, Elko county, Nev. Ore said to carry co[illegible] silver, and a trace of gold. Planned to start development work in 1917, bu[illegible] confirmation obtainable.

PATRICK MINING CO. NEVA[illegible]

See William Patrick Mining Co.

PAY ROLL MINING CO. NEVA[illegible]

Office: 310 Nat'l Bank Bldg., Tonopah, Nev.

PEER GOLD MINING CO. NEVA[illegible]

Address: Clyde Garrett, Burney Gordon and Harry Cutler chief st[illegible] holders, Reno, Nev.

Property: in Pine Nut range at Como, 8 miles south of Dayton, sh[illegible] wide vein in andesite. High-grade ore discovered January, 1916, showed v[illegible] of $73 to $150.

Probably dead. Letters returned.

PEERLESS MINING CO. NEVA[illegible]

Controlled by Lewis Thompson and M. A. Conant of Springville, Utah[illegible]

Cap., 1,500,000 shares.

Property: 23 claims, 360 acres, near Hiko, Lincoln county, said to s[illegible] a 2½' vein, carrying ore containing silver, lead, and copper. Development s[illegible] slight and property a prospect.

PERSEVERANCE MINES CO., LTD. NEVA[illegible]

Address: Searchlight, Nev.

Officers: A. M. Buley, pres.; F. E. Sharps, v. p. and mgr.

Is a trust, with $500,000 capitalization.

Property: 4 patented claims, 80 acres, 10 miles N. E. of Searchl[illegible] Clark county, said to show contact vein in rhyolite-diorite. Ore is quartz [illegible] free gold and is said to average $22 per ton. Reserves, 4,000 tons blocked [illegible]

Development: by 2 tunnels, 325 and 375' long. Management sin[illegible] 500' shaft and erecting 10-stamp mill, at last report.

PIERMONT MINES CO. NEVA[illegible]

Address: F. H. Vahrenkamp, Tonopah, Nev.

Officers: F. H. Vahrenkamp, pres.; R. A. Millick, v. p.; F. B. Ma[illegible] sec.-treas.-mgr.; H. G. W. Dinkenspiel, and Edward Bowes, directors.

Property: an old silver mine first worked in the 70's, on the E. [illegible] of Schell Creek range, White Pine county, 27 miles from Ray siding [illegible]

Utah. Company levied an assessment of 1c a share in March, 1915.

Property: 6 patented claims at Pioche, Lincoln county, has been shut down for several years.

PIONEER EXPLORATION CO. NEVADA

Address: Hobart Bldg., San Francisco, Calif.

Reported to have acquired the Bloody Canyon antimony mine at Unionville, Pershing county, operated up to 1917 by the Antimony Syndicate and described thereunder.

PIONEER EXTENSION MINES CO. NEVADA

Office: 107 Boston Bldg., Denver, Colo. **Mine office:** Pioneer, Mineral county, Nevada.

Officers: H. A. Riedel, pres.; T. S. Ellis, sec.; Col. A. J. Trone, treas. gen. mgr.; Edwin S. Giles, supt.

Inc. in Arizona. **Cap.,** $1,500,000; shares $1 par; 400,000 shares in treasury.

Property: the Jolly Jane claim, 20 patented acres, adjoining the Pioneer Cons., at Pioneer.

Development: by 250′ shaft. A crosscut was driven from this level through rhyolite to prospect a contact 175′ E. of the Jolly Jane shaft. Mine reported under 3-year lease to Jolly Jane Leasing Co., since 1916. A prospect.

PITTSBURGH-DOLORES MINING CO. NEVADA

Address: Yerington, Nev.

Officers: H. S. McKee, pres., Pittsburgh, Pa.; A. Vignos, v. p.; R. Palmer, sec.; H. W. McIntosh, treas.; E. J. Schrader, gen. mgr.; J. B. Pe mine supt.; C. R. Wilson, mill supt.

Inc. 1912, in Arizona. **Cap.,** $1,500,000; shares $1 par; issued 1,000, Bonds: Authorized and outstanding, $175,000. Annual meeting in March.

Property: 16 unpatented claims at Rockland, Mineral county, 27 mi S. of Yerington, comprises the claims of the old Rockland mine, discovered 1868.

Ore: quartz, containing 1% pyrite with gold and silver values, occ in a fissure vein from 1½ to 9′ wide, with rhyolite hanging-wall and grano-dio footwall. Vein strikes N. E., dips 40° E., and carries pay ore in shoots, aver ing about 0.44 oz. gold and 3.4 oz. silver, value about $10.50.

Development: by tunnels, greatest depth of workings being 1,300′ a horizontal extension about 13,000′. Ore is extracted by the fill method, st being used in timbering. A Sullivan angle compressor furnishes air, power operating mine and mill is taken from the Truckee River General Electric

Owing to the distance of the property from the railroad, 27 miles, tra portation of supplies is expensive, $12 per ton.

Production: for 18 months to Dec., 1916, was 27,268 tons of ore, incl ing some from dumps and tailings, yielding $230,370. Mining costs were per ton, including development, and average milling cost was $2.75. In $18,749 was spent on construction work.

Mine and mill closed down indefinitely in 1918, owing to high costs and satisfactory conditions. See Vol. XIII for full details.

PITTSBURGH-ELY COPPER CO. NEVADA

Ely, White Pine county, Nev.

Officers: H. P. Harder, pres.; Louis H. Bock, v. p.; J. A. Varney, s Frank Straub, treas., trustee and gen. mgr.

Inc. Dec., 1916, in Arizona. **Cap.,** $5,000,000; shares $5 par; non-ass able; 695,285 shares outstanding at last reports.

Property: 11 claims, unpatented, 220 acres, including the Keyb group of 6 claims, 120 acres, near the Keystone mine of the Nevada Co dated, and a small group near the Cumberland-Ely mine of the same co Lands show porphyry and limestone, and company reports having copper c and sulphides, assaying 3 to 12% copper.

Development: by 2 shallow shafts and tunnels of 160′ and 40′.

Equipment: includes a 40-h. p. steam hoist. Inactive, except for assessment work, since 1907.

manganese, 3 oz. silver and some gold, 3% lime, 11% insol. and 14% silica, va at from $7.50 to $9.50 per ton. Owing to large percentage of iron, the o especially valuable as a flux to the lead smelters, the iron commanding a b over the cost of smelting, with silver, gold and lead values coming in as a p From this source alone the ore yields $3-$4 per ton.

Company also owns the Pioche King group of 9 claims, and about 1,000 a of patented land at Dry Valley and Bullionville, 12 miles from Pioche, sa contain 120,000 tons of tailings on dumps, showing 5.34% lead, 10 oz. of s 0.11 oz. gold per ton, and estimated to average $5 per ton profit.

A 200-ton oil flotation mill was erected to treat these tailings in 1916. T mill results during 1918 did not prove as successful as anticipated, but 10 tons of tailings are expected to run 8 oz. silver, 1.80 oz. gold, and 3% lead.

The Davidson mine, adjoining the Prince, was taken over in July, 1918, i is being extensively developed. Receipts from ore sales are more than pay for development work.

Development: the Prince mine is developed by 550′ shaft with seve miles of drifts. A new 2-compartment shaft started in May, 1918, and comple to 400′ in July, 1919, is being deepened to 1,300′ so as to explore the quar underlying the limestone. Equipment was moved from the old to the new s and the old shaft abandoned. Ore reserves estimated at approximately 1,0 tons.

Diamond-drilling is under way: hole No. 3, on the 600′ level, when a depth of 340′, ran into a bed of oxidized iron-manganese 10′ thick, which ass 25 oz. silver and $3.60 in gold. At 627′ eleven feet of clean zinc sulphide w encountered, expected to run 30% zinc.

Equipment: includes steam power, hoist, compressor and 9 mile sta ard gauge railway connecting with the Salt Lake Route from Pioche. Fre rate was $1.75 per ton in 1917.

Production: shipments in 1915 were 117,037 tons; in 1916, 135,643 to in 1917, 122,872 tons; in 1918, 84,137 tons; in 1919 (to June), 5,000 to 6,000 t per month, increased to 8,000 in September.

Present management has put the mine on a paying basis, developed h ore reserves and accumulated a cash surplus. Present high prices for sup and the development work necessary during past year are responsible for i creased earnings. Costs total $12 per ton.

PROSKEY REGENT MINING CO. NEVA

Dead. Property at Rawhide, Nev., formerly held by Mogul Mining Co., purchased 1919 by the Seminole Regent Mng. Co., which see.

PROVIDENCE EXTENSION GOLD MINING CO. NEVA

Office: Morris, Ill.

Officers: I. F. Hatcher, pres.; W. F. Buck, v. p.; G. A. Leach, treas., with O. M. Barker, directors.

Inc. 1908, in Nevada. **Cap.,** $1,500,000; shares $1 par; 1,100,000 sh outstanding.

Property 3 patented claims and a fraction at Seven Troughs, Ha boldt county, Nev., reported by management to show high-grade free-mi quartz ore in fissure veins, 4″ to 2′ wide and to carry from $14 upward gold per ton. Examined by F. A. Wheeler.

Development: by 170′ vertical shaft. Idle since 1917, pending re-fin ing of the company.

QUEEN REGENT MERGER MINES CO. NEV

Office: 337 Monadnock Bldg., San Francisco, Cal.

Officers: J. D. Brown, pres.; H. B. Wade, sec.; J. E. Kerr, gen. m Wm. P. Miller, cons. engr., at last accounts.

Inc. 1911, in California. **Cap.,** $2,000,000; shares $1 par; 761,000 s issued.

Property: 5 unpatented claims, bought June, 1915, for $60,000, in mining district, Mineral county, 18 miles E. of Nolan, on the E. side of W lake. Tract is said to cover 4,000′ of the main fissure of the Rand district

Property: the Wedekind silver mine located in 1896 and said to h produced $500,000. Ore was extracted by open-cut and treated in a local m A 140′ shaft was to be deepened in 1919-1920.

RENO-YERINGTON COPPER CO. NEVA

Officers: E. L. Brown, pres.-mgr., 944 West 6th Street, Reno, Ne Victor Cokefair, v. p.; M. C. Brown, sec.; Farmers & Merchants Natl. Ba treas.; preceding with Walter Harris, O. H. Sonne, Will McDonough, direct

Inc. Jan. 25, 1907. **Cap.,** $1,000,000; $1 par; 750,000 outustanding.

Property: 5 unpatented claims, about 100 acres, north of the Blues mine, at Yerington, Lyon county, said to show sulphide ore in granite w easterly dip, averaging 3% copper.

Development: by 700′ tunnel and 100′ incline shaft sunk on the cont

Equipment: includes hoist and buildings.

REORGANIZED PIONEER MINES CO. NEVA

Address: Goldfield, Nev. **Mine office:** Pioneer, Nev.

Officers: W. J. Tobin, pres.; J. K. Turner, v. p.; Ben Gill, sec.-tre with E. A. Blakesley, directors.

Inc. May, 1918, in Nev. **Cap.,** $500,000; 10c par; assessable; 2,250 outstanding. Assessment No. 1 of 1c per share, levied March, 1919. Com is a reorganization of the Pioneer Cons. Mines Co. described in Volume XI the new company assuming all obligations of the Pioneer Cons. Stockhol were given the privilege of exchanging their holdings share for share upon p ment of a 1c bonus for the new stock. Up to March 1, 1919, 2,014,836 sh had been exchanged, and of the $15,836 indebtedness, over $12,000 had b paid off.

Property: 12 claims, 10 patented, 180 acres, at Pioneer, Nye county.

Geology: irregular masses of altered and mineralized rhyolite bre are traversed by small, irregularly intersecting quartz-filled fractures con ing gold-silver values. Isolated bunches of quite high-grade ore have been countered, but not of commercial size.

Development: by 500′ main working shaft and 15,000′ of workings. T shaft will be sunk to depth of 800′.

Equipment: includes electric power, 40-h p. hoist, 7-drill compres hoist, gasoline engine, 50-ton amalgamation and cyanide mill.

In 1918 company acquired the K.-K. claim and now plans developin greater depth to pick up the main Pioneer vein.

RESERVATION HILL M. & M. CO. NEVA

Address: W. E. Casson, mgr., Carson City, Nev.

Officers: R. A. Trimble, pres.; W. E. Baldy, v. p.; R. A. McKay, s treas., with H. R. Burlington and J. E. Monahan, directors.

Inc. 1907, in Nevada. **Cap.,** $1,000,000; $1 par; 788,000 issued.

Property: 2 claims, 35 acres, 1 mile from Reservation station, Mine county, Nev., partly under lease.

Development: by short tunnel and shallow shaft, the latter said show 18″ of ore that assayed high in silver, lead, and gold.

A prospect.

RICHLAND MINES CO. NEVA

Address: Imlay, Nev.

Officers: John R. Tullis, pres.-supt.; B. J. Sears, v. p.-treas.-mgr.; J. Ferguson, sec., with F. L. Reber and C. T. Smith, directors. C. T. Smith agent and registrar.

Inc. May 15, 1919, in Nevada. **Cap.,** $150,000; 10c par; 750,000 shares treasury. Annual meeting, May 15th.

Property: 4 claims, 80 acres, in Richland mining district, 7 miles of Imlay, Pershing county, is said to show veins in granite and shale. The vein has an easterly course and dips due north; it is reported to be 2′ wide to average $35 per ton in gold, silver and lead.

Development: by crosscut tunnel that is expected to cut both veins 100′ depth.

work. From section 921, there was milled 1,422 tons of $3.20 ore, of wh 78.5% was recovered by amalgamation. A 55 or 60-cent tailing could be pended upon. This section is one of the largest ore-zones in the mine and favorable for future exploitation. Sections 710 and 473 are too poor for c sideration.

The lode mine is now worked only by lessees, who extracted 180 tons $44.50 ore in 1917, and 2,131 tons of $36.70 ore in 1918. The royalty paid to company for those years amounted to $1,817 and $17,442, respectively. T company will probably resume underground work in 1920.

The company's operations for 1918-19 were mainly confined to placer min Company has over 367 acres of placer ground and estimates 1,500,000 yards gravel worth $1 a yard as available. Two monitors are used, tearing down t sluicing 1,200 to 1,500 yd. a day; main tail race is 4,449′ long, with two l laterals. The high-pressure pipe-line is 45,000′ long, is spiral steel, commenc with 30″ and reducing to 20, 18 and 16″; head 600′ with 400 miner's inches water. Total cost of the Jett Creek pipe-line, water-rights and placer equipm has been over $200,000. Operations started in June, 1915, and have been pr table, especially so, as the lode mine was closed to company operations.

The controlling factor in these placer operations is the water-supply, gi various results in different seasons. In 1916, a shortage of water was aided teams and scrapers; in 1917, the high-water season lasted 85 days, so a dam w built in Jett canyon, and the waters of Jefferson and Shoshone creeks were p chased; in 1918, the season was the poorest yet experienced, the hydraulic l being only 45% of that in 1917; in 1919, the heavy snowfall indicates a l season. Lessees are working on bedrock, making fair returns.

Equipment: includes two 50-h. p. hoists, 10-drill compressor, elect power and 180-ton plant, including Huntington and tube-mills. Company a operates the Toquima Stores Co., which carries a complete stock of dome supplies.

Production: to the end of 1918 was $3,430,964 from 411,015 tons of and 374,632 yards of gravel. Of this sum, $959,068 was profit. An analysis production shows the following:

Year	Tons	Value	Profit	Yards	Value	Pr
To end of 1916.....	398,897	$3,004,229	$752,934	175,477	$139,912	$65
1916.....	67,452	357,014	49,007	175,477	139,912	65
1917.....	12,118	78,483	29,773	127,788	140,016	91
1918.....	.....	.....	.....	71,367	68,324	19

The profits do not include royalty or sundry revenue.

Company has an efficient management and has made a good record, de unfavorable conditions. The future depends on its ability to mill a large q tity of low-grade ore at low cost, and on the profits from placer mining.

ROYAL CONSOLIDATED COPPER CO. NEVADA-ARIZO

Probably dead. Letters returned, 1915, from former St. Louis, M address. **Mine office:** Hawthorne, Esmeralda county, Nev.

Officers: L. L. Crisp, pres. and gen. mgr.; G. L. Werth, v. p.; E. Drake, sec.-treas.; B. H. Martens, supt.; preceding, with Robt. W. Alt and Al Lawson, directors.

Inc. April 27, 1907, in Arizona. **Cap.,** $2,500,000; $1 par; issued 1,43 Dec. 31, 1910. **Bonds:** $300,000, authorized, at 7%; issued, $2,300, Dec 1910. Annual meeting, first Monday in April.

There are two companies of this title; one an Arizona, the other a Nev corporation; the Arizona company apparently holding stock in the Nevada op ating company.

Property: 10 claims, 1 fractional, 200 acres, 8 miles from Luning a 16 miles from Hawthorne and Mina. According to the company's former exp the formation is "dyarite," porphyry and limestone, with large "burns" of gossan, the ore deposits consisting of copper, gold and silver, lying in a fis "cutting" a contact of porphyry and lime, the orebody being 250′ wide.

Property: Ely Valley group, 9 patented claims, 134 acres, in Ely mi district, near Pioche, Lincoln county.

Ore: occurs in fissure veins and as chamber deposit in limestone, to average 0.325 oz. gold, 3.05 oz. silver, 9% lead.

Development: by incline shaft to depth of 445', with 4,500' of worki

Equipment: includes 25-h. p. hoist and compressor.

Management estimates ore reserves at 3,000 tons, with 1,500 tons blo out. Planned 350' of core-drilling in 1919.

SILVER BELL & ALPHA CONSOLIDATED MINES CO. NEVA

Officers: Lorin Hall, pres., Salt Lake City; Clinton D. Ray, sec.; C Smith, supt., Rye Patch, Nev.

Inc. 1915, in Utah. **Cap.,** $1,000,000; shares $1 par; 450,000 in treas 100,000 were to be sold June, 1916, to erect a mill.

Property: two noted silver-gold mines at Rye Patch, Nev., Pers county, with reported production of $11,000,000. Mine is 3.6 miles from rail

Development: by shaft sunk through old workings and tapped by l working tunnel, with reserves of 200,000 tons of ore in old workings, sa assay 5 to 30 oz. silver per ton with 40c to $1.40 gold per ton. Company fig $2 mine and transportation costs and was to erect a mill. A streak of ore wa in 1916, carrying 2,520 oz. silver per ton in brittle silver and black sulphu

SILVER CENTER MINING CO. NEVA

Address: Clay Peters Bldg., Reno. Nev.

Inc. May 3, 1919, in Nevada, by H. M. Hamlin, E. C. Dalzela and W Jones. **Cap.,** $200,000; 10c par.

SILVER CHIEF MINING CO. NEVA

Address: Nixon Bldg., Reno, Nev.

Officers: D. A. Smith, pres.; W. T. Wilson, v. p.; J. B. James, sec.-tr with E. H. Smith and B. S. Gregory, directors.

Inc. 1919, in Nevada. **Cap.,** 1,500,000 shares.

Property: 6 claims in the Gillis range, 12 miles N. of Luning, Mi county, on the Rawhide-Luning road. Claims show granite-rhyolite contac which silver occurs. Work was started in August, 1919.

SILVER COMET MINING CO. NEVA

Address: Panaca, Lincoln county, Nev.

Officers: at last accounts, E. D. Smiley, pres.-mgr.; M. J. Smiley, J. W. Baker, treas., with W. A. Burnett, directors, all of Boston, except E Smiley.

Inc. Jan., 1913, in Nevada. **Cap.,** $500,000; shares $1 par. Annual m ing in July.

Property: 5 unpatented claims, 100 acres, in the Comet mining dist Lincoln county. Ore: gold-lead-silver-tungsten, occurs in nearly vertical fis veins in quartzite, said to assay $30 per ton in gold, silver and lead. Devel by 145' vertical shaft, with 950' of workings.

Equipment: includes a gasoline hoist and 50-ton mill completed in 1 the mill contains a crusher, rolls, mill and magnetic separator. No recent formation.

SILVERFIELDS AJAX MINES CO. NEVA

Name changed to Elgin-Bellehelen Divide Mining Co., which see in lis Divide companies herein.

SILVERFIELDS MINING CO., LTD. NEVA

Address: J. M. Hamilton, sec., 11 Pine St., New York.

Inc. Dec. 27, 1906, in Great Britain, as Golconda Consolidated Co., L and changed name to present title Feb., 1909. **Cap.,** £250,000; shares par; issued, £143,353, fully paid.

Property: sundry claims in Battle Mountain district, Lander county, merly owned by the Humboldt Sm. & Red. Co., with a third interest in the Ha lulu group, balance of which is owned by the Golconda-Nevada Copper Co. the Kennedy district, Humboldt county.

Development: by a 250' shaft showing a 3' vein in limestone said assay, 8% copper, 26% lead, 390 oz. silver and $4 gold.

Silver, which see, near Unionville, Pershing county. The only inform obtainable is from various brokers' circulars and advertisements. Ea 1920 it was proposed to merge the Silver Reef, Arizona Silver, Arizon tension, Arizona Tip Top, and Consolidated Silvers, Inc., into the Uni Silvers Co., the "final Silver" of the above named brokerage house.

SILVER STANDARD MNG. & EXTRACTION CO. NEV

Address: R. W. Martin, Las Vegas, Nev.

Officers: R. W. Martin, pres.; W. C. Borchers, v. p.; W. E. Ferron, treas.; with R. T. Leonards and C. D. Breeze, directors. G. A. Duncan, s

Property: the Duncan mine, Flagstaff group, Nelson townsite, water-rights in Eldorado canyon, Clark county. The Flagstaff property i to have yielded $500,000 in silver and gold up to 1915. One shoot was 8' and 450' long, and yielded 18,000 tons of $22.80 ore. Recent developme opened a new 6' vein of high value. Property is fully equipped, and enou was said to be available early in 1920 to supply the mill.

SILVER TUNGSTEN MINING CO. NEV

Office: 222 Judge Bldg., Salt Lake City. Raymond Ray, pres.; E Kimball, sec.-treas.

Inc. 1916, in Utah. **Cap.**, $50,000; shares 10c par; assessable; outs ing 38,000 shares. Listed in Salt Lake City. Cash on hand, April, 1916, no debts except a bond of $1,750 due May, 1917.

Property: 3 claims, unpatented, in the Cherry Creek mining di White Pine county, 8 miles from a railroad, said to show an 8' vein, cont tungsten ore.

Development: consisted only of 24' of trenching and 20' of tunn One of the mushroom tungsten companies started when tungsten was sell war prices.

SILVERZONE EXTENSION MINING CO. NEV

Organized by Geo. W. Quigley, J. W. Hanson and O. G. Wolther, of pah.

Property: 5 claims, covering 3,000' on a ledge or dike said to assa to $147 per ton, mostly in silver.

A new shaft is being sunk 400' west of the old Silverzone glory hole

SILVERZONE MINES CO. NEV

Silverzone (Hannapah), Nev.

Inc. 1919, by Wm. F. Gray and J. J. Clark of Tonopah.

Property: the Silver Glance mine, which was worked by "glory years ago. An ore-shoot opened for 150' in length and to depth of 125'. s run $8-$10 per ton, with 160,000 tons developed. Company has given lea parts of its holdings.

SILVERZONE MOHAWK CO. NEV

Care Wm. F. Gray, Silverzone (Hannapah) P. O., Nevada. This i a Gray & Clark property.

A new shaft sunk in 1919 is said to have cut 4' of $30 ore at a depth with $445 ore on the hanging wall. On the west end of this group, le Chas. Spilman, ore in the old Tripod shaft said to range from $10 to $ ton.

SMITH VALLEY MINES CO. NEV

E. J. Cooper, Receiver, Yerington, Nev. H. L. Van Valen, representi stockholders, 410 Advertising Bldg., Chicago, Ill., at last accounts.

Inc. 1912, in Nevada. **Cap.**, $2,000,000. Placed in receivers' hand 30, 1914; debts were about $17,000. Reported January 5, 1916, that obli "are being rapidly paid off; it is expected that the Receiver will be disch about 60 to 90 days from present date."

Property: 23 claims, 467 acres at Yerington, Lyon county, said to gold ore in a contact deposit between andesite and porphyry; width of 3' with average assay reported of $16.80 per ton. Claims 60,000 tons ore.

Development: 200' incline shaft, with 900' of workings. Equip cludes 25-h. p. gasoline hoist and a 6-drill compressor.

Letters returned and company presumably out of business.

Officers: Herman Badt, pres.; David Neff, v. p.; J. L. Vandive with Samuel Neff, all of Salt Lake City, directors.

Property: on Spruce Mtn., south of Wells, Elko county, develo 550′ tunnel, being driven 300′ further to reach the orebody. Ore occurs carrying lead and silver. Past production reported to have totaled $ High-grade ore shipped in October, 1919.

In January, 1920, rich ore was reported opened at depth of 400′, and of ore awaited shipment. This company had extracted 24 cars to th three of which netted $4,089.

STANDARD METALS CO. NE

Address: A. L. Chappel, 153 North Virginia St., Reno, Nev.

Inc. April, 1916.

Property: claims on Peavine mountain, 5 miles N. of Reno, in W county, first worked in 1863.

The main vein is in andesite; strikes N.-S., and dips 42° W. The p oreshoot is in a crushed zone, and is 155′ long, up to 61′ wide, and 67′ hig carries copper, silver and lead.

Development: by 350′ tunnel and 215′ incline shaft near mouth nel; further sinking is under way. Water amounts to 300 g. p. m.

Equipment: includes 6-mile transmission line, hoist, 60-ton (to larged to 100 tons) mill employing rolls, ball mill, tables, and flotati chine, making a $75 to $211 concentrate, auto-trucks and loading b the W. P. R. The product is sent to Utah smelters.

STANDARD METALS CORPORATION

Offices: 805 Arrott Bldg., Pittsburgh, Pa., and Reno, Nev.

Cap., $3,000,000; $1 par.

Officers: W. P. Lemley, pres.; A. L. Chappel, and B. L. Elliott, W. K. Elder, sec.-treas.; A. G. McCaughan, asst. sec.-treas.; with J. A. D. H. Collins, John Lofink, Jr., and W. H. Slifer, directors.

Property: 3 patented claims and millsite, 47 acres, including th master and Poe mines bought from the Standard Metals Co. in 19 1,725,000 shares of Standard Metals Corporation. The claims are on mountain, 5 miles N. of Reno, in Washoe county. The first work done district was in 1863. Old workings were to a depth of 100′, where a wide said to have been opened. Ore carries silver and galena. In March, 1 electric hoist and pump were erected, and shaft sinking started.

STAR OF THE WEST MINING CO. NEV

Offices: 1482 Broadway, New York, and Reno, Nev.

Officers: Robt. B. Todd, pres.-mgr.; Leonard L. Griffiths, v. p. Punderford, sec.-treas, with R. G. Withers and John F. Clapisson, director

Inc. April, 1919, in Delaware. **Cap.,** $1,000,000; $1 par; 500,000 sh treasury. Security Transfer & Registrar Co., registrar and transfer agent

Property: 6 claims, 4 patented, in Gold Park district, Nye county merly owned by the Nevada M. Co. Ore occurs in fissure veins in por with N. E.-S. W. course and dip of 45°, said to average $50 per ton in and gold.

Development: by 5,000′ of drifts and tunnels. Is an old producer ing a past production of $1,000,000. A 30-ton concentrating mill was installed in 1919.

Management estimated reserves, April, 1918, at 30,000 tons, aver per ton.

STATES MUTUAL CONS. MINES CO. NEV

Address: Searchlight, Nev.

Officers: Mrs. V. H. Brewer, pres.-mgr.; J. W. Carnie, v. p. McKee, sec., with Geo. Allan and Albert Cappel, directors.

Cap., $5,000,000; $1 par.

Property: 140 acres in Campaign copper mining district, Sear Clark county, said to carry a deposit 4,500′ long running from 2 to 3 per. **Development:** by tunnels.

Mrs. Brewer has been running the the mine for several years, and

Inc. June 4, 1910, in Nevada, as successor of Washington-Nevada M ing & Milling Co. **Cap.**, $1,000,000; shares $1 par; non-assessable; iss $799,420. Annual meeting, first Monday in January.

Property: 11 claims, 3 patented, 57 acres, with 120 acres mill and smel sites, 30 miles S. W. of Goldfield and 10 miles from a railway, in the Lida dist District shows Cambrian limestone and shale, cut by quartz monzonite, cap by volcanic rocks. The ores occur as impregnations and veins. The claims reported by the management to carry 12 deposits, 4 under development of 20′ average width, traceable 5,000′, carrying a sulphide ore, said to give an of 8.7% copper, 17 to 19% lead, 11% zinc, 11 oz. silver and $1.90 gold per to

Development: by 9 shafts, of 31 to 120′ depth, and by 6 tunnels of to 140′ length; the tunnels are not being used.

Equipment: includes a 15-h. p. gasoline hoist and 5 mine buildings. T management planned deepening the main shaft to 200′ at last report.

TEACUP MINING CO. NEVA

Address: McGill, or Cherry Creek, Nev.

Officers and directors: Geo. Granopolus, pres.; J. M. Lockhart, v. p.; J. Mueller, sec.-treas.; J. W. Wenzel, mgr.

Inc. June 27, 1919, in Nevada. **Cap.**, $1.000,000; $1 par; assessable; 322 issued. Operating expenses for 1918 averaged $5,000 per month.

Property: 22 claims, 2 patented, 440 acres in Cherry Creek district, W Pine county.

Geology: there are two veins under development; the Teacup, wor since 1868, lies along a contact between lime and shale, is, from 4 to 12′ w runs N.-S. and dips 45° W. The Exchequer is a fissure vein in quartzi 4 to 11′ wide, and runs S. 70° W. crossing the Teacup vein 675′ S. of t Claims cover 5,000′ along strike of Exchequer vein and 3,000′ on the Teacup.

Development: by a 1,000′ shaft and a 450′ incline shaft; a total of 4,(of workings to depth of 1,000′. A crosscut on 900′ level intersects the Ex quer vein.

Equipment: includes 60-h. p. gasoline hoist, assay-office and buildin compressor, 7,250′ tramway, and 100-ton mill with flotation and cyanide unit be installed.

Mine is credited with past production of 3,000,000 oz. silver, and mana ment reports reserves of 100,000 tons, running 14 to 27 oz. silver.

TECHATTICUP MINE NEVA

Address: R. T. Walker, lessee, Nelson, Nev. Owned by Joseph Wh ton Estate, Philadelphia, Pa.

Property: 9 claims, 8 patented, 1 mile E. of Nelson, Clark county, N said to show a quartz vein in monzonite, dipping 10 to 80° and pitching E. Ore is a sulphide.

Development: by 600′ incline shaft, and 3,000′ of workings.

Equipment: 25-h. p. gasoline hoist, 3 compressors and 50-ton cyan mill.

Production: in 1916 was 7,676 oz. gold and 58,393 oz. silver. Operati but no record available.

TECOMA CONSOLIDATED MINES CO. NEVA

Address: C. S. Woodward, mgr., Montello, Elko county, Nev.

Property: a silver-lead mine near the Utah border, first opened in 1 when mine was made to pay its way by the proceeds of rich ore shipp Since 1916, $140,000 has been spent in reopening the mine and a "red lime" on foot-wall of the silver-lead orebody was found to be zinc oxide. A bl 100x100′ of 20% zinc ore is developed. Development is extensive on 1,000′ le Dumps contain 10 to 20% lead and 5 to 10 oz. silver ore.

TENABO MILL & MINING CO. NEVA

Property acquired in 1920 by Consolidated Cortez Silver Mines Co., which Fully described in Vol. XIII.

Production to date is said to be 12,000,000 oz. of silver and 25,000 oz. gold. Reserves are now estimated at 39,000 tons.

Officers: Whitman Symmes, pres.-supt.; J. H. Goldman, v. p.; Swain, sec., with Geo. F. Bennett, A. L. Rader, C. W. Conliss, directors.

Inc. Nov., 1904, in California. **Cap.,** $200,000; shares $1 par; all out ing; assessable. Last assessment, the 45th, of 10 cents, called October 31

Transfer office: 381 Bush St., San Francisco, Cal. **Registration** Co., San Francisco, registrar. Annual meeting, third Thursday in Nov Listed on New York Curb and San Francisco Exchange. Company is same management as Mexican Gold & Silver Mining Co., which see.

Gross earnings for 1916 were $378,818, less $164,727 for operating ch

Property: about 600 acres along the Comstock lode at Virginia north of the Mexican mine and south of the Sierra Nevada mine.

Development: following a change in management, work on the and 2,900′ levels was abandoned. The ore in sight on the 2,600′ level w tracted and the water allowed to rise to 2,100′. Exploration is now bein ried on by the Mexican near the Union Cons. south line, and by the Uni its own ground on the 1,600′ level. This has not yet resulted in finding or

Production: during past two years about $1,000,000, the ore aver $30 per ton. Total production approximately $4,000,000.

UNION COPPER CO. NEV

Yerington, Nev. Title changed to Standard Copper Co., in 1912.

UNION MINES CO. NEV

Office: Union, Nev.

Officers: W. P. Fairman, pres.; E. T. Comfort, sec.; L. R. That mgr. A close corporation and prefers not to have us publish information.

Operates a silver-lead mine, 35 miles S. of Palisade, Eureka county, N

UNIONVILLE MINING CO. NEV

Address: J. A. Spiker, pres.-mgr., Unionville, Nev.

Property: at Unionville, Pershing county, said to show 17,500 ton $20 gold-silver ore. There are 5 fissure veins in rhyolite with 3′ of ore on h ing wall. A 50-ton cyanide mill moved from Seven Troughs in Hum county, was erected in 1919.

UNITED COMSTOCK PUMPING ASSOCIATION NEV

Operates electrically-driven pumps to drain the lower levels of the Nort mines on the Comstock Lode at Virginia City, owned and operated by the S Nevada Mining, Cons. Virginia Mining, Mexican Gold & Silver Mining Union Cons. Mining companies.

The lower levels were completely re-opened to the 2,900′ level in Septe 1917, after being filled with water for 33 years. Expenses incurred are ap tioned among the mines.

The system comprises 3 Riedler pumps on the 2,000′, 3 centrifugals on 2,310′, 3 vertical centrifugals on the 2,500′, and 2 vertical centrifugals on the 2 and 2,900′ levels.

UNITED MINING CO. NEVA

Probably dead. Letters returned from former mine office: Carson City,

Officers: H. D. Cowden, pres. and gen. mgr., Bloomington, Ill.; R. Hingston, treas. and gen. supt.; F. W. Boston, sec.; L. B. Perry, asst. sec.

Inc. 1905, in Nevada. **Cap.,** $3,000,000; shares $1 par; non-assess 500,000 preferred and 2,500,000 common; issued $1,876,150.

Property: 34 claims, 680 acres, in the Delaware district, 12 miles Carson City, Washoe county.

Reported in 1915 that the Nevada mine was abandoned and stockho given shares in the Boston American Mining Co., Wash., an equally unpro and doubtful proposition. It is evident from the literature sent out companies that the management preferred to mine the public instead of its

Management reported, January, 1916, "property is not working are looking for some process that will enable us to handle our own plant."

UNITED STATES TUNGSTEN CORPORATION

Operated a mill for concentration of tungsten ore at Tungsten White Pine Co., Nev. Company was dissolved December 21, 19

excess of iron and manganese, making a desirable smelter flux. Litigation the Prince Cons. during 1917-18 terminated in favor of the Virginia Louise, latter obtaining a judgment of $27,334 for trespass. A compromise was eff whereby the Prince Cons. dismissed the apex suit filed against the Vi Louise and granted the right to ship ore over its private railroad at the ra 50c. per ton in return for the dismissal of the trespass judgment.

Development: by 600′ shaft and 2,500′ of drifts and raises. Ore blo out is estimated as equal to 3 years' supply at 100 tons per day, and an e quantity probable ore.

During 1918 the property was entirely re-equipped, development work sumed and shipments commenced in September to the Midvale smelter in U at the rate of 50 tons daily. Total tonnage shipped was 5,447 dry tons October, 1919, daily shipments were 100 tons. Net profits are reported $3 per ton. Extraordinary expenses are practically at an end, and future p can be devoted to paying off bonds and distributing dividends.

VULCAN MINING, SMELTING & REFINING CO. NEVA

Office: 708 First Nat'l Bank Bldg., Denver, Colo.

Officers: H. Ornauer, pres.; E. E. Whitted, v. p.; A. E. Brooks, sec.; L. Dines, treas., with H. C. James, Tyson S. Dines and J. M. Herbert, direct

Inc. in Wyoming. **Cap.**, $2,500,000; $1 par; 2,000,000 outstanding.

Property: Hunter mine, 16 patented claims, 132 acres, in the Hu district, White Pine county, about 30 miles from Ely, the nearest rail p shows copper, silver and lead ores occurring in fissure veins in monzonite limestone. Developed by 300′ and 500′ shafts and tunnel, with a total of underground workings.

Equipment: includes hoist, compressor and steam power. Lessees duced 65 tons of ore in 1915, averaging $38 per ton, and in 1916 had of ground to work and were shipping fair quantities of ore to Murray, U Company has been inactive since 1912.

V 7 MINING CO. NEVA

Address: W. E. Casson, sec., Carson City, Nev. G. L. Hedges, mgr.

Property: 5 claims in the Reservation district near Schurz, Mi county. A 3′ vein, a contact between lime and granite, carrying silver-lead had been opened to a depth of 100′ by December, 1919. Shipments were exp to start early in 1920.

VULTURE-WONDER MINES CO. NEVA

Title changed to Nevada Silver Consolidated Co., which see.

WALKER RIVER COPPER CO. NEVA

Offices: 403 Madison Ave., New York, and Yerington, Nev.

Officers: Chas. N. Edge, pres.; H. W. Miller, v-pres., with H. B. L J. A. Martin, J. H. Sussman and Wm. C. Hand, directors. R. A. Atw sec.; C. S. Dodge, treas.; J. E. Gelder, mgr.

Inc. June, 1915, in Nevada. **Cap.**, 2,500,000 shares; $5 par; outsta 675,000 shares. Transfer office: Company office; registrar, Registrar & Tr Co., New York.

Property: 15 claims, 250 acres, including millsite, near Yerington, L county, being developed in conjunction with the Empire Nevada mine of Empire Nevada C. M. & S. Co., held under a perpetual lease. Title wi to the Walker River Co. when royalties paid amount to $500,000. Claims a low-grade copper deposit said to cover an area 1,000 by 4,800′ so far as d

Ore is said to assay 3% Cu.; 0.5% S.; 72% SiO_2; 5% Fe_2O_3; 11% Al_2 2% CaO; 1% MgO.

Development: 350′ vertical shaft. During 1918, $36,000 was expend diamond-drilling on the Empire Nevada, said to have proved the oreb extend to 500′ depth. Present work is by quarrying.

Ore reserves: management claims 550,000 tons of 2% ore prov drilling and surface and underground work.

Equipment: includes 25-ton leaching plant, built to use the ferric chloride process, but changed 1920 to leaching with precipitat scrap iron.

Officers: Dr. Roy W. Martin, pres.; F. A. Wait, v. p., with M. E. Fish, Jas. German and Harry Dale, directors.

Property: in Eldorado canyon, near Nelson. A small mill installed b

WEDGE COPPER CO. NEVA

Address: Luning, Nev. H. H. Hunter, managing director. Lovel Nev. Mark Walser and H. O. Howard, directors. Knud Freitag, cons. e

Inc. March, 1916, in Nevada. **Cap.,** $1,000,000; $1 par.

Property: 6 claims, 8 miles from Luning, Mineral county, developed crosscut tunnel cutting copper ore at 800′ depth. Said to show 2′ of 2% in a 6′ vein.

Company reported consolidated with adjoining properties and flotation p erected in 1918, but no confirmation available.

WEST ARROWHEAD MINES CO. NEVA

A new company organized to operate in the Arrowhead district.

WESTERN MINES DEVELOPMENT CO. NEVA

Out of business. Fully described in Vol. XIII.

WESTERN ORE PURCHASING CO. NEVA

Address: F. M. Manson, Reno, Nev. Company operates a 900- sampler at Hazen; also has plants at Goldfield, Nev., and Murray, Utah. Ha 29,262 tons of ore in Nevada plant in 12 months ending November, 1918, well and favorably known.

WESTERN SILVER MINES CO. NEVA

Office: Dooly Blk., Salt Lake City, Utah.

Officers: J. M. Howell, pres.-mgr.; A. R. Irvine, v. p.; W. G. How sec.-treas., with David Neff and J. A. Spencer, directors. C. F. Williams, E Nev., resident agent.

Inc. 1917 in Nev. **Cap.,** $1,500,000; $1 par; 600,000 shares outstand March, 1919. Stock offered at 50c. in 1918 to provide capital for 500-ton and further development.

Property: 10 patented claims, includes the Moho mine 20 miles fr Mina, in Mineral county. Silver-lead ore occurs in fissure veins in andesite, is said to assay $9.

Development: 5,000′ of workings to depth of 360′. Management rep ore reserves of 200,000 tons.

WEST SPANISH BELT SILVER MINING CO. NEVA

Property adjoins holdings of the Cons. Spanish Belt Silver Mng. Co. on west in Spanish Belt district, Nye county, said to be explored through worki of that company.

WHALE MINING CO. NEVA

Officers: J. M. Hays, sec., 20 S. 9E St., Salt Lake City, Utah; R Salisbury, C. W. Whitley, L. Greene, trustees.

Property: the Whale mine, 6 unpatented claims, 120 acres, 8 miles of Goodsprings, Clark county. The mine has deposits of zinc ore which o in limestone and dip 45°, the pay ore being found in shoots 2′ to 5′ wide.

Development by a 600′ tunnel. Greatest depth of workings, 300′. mine is still in development stage.

Equipment: includes 10″x10″ compressor. A shipment of carb ore said to have averaged 38% zinc. Presumably idle.

WHITE CAPS EXTENSION MINES CO. NEVA

Address: J. G. Kirchen, Tonopah, Nev. **Mine office:** Manhattan, Ne

Officers: J. G. Kirchen, pres.; J. H. Miller, v. p.; A. G. Raycraft, treas., with Hugh H. Brown and W. L. Mangum, directors.

Inc. 1917, in Nevada. **Cap.,** $200,000; shares 10c par; assessable; 1,3 issued. Listed on New York Curb and San Francisco Exchange.

Property: 13 claims, in Manhattan district, Nye county, said to show deposits occurring as chimneys in limestone, with 50° dip. Ore carries and a trace of silver.

Development: by vertical shaft to depth of 400′.

Equipment: includes 50-h. p. hoist, compressor, drills and pump motor driven.

Inc. August 5, 1915, in Nevada. **Cap.**, $1,000,000; $1 par; 850,000 sh issued. Bonds outstanding $25,000. Annual meeting, first Wednesday in Jan

Property: Green Monster Extension mine at Goodsprings, Clark co Nev. Produced 35 tons of zinc ore in 1915-16. A prospect.

WHITE PINE SILVER MINES CO. NEVA

Address: Web. Greene, sec., care Fritsch Loan & Trust Co., 201 Bldg., Salt Lake City, Utah.

Officers: August Vogeler, pres.; Arthur Robinson, v. p.; W. H. Pen treas.; L. R. Nelson, mgr.

Inc. 1918, in Utah. **Cap.**, $100,000; 10c par; 500,000 shares in treasu

Property: 8 claims, adjoining the Siegel mines at Schellbourne, W Pine county, developed by tunnel and shaft said to show copper, lead, and s running from $16 to $80 per ton. Developing only in 1919.

WILLARD METALS MINING CO. NEVA

See New Willard Gold Mines Co.

WILLARD MINES CO. NEVA

Idle, at last accounts.

Officers: F. H. Bird, pres.; J. T. Goodwin, v. p.; R. Nenzel, sec. A. Twigg, treas., with L. A. Friedman, D. C. Wheeler, directors. H. H. Hu mgr. and supt.

Inc. in Nevada. **Cap.**, $1,000,000; $1 par; outstanding, 662,000. bonded indebtedness. Annual meeting, third Wednesday in January.

Property: 3 unpatented claims, 8 miles E. of Lovelock, Pershing cou Nev., which show a vein carrying pay ore in shoots.

Development: by several shafts, deepest 50′, and a 70′ tunnel. Sh ments averaged $54 per ton in gold and silver.

Property in a district that was feverishly active in 1915, but the tempera subsided in 1916. See Nevada Honeybee and other mines of Loring (for Willard), Nevada.

WILLIAM PATRICK MINING CO. NEVA

Address: Manhattan, Nev.

Officers: Wm. C. Houppert, pres.-mgr., Otto Johnson, v. p.; W. P. well, sec.-treas., with Wm. E. Osborn and W. A. Bastian, directors.

Inc. December 26, 1917, in Nevada. **Cap.**, $100,000; 10c par; 847,00 sued.

Property: 2 patented claims, 40 acres, near Manhattan, Nye county, to show free-milling ore in quartz vein with E.-W. course and dip of about Pay-ore occurs in shoots assaying from $2-$18 per ton in gold. Develope 169′ shaft and crosscuts. Ore is mined by glory-hole method.

Equipment: includes 25-h. p. electric hoist, pump, tramway. 35-ton Management reports 1,200 tons of ore on dump, assaying about $8 per and 20,000 tons of ore blocked out.

The mine was closed down December, 1918, but was to be re-opened w conditions return to normal.

WILSON-NEVADA MINING CO. NEVAD

See Nevada Lincoln Mining Co.

WILSON SILVER MINES CONS. CO. NEVAD

Main office: Goldfield, Nev. **Agent's office:** A. P J. Theo, 15 Wil St., New York City.

Officers: J. B. Kendall, pres.; N. P. Theo, v. p.; M. A. Kendall, sec.-t

Inc. in Nevada. **Cap.**, $2,000,000; $1 par. Traded in on New York C

Property: 18 claims, 16 patented, 300 acres, in Esmeralda county, 5 m from McLean on the T. & G. R. R.

Silver-lead ore occurs in a replacement deposit in limestone and is repor to carry from 50-300 oz. silver and 70-80% lead per ton.

Development: by 3,000′ of old workings, with reserves estimated 10,000 tons blocked out, valued at $500,000, and 20,000 tons of ore on the dum

Past production given as $325,000 net. Shipments are made to Hay sampler. Treasury stock was offered the Eastern public June, 1919, to pro funds for necessary equipment.

Officers: A. J. Robbins, pres.-gen. mgr.; E. B. Critchlow, v. p.; Reyn Robbins, sec.-treas., with A. J. McDermott and G. A. Fayle, directors.

Inc. in Utah. **Cap.**, $100,000; 10c par; assessable; 575,000 issued.

Property: 12 claims, 190 acres, in Yellow Pine district, Clark coun Nev., said to show a chamber deposit in limestone, dipping 45° W., with N course. Ore shoots are 2 to 8′ wide and 10 to 40′ long. Ore contains carbo of zinc and lead, with some copper and silver; zinc content is 35%.

Development: by 800′ incline shaft, 200′ tunnel and total of 4,50 workings. During 1918 only about 500′ of drifting was done on the 1 level of the shaft.

Production: to 1917 about $100,000, average in 1916 being $25 per t In 1918 output was 250 tons.

Owing to market and labor conditions management did only sufficient w to hold the property in 1919.

YELLOW PINE MINING CO. NEVA

Main office: Goodsprings, Nev.

Officers: J. F. Kent, pres.; R. B. Chapman, v. p.; Morris P. Kirk, mgr.; C. W. Kent, treas., with S. E. Yount and S. H. Westfall, directors.

Inc. 1905, in Nevada. **Cap.**, $1,000,000; $1 par; non-assessable; all issu No bonded indebtedness. Stock transferred and registered, 431 Security B Los Angeles, Cal. Listed on Los Angeles Stock Exchange.

Financial statement for year ending January 10, 1918 shows: gross rece $662,256; total expenditures, $248,575; gross profit, $414,778.

Dividends: in 1918, $300,000; in 1919, $150,000.

Property: 13 patented claims, 240 acres in Yellow Pine district, Cl county, 4½ miles N. W. of Goodsprings, and 12 miles W. of Jean, nearest point. In 1917, the Charleston claim, held under lease, was turned over to Charleston Mining Co. (which see), the Yellow Pine retaining a half interes the new company.

Ore occurs as replacement deposits in limestone, and averages 30% z 14% lead and 14 oz. silver. The main deposit dips about 30° W. and run N. S. Faulting is frequent, and oxidation continues to present depth increases, and zinc decreases at depth. The property and plant were descri in "Mining and Oil Bulletin" of Los Angeles, by H. A. Walker, in October, 1

Development: by an incline shaft, 900′ deep, greatest depth of work being 950′ and linear extent 29,000′. New work in 1917 amounted to 3,0 costing $12.08 per foot.

Equipment: includes 50-h. p. oil engine, hoist good for depth of 2,5 compressors, generator, 4½ miles of tramway from mine to mill, 12 miles 36″ gauge railway with Shay locomotive between Goodsprings and Jean on Salt Lake Route; 120-ton wet concentrator using jigs and tables. The s strictly speaking, is a separator rather than a concentrator. The ore is a lo grade silver-lead-zinc material, and in the treatment at this plant no reje is made, all products of the mill being shipped. In 1919 a calciner was adde eliminate moisture and carbon dioxide in the zinc carbonates.

Production:	tons Ore.	% Lead.	% Zinc.	oz. Silver.	Tot
1917	19,976	14.85	29.1	7.55	42
1916	20,581	10.5	30.4	4.53	4
1915	16,136	10.2	31.8	5.40	

Total production to January 1, 1919, 138,156 tons.

Operations were suspended from March to August, 1919, on account of which destroyed much of the plant, since re-built. The Yellow Pine managed and should pay dividends for a long while.

YERINGTON BULLION MINING CO. NEVA

Idle, and mail returned from former address, Lucin, Utah.

Officers: A. J. Schmidt, pres.; J. A. Knox, sec.-treas.

on No. 3 shaft which was 70′ deep (June, 1919), showing stringers of or the surface. A carload in 1916 yielded 4.45%.

The **Copper Flat** group, 1 mile E. of Yerington is developed by 20 pits and shallow shafts, deepest 60′, showing malachite and cuprite o 6% copper tenor. Shipments in 1917 averaged 6.46% copper.

The **Effie May** group is a gold prospect developed by a 135′ shaf about 2,000 tons of ore blocked out. Property is on the Nevada Copp railway.

YERINGTON MOUNTAIN COPPER CO. NE

Offices: 302 Natl. Bank Bldg., Tonopah and Golconda, Nev.

Officers: J. G. Kirchen, pres.-mgr.; E. M. Kirchen, v. p.; H. Perr treas., with H. J. Toner, W. A. Krasselt, H. R. Cooke and E. J. Haug, d W. L. Taylor, supt.

Inc. February 10, 1912, in Nevada. **Cap.**, $3,000,000; **shares** $1 pa assessable; issued $2,300,000. First Natl. Bank of Tonopah, Nev., an Corporation Co., New York, registrars and transfer agents. Listed o York Curb and San Francisco Exchanges.

Property: 46 claims, 920 acres, in the Mountain View district, N. W. of Schurz and 12 miles E. of Yerington, shows fissures in gran that run N. 40° E., and dip 65°. Ore minerals are mainly chalcocite, wi copyrite, chrysocolla, malachite, cuprite and occasional native copp assays 4½ to 8% copper, 2 to 4 oz. silver and 80c. to $2 gold per ton.

In July, 1916, company purchased the Adelaide mine, near Golconda boldt county, from the Glasgow & Western Dev. Co.

At the Adelaide mine there is a contact deposit in limestone and opened by a 300′ shaft and 1,450′ of tunnels, with a total of 6,500′ of In August, 1917, the orebody on the 200′ level was 20′ wide, and mont ments were 200 tons of 5% ore.

In 1918 a group of five gold-silver claims 100 miles N. W. of Tono acquired.

Development: at the Yerington by a vertical 300′ main sh 1,200′ of tunnels, with about 8,000′ of openings. The Azurite tunnel wa from the other side of the mountain to cut ore exposed in the Levine tu at 400′ greater depth. Tunnel discloses ore in bunches and streaks. Th tunnel yielded a good grade of shipping ore of about 5.5% copper.

Equipment: includes gasoline hoists, 2 compressors, pumps, etc

Production: in 1916 was from 400 to 600 tons per month. All w temporarily suspended February, 1918, on account of heavy flow of lower workings.

YUBA LEASING & DEVELOPMENT CO. NE

Out of business. Formerly at Pioche, Lincoln county.

ZANZIBAR MINING CO. NE

Address: P. O. Box 374, Reno, Nev.

Officers: J. M. Short, pres.; L. S. Reese, sec.-treas.

Property: 2 claims between the White Caps and White Caps E at Manhattan, Nye county, developed by 400′ shaft. Idle, pending re tion, 1919.

THE DIVIDE (OR GOLD MOUNTAIN) DISTRICT.

This district, which is six miles south of Tonopah and on the main Goldfield, was known and under development at the time when the re discoveries at Goldfield lured everyone away from the prospects of Gold tain, as the district was then called. In 1912, the Tonopah Divide Min pany was organized by Mr. H. C. Brougher, to acquire and develop the now known as the Divide mine, then owned by the moribund Gold Mining Co., whose shareholders were offered new stock for old on pay 3c. a share.

New work at this property opened up a remarkable orebody in a vein considered worthless, and started a mining boom early in 1919, that riva of the Goldfield stampede. The country was located for miles around th

Inc. May 27, 1919, in Nevada. **Cap.**, 1,500,000 shares; 10c. par, asses 700,000 issued.

Officers: Elmer Bisbee, pres.; Gust Hanson, v. p.; C. N. Miller, treas., with W. G. Robertson and E. N. Bannon, directors.

Property: 160 acres including Little Belle claim, 3 acres of inside tory adjoining the Gold Reef group; Star section near the Gold Zone sh the Doughboy group, 13½ acres, surrounded by the Knox, Florence, and gler mines. The Doughboy is the main holding. The Mornington placer along the Feather river in California, controlled by C. N. Miller and as is presumably included.

Development: shaft being sunk at about 200' from the Knox sh vein was cut at 12' containing ore carrying free gold.

ALBANY DIVIDE MINING CO

Office: Tonopah, Nev.

Officers: G. W. Allen, pres.; John Barrier, treas.; H. C. Price, se Wm. Forman and John Shepard, directors. C. R. Evans, asst. sec.

Inc. March, 1919, in Nevada. **Cap.**, 1,500,000 shares, 10c par. Li Boston Curb.

Property: 3 full and 2 fractional claims, adjoining the Hecla, E Congress, Bullion, and Hudson groups. Core-drilling was to be started June, 1919, to prospect to depth of 800'.

Stock of the company was manipulated to $23 a share on the Bos in 1919, giving the property a market value of $34,500,000, though on face work had been done on the claims.

ALDA DIVIDE MINING CO.

Office: Goldfield, Nev. E. Carter Edwards, res. agt.

Officers: G. H. Duell, pres.; J. L. Woodward, v. p.; W. E. Edwar treas., with William Huggard and E. C. Edwards, directors.

Inc. April, 1919, in Nevada. **Cap.**, $150,000; shares 10c par. T **office:** 66 Broadway, New York City.

Property: 8 claims about 2¼ miles S. W. of Gold mountain.

ALLIED DIVIDE EXTENSION MINING CO.

Office: Goldfield, Nev.

Officers: H. B. Ruhl, pres.; Albert Ninnis, v. p.; B. E. Garne treas., with Gust Hanson, directors. J. K. Turner, cons. eng.

Inc. in Nevada. **Cap.**, $150,000; shares, 10c par.

Property: a prospect, consisting of 2 claims and a fraction just the Allied Divide.

ALLIED DIVIDE MINING CO.

Office: Goldfield, Nev.

Officers: H. B. Ruhl, pres.; Albert Ninnis, v. p.; B. E. Garn treas., with Gust Hanson, directors. J. K. Turner, cons. engr.

Inc. February 26, 1919, in Nevada. **Cap.**, 1,500,000 shares; Listed on San Francisco Stock Exchange. Has a good treasury fund.

Property: 4 claims, southeast of Gold Zone and surrounded Liberty Bell, Mammoth, Divide Extension, and East Divide. Is said direct trend of main Divide vein.

Development: 200' shaft sunk on Marquette claim.

Equipment: 20-h. p. gasoline hoist 10x10, compressor, tools, chased from companies at Belleville and Candelaria.

ALPHA DIVIDE MINING CO.

Office: 314 Clay Peters Bldg., Reno, Nev. Alex. S. Proskey,

Property: a group of 5 claims, 2¼ miles N. W. of Gold mou October, 1919, company was being financed and work was to be soon after. Is a prospect only.

ALPINE DIVIDE MINING CO

Inc. April, 1919, in Nevada. **Cap.**, $150,000; shares, 10c par.

Property: 6 claims bounded on W. by the Doughboy and 1¾ miles slightly N. E. of Gold mountain. A prospect without know

Officers: A. S. Proskey, pres.; A. N. Salisbury, v. p.; H. E. Scott, sec E. F. Lunsford, treas., with S. F. Taylor, and L. Little, directors.

Inc. March, 1919, in Nevada. **Cap.**, 1,500,000 shares; $1 par; 850,000 o standing. Listed on San Francisco Stock Exchange.

Property: 2 claims, 28 acres, between the Divide Cons. and Moha Examined, 1919, by A. H. Elftman, who reports that several veins cross ground, and that pay-ore should be found at shallower depth than in o parts of the district.

Development: by shaft, 102′ deep early in October.

Equipment: electric and gasoline power, 25 h. p. hoist, and compres

ARGONAUT HASBROUCK DIVIDE MINING CO. NEVA

Address: A. H. Elftman, Tonopah, Nev.

Inc. 1919, in Nevada. **Cap.**, $150,000; par 10c.

Property: 60 acres in the Divide district, W. of Kendall Divide. July, 1919, a 50-h. p. hoist, compressor, and accessories were ordered. S sinking to be done in 1920.

ARGONNE DIVIDE MINING CO. NEVA

Office: Tonopah, Nev.

Officers: Frank Berry, pres.; C. W. Taylor, v. p.; T. A. Frazier, s treas., with Charles Keilhofer, R. W. Cattermole, and H. H. Brown, direc A. H. Elftman, cons. engr.

Inc. April, 1919, in Nevada. **Cap.**, $300,000; shares 2c par.

Property: the Homestake-Gold Wedge group of 7 claims, purcha from Charles Kielhofer and others by a syndicate represented by M. B. C C. R. Miller, and Barron Hoopes, Jr., of the Tonopah Mining Co. Equip from the Silver Plume shaft of the Tonopah company was brought to m

Development: A shaft is to be sunk to 200′ depth and levels start The ore so far cut assays $3 to $10 per ton in gold and silver. In October, $ assays were reported at lower depth. A hoist and head-frame have b erected.

ARIZONA DIVIDE MINING CO. NEVA

Office: 15 Broad St., New York.

Inc. in Nevada. **Cap.**, 2,000,000 shares. 10c par; non-assessable; 1,575, outstanding, of which 400,000 are underwritten for benefit of the treas 1,175,000 are issued or set aside for the Arizona Central Gold Mines Co., a to acquire property at Divide. As a reserve, 425,000 shares are held in treas

Property: at Divide—the Military group of 5 claims, 1¼ miles S. the Tonopah Divide. Examined by L. R. Robins and R. C. Knox. Two shear-zones said to cross the property, roughly parallel to the course of Tonopah Divide shear-zone. "The Military is a geological 'gamble' of same character as other Divide properties. . . . "

At Oatman, Arizona—17 acres, surrounded on three sides by the Un Eastern. A quartz-calcite vein, 30 to 60′ wide, outcrops for 1,000′. A shaft has been sunk on a vein assaying $5 to $6 gold per ton. Pay-ore is pected at 500′. Shaft has a hoist, compressor, etc., adequate for depth of 1,0

ATLANTIC DIVIDE MINING CO. NEVA

Address: Tonopah, Nev. E. Marks, res. agt.

Officers: Wm. Forman, pres.; W. J. Douglass, v. p.; E. Marks, tre M. L. Cooper, sec., with Arthur G. Raycraft, director.

Inc. 1919, in Nevada. **Cap.**, $150,000; 10c. par.

Owns Wedge group of 50 acres.

AZTEC DIVIDE MINING CO. NEVA

Office: Goldfield, Nev. Ben Gill, res. agt.

Officers: J. B. McCann, pres.; J. K. Turner, v. p.; Ben Gill, sec.-tre with Joseph Mayer, and F. P. Case, directors.

Inc. 1919, in Nevada. **Cap.**, $150,000; 10c par.

Property: a group covering 50 acres between the East Divide and E Divide Extension. Has electric equipment and plans active development, 1

AZTEC DIVIDE MINING CO. NEVA

Office: State Bank Bldg., Tonopah, Nev.

Property: 8 claims and fraction in Bellehelen mining district, N county, Nev. Has 150′ shaft and 50′ tunnel. Ore shipped in 1919.

BELMONT DIVIDE MINING CO. NEVA

Office: Tonopah, Nev. B. A. Rives, res. agt.

Officers: J. H. Healy, pres.; J. H. Miller, v. p.; Allen Rives, sec.-tr with C. T. Stevenson and Zeb Kendall, directors.

Inc. March, 1919, in Nevada. **Cap.,** 1,500,000 shares, 10c par, 75 shares in treasury; assessable.

Property: Bodie and Mustang claims, 36 acres, adjoining Big Divide S., Trilby on N., Bingo on W., and Divide Syndicate on E. A mineral fissured dike, said to assay well, runs through the claims. Some surface pecting has shown favorable indications.

BEN HUR DIVIDE EXTENSION MINING CO. NEVA

Address: Tonopah.

Officers: Ed Malley, pres.; Ben. D. Luce, v. p.-mgr. J. Clarence K sec.; Albert Kelly, treas.; John Barrier, director.

Inc. March, 1919, in Nevada. **Cap.,** $150,000; par 10c.

Property: 5 claims adjoining the Ben Hur on the W. Has 22 hoist, compressor, etc., and was sinking shaft until shut down by miners'

BEN HUR DIVIDE MINING CO. NEVA

Office: Tonopah, Nev. M. K. Franklin, supt.

Officers: Wm. Watters, pres.; C. W. Brandon, v. p.; R. J. Kelly, treas.; Roger Dougherty and Albert Kelly, directors.

Inc. March 29, 1918, in Nevada. **Cap.,** 1,000,000 shares; 10c par; assable. Listed on San Francisco Stock Exchange.

Property: 6 claims in southeastern part of district, near the Chariot North Ben Hur, and north of Gold Seam; held since 1902 by Watters Dougherty.

Development: a shaft sunk in 1918 was deepened to 300′ in 1919. original shaft was sunk on a quartz vein that assayed from $4 to $39 per On the surface, this vein was 25′ wide and of great length. Crosscut at was in favorable formation, and in December, the orebody was said improving at 250′.

Equipment: 15-h. p. gasoline hoist, compressor, 2 machine-drills ings, etc., good for depth of 700.

BEVIS DIVIDE MINING CO. NEVA

Office: 301 Nixon Bldg., Reno, Nev.

Officers: S. H. Wheeler, pres.; Wm. Woodburn, v. p.; M. A. sec.-treas., with C. T. Stevenson and F. H. Norcross, directors. Edward supt.

Inc. April 4, 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c par. on San Francisco Stock Exchange. Transfers made at company's office.

Property: 2 claims, 40 acres, S. of the Mammoth and N. of the show a "dike" or vein traceable across Zone and Reef groups into the

Development: sinking shaft to 250′ depth. At 35′, ore of low sistent value, was cut. This was pronounced as true fault matter in which occurs.

Equipment: electric hoist and compressor.

BIG ACE DIVIDE MINING CO. NEVA

Address: Tonopah, Nev. W. E. Carson, res. agt.

Officers: H. C. Stimler, pres., W. Brougher, v. p.; E. T. treas.

Inc. May, 1919, in Nevada. **Cap.,** $150,000; par 10c. 750,000 treasury stock.

Property: 5 claims, 100 acres N. of Signal and Southern Cross northern edge of district.

BIG BILL DIVIDE MINING CO.

Office: Tonopah, Nev.

Officers: W. W. Booth, Sr., pres.; W. W. sec.-treas.; G. W. Burgan, supt.

Officers: Harry McNamara, pres.; W. A. Nye, v. p.; H. E. Dugan, sec.-treas., with H. C. Price, directors.

Inc. 1919, in Nevada. **Cap.,** $150,000; shares 10c par.

Property: 4 claims, adjoining Golden State Divide. A prospect.

BROKEN HILL DIVIDE MINING CO. **NEVADA**

Officers: John McGee, pres. and mgr.; J. C. Williamson, sec.

Property: 4 claims, adjoining the Anaconda Divide on N. E., 3 miles N. W. of Gold mountain.

Development: sinking was to be started in 1919. A prospect on outskirts of district.

BROUGHER DIVIDE MINING CO. **NEVADA**

Office: Tonopah, Nev.

Officers: H. C. Brougher, pres.; George Wingfield, v. p.; with G. A. Kernick, James Grimes and Gust Hanson (supt.), directors. E. J. Erickson, sec.-treas.

Inc. March 16, 1918, in Nevada. **Cap.,** $1,000,000; $1 par, 851,508 outstanding, assessable. Listed on San Francisco Stock Exchange. **Annual meeting,** first Monday in April.

Property: 7 claims, 72 acres, lying immediately north of the Tonopah Divide and southwest of the Divide Extension.

Development: in July, 1918, a vein 70′ wide was crosscut on 200′ (or 177) level. The vein on this level showed no ore, although the drifts were over 500′ long in December. The southeast drift of the 500′ level, 225′ long, cut several rich stringers, and according to reports in the daily papers, a large body of milling ore was cut assaying $24 per ton for a good distance, though the values are spotty. A raise 75′ up, was stopped as the values faded out. Efforts were made to locate the Divide Extension vein by trenching, and a fissure was found.

Equipment: electric hoist, compressor, drills, etc.

Property is rated by engineers as having good chances, but energetic development and abundant funds have failed to find a payable orebody at present depth.

BUCKSKIN DIVIDE MINING CO. **NEVADA**

Address: Tonopah, Nev.

Inc. 1919, in Nevada. **Cap.,** $150,000; par 10c.

Property: 2 claims south of the Pershing and west of the Bullion Divide.

BULLION DIVIDE MINING CO. **NEVADA**

Office: Tonopah, Nev. Harry Price, res. agt.

Officers: W. F. Reading, pres.; S. A. Kimmel, v. p.; G. M. Reading, sec.-treas., with G. A. Bartlett, J. P. Bell, Roger Dougherty, directors.

Inc. March, 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c par. Listed on Boston Curb.

Property: Wonder group, 4 claims, 70 acres, south of the Pershing and north of the Albany and Congress. Surface exposure of fissure veins are reported to be well mineralized and a 250′ shaft is to be sunk with levels at 100′ and 200′. A prospect of no especial merit.

BUTLER DIVIDE MINING CO. **NEVADA**

Office: Tonopah, Nev. C. L. Lisle, res. agt.

Officers: A. I. D'Arcy, pres.; J. K. Turner, v. p.; C. L. Lisle, sec.-treas., with Branch Smith, L. L. Dellinger, and C. A. Calhoun, directors.

Inc. April, 1919, in Nevada. **Cap.,** $15,000; shares, 1c par.

Property: the Woodbutcher claims, 40 acres, between the Rosetta and Operator mines. Reported to show a number of quartz "blow-outs" on the ground, and that the rhyolite-breccia, the ore-bearing formation, will be reached at shallow depth. A prospect.

BUTTE DIVIDE MINING CO. **NEVADA**

Office: Tonopah, Nev.

Officers: W. F. Reading, pres.; S. A. Kimmel, v. p.; G. M. Reading, sec.-treas. and supt., with F. G. Corde and F. R. Lewis, directors.

Inc. April 24, 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c. par. Listed on San Francisco Stock Exchange.

CHARIOT DIVIDE MINING CO. NEVA

Office: Tonopah, Nev.

Officers: Wm. Watters, pres.; Zeb. Kendall, v. p.; R. A. Rives, s treas., with A. E. Kane and C. T. Stevens, directors.

Inc. March 18, 1919, in Nevada. **Cap.,** 1,500,000 shares 10c par, asse able. Listed on San Francisco Stock Exchange.

Property: 6 claims, adjoining the Ben Hur on N. E., about 2 m S. E. of Gold mountain.

Development: reported sinking in July, 1919. **Equipment:** hoist, c pressor, etc. A prospect.

CLARKE DIVIDE MINING CO. NEV

Address and transfer office: Tonopah, Nev.

Officers: Dr. Roy W. Marten, pres.; Las Vegas, Nev.; Chas. R T ping, v. p., San Francisco; C. P. Campbell, sec.-treas., Los Angeles; with T L. Clark and Clarence L. Putnam, directors.

Inc. April, 1919, in Nevada. **Cap.,** $150,000; par 10c; 750,000 sh in treasury.

Property: 7 claims, about 120 acres in S. Klondike section of Di Company financed and sinking shaft.

CLINTON DIVIDE MINING CO. NEV

Address: Tonopah, Nev.

Officers: C. W. Slack, pres.; F. H. Norcross, v. p.; I. Havens, Edward Strauss, treas., with F. S. Strauss, C. A. Clinton, J. P. Stinson A. Bartlett, directors.

Inc. 1919, in Nevada. **Cap.,** $150,000; shares, 10c. par.

Property: Rex group, 5 claims, 2 miles northwest of Gold m and north of the Sioux Divide.

COALITION DIVIDE MINES & DEVELOPMENT CO. NEV

Office: J. G. Brown, agt., Tonopah, Nev.

Officers: G. W. Warmoth, pres.; R. I. Pierson, v. p.; Robert Mc sec.-treas., with G. D. Olson, J. W. Kraner, E. J. Hoak and J. E. Post.

Inc. in Nevada. **Cap.,** $150,000; shares 10c par.

Property: 6 claims, the Burropah group, near the Rosetta; a old mine, 2 claims in Sante Fe district, near Luning, Mineral county, Nev ore.

COLUMBIA DIVIDE MINING CO. NE

Office: H. D. King, agt., Tonopah, Nev.

Officers: H. R. Grier, pres.; H. H. Atkinson, v. p.; H. D. K treas., with A. I. D'Arcy and H. E. Clark, directors. R. Wilson, supt.

Inc. April, 1919, in Nevada. **Cap.,** $550,000; shares 10c par.

Property: the Giant King group, 3 claims adjoining Western on N., and Hull City on S., a mile S. W. of Gold mountain. In Decem Estaleah-Cerbat Silver M. Co.'s property in Mohave county, Arizona, over.

Development: a shaft to be sunk 215' with crosscuts and level and 200'. A prospect.

COMBINATION DIVIDE MINING CO. NE

Office: Goldfield, Nev.

Officers: W. S. Phillips, pres.; G. A. Nelson and D. Patterson H. W. Nelson, sec.; also directors. J. A. Patterson, supt.

Inc. 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c. par;

Property: 3 claims, 2 miles N. W. of Gold mountain, bounded and northeast by the Pyramid and Sunbeam.

Development: a shaft sunk in typical Divide breccia, with yel pery quartz assaying up to $10.20 per ton at 30' depth.

Equipment: hoist, compressor, and drills were to be installed A fair prospect.

COMSTOCK DIVIDE MINING CO. NE

Address: Tonopah, Nev.

Development: ground contains two well-defined and mineralized v The main vein is considered to correspond with the course of the "silver of the Tonopah Divide. Workings consisted of a 30′ shaft, and 90′ of openings. The previous owner states that he shipped some ore that a $34 gold and 126 oz. silver per ton. Shaft sunk 100′ during 1919.

Equipment: gasoline hoists, tools, etc., purchased from compan Belleville and Candelaria, in Nevada.

CUMBERLAND DIVIDE MINING CO. NE

Office: Tonopah, Nev.

Officers: T. L. Oddie, pres.; A. E. Kane, v. p.; Warren Richa sec.-treas., with D. T. and P. J. Donovan, directors.

Inc. 1919, in Nevada.

Property: 4 Keystone claims, 50 acres next to the Sutherland a of the High Divide Annex.

Development: sinking started in June, 1919. **Equipment:** electric etc.

DANDY DIVIDE MINING CO. NEV

Address: Tonopah, Nev.

No information obtainable as to holdings, etc.

DESERT KLONDYKE MINING CO. NEV

Address and transfer office: Tonopah, Nev.

Officers: R. H. Tune, pres.; W. Lucot, v. p.; C. N. Miller, sec.-t with A. F. Price and Gerald B. Hartley, directors.

Inc. April, 1919, in Nevada. **Cap.,** $150,000; par 10c.

Property: Annex and Annex No. 1 claims in Klondike sectio Divide district, 6 miles south of Gold mountain.

DETROIT DIVIDE MINING CO. NEV

Address: care J. B. Evans, Tonopah, Nev.

Property: 6 claims at Divide, 2¾ miles due west of Gold mou and also the Carbonate silver-copper mine in the Providence range, nea California-Nevada line, and 3 miles from the Salt Lake Route. A large has been opened, showing 3′ of $75 silver and $15 copper ore. Develop by tunnel, and a compressor plant was at work in December, 1919. Ex by J. K. Turner, 1919.

DIVIDE ANNEX MINING CO. NEV

Office: 415 National Bank Bldg., Tonopah, Nev.

Officers: M. R. Averill pres.; W. J. Douglass and F. W. Taylor, v. E. J. Ramsey, sec.; M. E. Hill, treas., with I. Tasem, directors. Ralph W supt.

Inc. January 31, 1919, in Nevada. **Cap.,** 1,000,000 shares; 10c Listed on San Francisco Stock Exchange.

Property: 2 claims, directly adjoining the Tonopah Divide at east corner. The ground is well located on the middle of East Divide zone. Sinking under way in 1919, and machinery erected, sufficient for of 750′.

DIVIDE BOY MINING CO. NE

Address: Tonopah, Nev.

Unable to locate officers or holdings, etc.

DIVIDE CHARTER MINING CO. NEV

Office: Tonopah, Nev. H. H. Brown, res. agt.

Officers: J. E. Adams, pres.; J. H. Miller, v. p.; Allen Rives, treas., with Zeb Kendall, H. H. Brown, and F. M. Manson directors.

Inc. March, 1919, in Nevada. **Cap.,** 1,500,000 shares; 20c. par, able; 750,000 outstanding.

Property: 5 claims, 100 acres, S. of the Kendall and N. of B group. Samples from outcrops assay up to $10 per ton. Examined b Higgins.

DIVIDE CITY MINING CO. N

Office: F. Pittman, agent, Tonopah, Nev.

claim-owner of the district, who had abandoned this ground. A shot in bottom of this hole exposed ore stringers and the superintendent sank a pect shaft, now known as the Caldwell, using a windlass. Rich seams found in the course of sinking, and at a depth of 45′ laterals were started west and southeast, cross-cutting a wide fracture zone, with a trend N. 22° E. Well-defined walls were found 55′ apart, with a S. E. dip drifts advanced N. E. on both walls, have continued in high-grade foot-wall drift having exposed faces continuously sampling from $150 to per ton, and the hanging-wall drift ranging from $20 to $150. The ore is said to average over $25 per ton and the waste-dump, taken from the and cross-cuts, is of shipping grade. This shaft was timbered, hoisting ment erected, and was 200′ deep in October. In a winze below this level value persists 2′ breaking $75 per ton. Drifts at 45, and 100′ depths are 130′ in ore worth $70 and stringers were reported cut on 200′ level. Surface trenching exposed the vein farther north and near the Dividend side-line, high assays are obtained from these trenches. The main Kendall shaft is deep, and a drift will be driven, following the northwest vein, to reach north vein.

The Kendall shaft is well placed for deep development of the rich found in the Caldwell shaft, as the vein dips out of the latter at an angle of

Development on the 200′ level of the Caldwell was at first along a zone, and drifting showed non-commercial values; an extension of the cross encountered the vein exactly where the dip would bring it, and in January 1920, the face showed 6½ feet of 224 oz. ore, with 4″ of $2,000 ore. Later has shown that the vein is bunchy, and that greater depth is needed to reach more uniform mineralization.

Equipment: electric hoist, compressor, etc.

Production: 20 tons daily in August, 1919.

Shares in this company rose rapidly to nearly $3 when the rich ore found, advancing in August to about $4. An unofficial estimate of ore able was $200,000 net, equal to 25 cents per share.

DIVIDE FRACTION MINING CO. NEVA

Office: Tonopah, Nev.

Officers: M. J. Sullivan, pres.; G. A. Cole, v. p.; H. J. Coogan, treas., with H. C. Heidtman and F. J. De Lonchamps, directors.

Inc. April, 1919, in Nevada. **Cap.,** 1,500,000; 10c par, non-assessable.

Property: 5 fractional claims, adjoining the Toggery and Oper groups. A prospect.

DIVIDE GOLD DYKE MINING CO. NEVA

Office: 206 Clay Peters Bldg., Reno, Nev.

Officers: R. M. Preston, pres.; Charles Kielhofer, v. p.; A. Murta sec.-treas., with C. F. Stevens and C. W. Skene, directors.

Inc. in Nevada, 1919. **Cap.,** $150,000, 10c par.

Property: 4 claims E. of the Gold Wedge, and 2½ miles S. E. of G mountain.

Development: shaft sinking started in May, 1919. A prospect.

DIVIDE LEADER MINING CO. NEVA

Office: Tonopah, Nev.

Officers: F. E. Baker, pres.; H. E. Loufek, v. p.; V. M. Place, s treas.

Inc. in Nevada. **Cap.,** $150,000; shares, 10c par.

Property: two groups, one 2¼ miles E. and the other, 2 miles S Gold mountain. Surface shows well defined veins.

DIVIDE SYNDICATE MINING CO. NEVA

Office: Russ Bldg., San Francisco, Cal.

Officers: W. A. Sherman, pres.; Charles Kielhofer, v. p.; F. H. La sec.-treas., with William Lichtenberg (supt), A. A. Heer, directors.

Inc. March 8, 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c par

Property: 10 claims, 160 acres N. W. corner of tract 1,000′ from the Tonopah Divide. Examined by Dr. Elftman and J. K. Turner.

Development: by 400′ shaft, which entered lower breccia zone at 290′. At 93′ from the shaft the east cross-cut on the 400′ level cut a vein 26′ wide, whose full width assayed $7 per ton. The south foot-wall drift was in similar material for 100′, and seams of rich sulphide showed occasionally. Where this drift on the vein intersects the main east fissure, below the great blow-out east of the shaft, an orebody is expected.

Equipment: suitable for depth of 1,000′.

ELDORADO DIVIDE MINING CO. **NEVADA**

Office: R. Nenzel, agt., Lovelocks, Nev.

Officers: Rudolph Nenzel, pres.; A. B. Harlan, v. p. C. H. Jones, sec.-treas.; W. E. Sirbeck, V. P. Twigg, directors.

Inc. April, 1919, in Nevada. **Cap.,** $150,000, par 10c., 750,000 treasury shares.

Property: 4 claims adjoining Frisco Divide and near Ajax Divide, 3 miles S. E. of Gold mountain. Is an undeveloped prospect.

ELGIN-BELLEHELEN DIVIDE MINING CO. **NEVADA**

Name changed from Silverfields Ajax Mines Co.

Office: F. A. Burnham, Tonopah, Nev.

Inc. March, 1919, in Nevada. **Cap.,** $150,000; par 10c.

Property: a gold-silver mine at Bellehelen, 30 miles due E. of Tonopah, in which an 18″ streak of rich silver ore was found at depth of 120′ early in 1919. Second-class ore sent to the West End mill at Tonopah assayed $84.34 per ton.

At Divide, company has 3 claims and 3 fractions N. of and adjoining the High Divide Extension, and next to the Wild Horse, Grass Valley, and others, about 5,000′ N. E. of the Tonopah Divide.

ELKTON DIVIDE MINING CO. **NEVADA**

Officers: C. H. Church, pres, Tonopah; E. R. Yerington, v. p.; S. C. Jameson, sec.-treas., with F. T. and C. F. Krebs, Will Brougher, and W. E. Casson, directors.

Property: 2 claims at N. end of Divide district, and 3-year lease on a silver-lead claim 2 miles from Reservation, Mountain View district, Mineral county, Nev. Operations were to have commenced late in 1919.

EMANCIPATOR DIVIDE MINING CO. **NEVADA**

Address: Wm. Forman, res. agt. Tonopah, Nev.

Operated by controlling interests of the Webster Mines Corporation.

Officers: W. J. Webster, of Wilmington, Del., pres.; W. C. Rannels, v. p. and gen. mgr.; L. P. Carpenter, sec.-treas. and cons. engr.

Inc. March, 1919, in Nevada. **Cap.,** $150,000, par 10 cts.; 750,000 treasury shares.

Property: 4 claims, ¾ mile E. of Gold mountain, is reported to show two strong dikes or veins, showing values at surface.

Equipment: complete for shaft sinking, etc.

EUREKA DIVIDE MINING CO. **NEVADA**

Office: William Forman, agent, Tonopah, Nev.

Officers: J. H. Miller, pres.; F. M. Manson, v. p.; J. E. Adams, sec.-treas.; F. B. Baker, G. F. Sloan, directors.

Inc. March 6, 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c par, assessable. Listed on San Francisco Stock Exchange.

Property: 7 claims, between the Calumet and Airedale, in southern part of district.

Development: by 200′ shaft, equipped with hoist and other machinery. Is a prospect which has produced some ore from old shaft, and which shows good vein.

FARRELL-DIVIDE MINING CO. **NEVADA**

Office: 205 Reno National Bank Bldg., Reno, Nev.

Officers: R. C. Harrison, pres.; B. J. Henley, v. p.; F. G. Hobbs, sec.-treas., with B. Sealy and J. R. Farrell, directors.

Development: sinking contemplated August, 1919. **Equipment:** ad quate for prospecting campaign by shaft sinking, etc.

GEM DIVIDE MINING CO. NEVAD

Address: E. P. Esser, res. agt., Tonopah, Nev.

Officers: E. T. Krebs, pres.; O. F. Krebs, v. p.; E. P. Esser, sec.

Inc. May, 1919, in Nevada. **Cap.,** $150,000; 10c par; 750,000 in treasu

Property: 5 claims W. of Portland Divide.

GIANT DIVIDE MINING CO. NEVAD

Office: Tonopah, Nev.

Officers: J. G. Crumley, pres.; C. E. Oyster, A. E. Kane, v. p's.; C. Boak, sec.-treas., with F. K. Pittman, directors. R. A. Hardy, cons. eng.

Inc. March 26, 1919. **Cap.,** $1,500,000; $1 par. Listed on San Fra cisco Stock Exchange.

Property: 3 claims and 3 fractions, 100 acres, 1¼ miles S. of Go Mountain, adjoining the Silver and Divide Syndicate on N. W. and S. E.

Development: contract was let in June, 1919, for sinking a sha which early in December was in well mineralized breccia, at depth of 436'.

Equipment: complete with 30-h. p. electric hoist, 8"x10", compre sor, drills, and camp.

GOLD BANK DIVIDE MINING CO. NEVA

Office: Goldfield, Nev.

Officers: H. B. Ruhl, pres.; Albert Minnis, v. p.; B. E. Garnett, se treas., with A. B. Garnett and F. C. Beedle, directors.

Inc. 1919 in Nevada. **Cap.,** $150,000; shares, 10c par.

Property: 2 claims and 3 fractions, 80 acres, adjoining the Rosetta miles south of Gold Mountain, between the Butler and Anchor ground. prospect.

GOLD BAR DIVIDE MINING CO. NEVA

Office: Goldfield, Nev.

Officers: H. B. Ruhl, pres.; Albert Ninnis, v. p.; B. E. Garnett, se treas., with A. B. Garnett and T. F. Potthoff, directors.

Inc. in Nevada. **Cap.,** $150,000; shares 10c par.

Property: 5 claims and a fraction E. of Sutherland and 1½ mi slightly E. of N. of Gold Mountain. Is a prospect only.

GOLDEN STAR DIVIDE MINING CO. NEVA

Office: Tonopah, Nev.

Officers: Harry McNamara, pres.; W. A. Nye, v. p.; H. E. Dugan, se treas., with H. C. Price and Tim Connolly, directors.

Inc. April 21, 1919, in Nevada. **Cap.,** $150,000; shares 10c. par.

Property: 4 claims in Klondike district, about 4½ miles W. of Tono Divide.

GOLDFIELD DIVIDE MINING CO. NEVA

Office: Tonopah, Nev.

Officers: H. D. Budelman, pres.; Clarence Waldner, v. p.; W. V. Ri ardson, sec.-treas., with J. R. Blair, H. H. Atkinson, directors.

Inc. April 28, 1919, in Nevada. **Cap.,** $150,000; shares, 10c par.

Property: 6 claims in the N. E. part of the district adjoining the pah. Work has been started.

GOLDFIELD MINING & ORE REDUCTION CO. NEVA

Address: Marvin Arnold, mgr., Goldfield,

Property: 7 claims surrounded by the Trilby, Divide Gold Dyke, Wedge, Calumet, and Argonne.

Development: on the Gold Seam group, 7 claims in S. E. part of a 200' shaft sunk several years ago showed seams of high-grade ore. sinking under way.

Equipment: 25-h. p. hoist, 4-drill compressor, etc.

GOLD REEF DIVIDE MINING CO. NEV

Office: Tonopah, Nev.

Officers: J. L. Ord, pres.; R. G. Williams, v. p. and mgr.; A. H.

from 35 to 60′ deep, sunk by lessees. Work was resumed in May, 1919, and July the formation was reported to be encouraging.

GOLD ZONE DIVIDE MINING CO. NEVA

Office: 416 State Bank Bldg., Tonopah, Nev.

Officers: C. C. Winget, pres.; Wm. Forman, v. p.; F. A. Burn sec.-treas. and mgr., with F. K. Pittman, F. Sommer Schmidt, directors. P Helm, supt.

Inc. Feb. 21, 1918, in Nevada. **Cap.,** $150,000; 10c par; 1,499,500 i assessable. Annual meeting, first Tuesday in March. Six assessments l to Sept. 6, 1919.

Is a reorganization of the Tonopah Gold Zone Mining Co., whose st were exchanged, share for share, into stock of Gold Zone Divide Minin

Property: 9 claims adjoining Tonopah Divide mine on S., and worked in 1901.

Development: by 520′ shaft with collar 250′ lower than that of To Divide shaft, and 1,600′ underground workings. On the 500′ level, drift tend to Divide company's boundary and west on vein for 200′. Condition indicate that greater depth is needed to get commercial ore, though stri carry gold and silver, in places up to $385 per ton. A short drift on vein i of Tonopah Divide boundary showed vein to carry an ore stringer of value, though not in commercial amount. Shaft sinking will be continu 800′, as a 100′ winze sunk from the 500′ is said to have cut 6′ of shipping ore, firming the belief that faulting had dropped the enriched horizon, several dred feet.

Equipment: 25-h. p. gasoline engine, hoist, 3-drill compressor, bl jackhammers, houses, etc.

Good location and management.

GREAT DANE MINING CO. NEVA

Address: Tonopah, Nev. H. C. Stimler, agt.

Officers: C. L. Putnam, pres.; L. S. McConnell, v. p.; A. C. K sec.-treas., with H. W. Albert, H. C. Stimler, and L. W. Horton, directors.

Inc. May, 1919, in Nevada. **Cap.,** $150,000; par 10c; 750,000 s treasury stock.

Property: 2 claims and fraction, 55 acres, south of the Reno, a ing the Toggery on W. and 4,000′ S. of the Tonopah Divide. Has 3 d veins, with 3 prospect shafts. The vein system of Toggery goes throu tract.

GREAT DIVIDE MINING CO. NEV

Is a development proposition organized to finance a promising tract Jim's Divide and a mile S. of the Tonopah Divide.

GREAT WESTERN DIVIDE MINING CO. NEV

Inc., 1919, in Nevada.

No information as to holdings, etc., obtainable.

GRIMES DIVIDE MINING CO. NE

Office: Tonopah, Nev.

Officers: J. L. Joseph, pres.; J. G. Crumley, v. p.; E. J. Erickson treas., with George Wingfield, H. C. Brougher, J. W. Sherwin and J. H. directors. A. I. D'Arcy, con. eng.

Inc. March 20, 1919, in Nevada. **Cap.,** $150,000; 10c par; assess All issued. Listed on San Francisco Stock Exchange. Transfers at co office. Had $56,278 cash in treasury July 1, 1919.

Property: 5 claims, 100 acres, adjoining the Tonopah Divide on s west side. Originally located 14 years ago and has produced some shippi

Development: a 350′ tunnel was driven prior to sinking new sh 1919. **Equipment:** complete includes electric hoist, etc. Is a pro prospect.

HARMILL DIVIDE MINING CO. NE

Office: Tonopah, Nev.

Officers: G. B. Hartley, pres.; Floyd Cable, v. p.; M. B. Hart treas., with W. D. Miller, directors.

Officers: W. A. Bradley, pres.; E. R. Bennett, v. p.; A. G. Rayc sec.-treas., with F. H. Bruce and Agnes Cordingly, directors.

Inc. Feb. 25, 1919, in Nevada. **Cap.,** 1,000,000 shares; 10c par; creased to 1,500,000 in June; non-assessable; all issued. Listed on San F cisco Stock Exchange.

Property: 3 claims E. of the Alto and Harmill, and 800′ E. of Tonopah Divide.

Development: by 250′ shaft, which cut 4′ of $18 ore, also a 4″ st high in silver.

Equipment: 15-h. p. electric hoist, 3-drill compressor, drills, etc.

HERCULES DIVIDE MINING CO. NEVA

Office: E. J. Erickson, res. agt., Tonopah, Nev. J. W. Hutchi manager.

Officers: J. G. Crumley, pres.; A. E. Kane, v. p.; E. J. Erickson, treas., with George Wingfield and H. C. Brougher, directors.

Inc. April 10, 1919, in Nevada. **Cap.,** $150,000 shares; 10c par; 75 in treasury. Listed on San Francisco Stock Exchange.

Property: 4 claims, between the Anchor and Argonne, and S. of Rosetta.

Development: shaft down 280′ in December, 1919, and silicified br worth $20 per ton reported cut. Has 30 h. p. hoist, compressor, and other chinery.

HIGH DIVIDE ANNEX MINING CO. NEVA

Inc. in Nevada. **Cap.,** 1,000,000 shares; 10c par; 500,000 issued.

Property: 5 claims between the High Divide and Sutherland Di

Equipment: suitable plant for sinking, which is under way.

HIGH DIVIDE EXTENSION CO. NEVA

Address: 1131 Hearst Bldg., San Francisco, Calif., or Tonopah,

Officers: W. C. Pitt, pres.; Grant Y. Alexander, v. p.; J. R. Whit sec.-treas., with George Woodland and F. T. Martens, directors. E. F. supt.

Inc. March 10, 1919, in Nevada. **Cap.,** $150,000; 10c par; assess 800,000 issued. Listed on San Francisco Stock Exchange.

Property: 6 claims, N. of the High Divide.

Development: sinking main shaft by deepening a 150′ shaft su early days of field, following a seam of ore. Fully equipped.

HIGH DIVIDE MINING CO. NEVA

Address: E. J. Erickson, res. agt., Tonopah, Nev.

Officers: H. C. Brougher, pres.; George Wingfield, v. p.; E. J. Er son, sec.-treas., with W. J. Douglass and Roger Dougherty, directors. Watters, supt.

Inc. April 13, 1918, in Nevada. **Cap.,** $150,000; 10c par; 1,250,00 standing. Listed on San Francisco Stock Exchange. Annual meeting Monday in May. $50,406 in treasury July 1, 1919.

Property: 3 claims, over 200 acres, 1,300′ N. E. of the Tonopah

Development: sinking 300′ shaft which was 230′ deep in August. At 25 ft. the rock was highly mineralized.

Equipment: electric hoist and 2-drill compressor.

HOBART DIVIDE MINING CO. NEVA

Inc. under laws of Nevada, 1919.

Property: 4 claims adjoining Rex Divide, nearly 2½ miles E. of Mountain.

HOMESTAKE DIVIDE MINING CO. NEVA

Office: J. C. McKay, res. agt., Tonopah, Nev.

Officers: James C. McKay, pres.; Nick Ahleman, v. p.; Ben. D. sec.-treas., with Ed. C. Smith, G. W. Quigley and B. D. Price, directors. O'Connell, supt.

Inc. March 24, 1919, in Nevada. **Cap.,** $100,000; 10c par. San Francisco Stock Exchange.

Development: ore was shipped years ago from shallow workings; new shaft 100′ deep is sunk in breccia on a well mineralized N.-S. vein showing values.

Equipment: head-frame, electric hoist, etc.

JUPITER DIVIDE MINING CO.

Address: R. L. Johns, care P. D. Kahn, 308 Bush St., San Francisco, Calif.

Officers: R. L. Johnson, pres.; M. B. Aston, v. p.; B. A. Rives, treas., with J. E. McCreary, C. J. Blumenthal, directors. Chas. Mabet, sec.

Inc. April, 1919, in Nevada. **Cap.,** 1,500,000 shares; par 10c; 75% issued.

Property: 130 acres, adjoining Chariot Divide on S. E., and about 2 miles from Gold Mountain. Veins show on claims. Ground has buildings, etc.

KEANE DIVIDE MINING CO.

Office: M. E. Allier, res. agt., Goldfield, Nev.

Officers: Tom Keane, pres.; Chas. T. Allier, v. p.; Floyd Cable, E. Marks, treas.

Inc. May, 1919, in Nevada. **Cap.,** 1,500,000 shares; par 10c.; 75% issued.

Property: 4 acres west of Jim's Divide and 2,200′ S. W. of Tonopah. Was sinking an incline shaft following a 6′ vein, 1919.

KENDALL DIVIDE MINING CO.

Address: care J. B. Kendall, res. agt., Goldfield, Nev.

Officers: J. B. Kendall, pres.; Del Hammond, v. p.; M. A. Kendall, treas., with C. A. Hammond, and N. P. and J. Theo. directors.

Inc. April, 1911, in Nevada. **Cap.,** $150,000; shares 10c par.

Property: 6 claims, 1,500′ S. E. of Hasbrouck Divide and 4,200′ S. W. of Tonopah Divide.

Development: sinking contemplated and machinery erected in 1919.

KENNETH DIVIDE MINING CO.

Office: 421 Clay Peters Bldg., Reno, Nev.

Officers: A. A. Codd, pres.; H. F. Bruce, v. p. and cons. engr.; W. G. Buck, sec.-treas., with R. H. Bates, and A. A. Busey, directors.

Inc. May, 1919, in Nevada. **Cap.,** $150,000; shares 10c par.

Property: 110 acres N. of Mizpah Divide, and 9,000′ N. E. of Gold Mountain.

KERNICK DIVIDE MINING CO.

Office: care A. A. Codd, Reno, Nev.

Officers: Geo. A. Kernick, pres.; H. C. Brougher, v. p.; A. A. Codd, sec.-treas.; H. F. Bruce, supt., with George Wingfield, directors.

Inc. April 5, 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c par; all available; 1,150,000 issued. Listed on San Francisco Stock Exchange.

Company has $42,000 cash and has spent $38,000.

Property: Little Zoe group, 3 claims, adjoining Verdi, Revert Western groups.

Development: shaft down 300′ in January, 1920; at junction of veins ore was reported cut at depth of 20′.

Equipment: electric hoist, etc.

KEYSTONE DIVIDE MINING CO.

Office: Tonopah, Nev.

Officers: R. J. Kelly, pres.; George Schmidt, v. p.; Dr. T. A. Mus[illegible] sec.-treas.; Wm. Forman, ass. sec., with Ed. Byrne and F. W. Taylor, dirs. Jay A. Carpenter, cons. engr.

Inc. March 2, 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c par; all available; 750,000 treasury. Listed on San Francisco Stock Exchange.

Property: 4 claims, S. of the Verdi and 700′ south of W. end of Tonopah Divide.

Development: shaft 250′ deep in December, 1919, and expected to

Also owns the Tohoqua lead-silver mine, sometimes known as the Ha at Leadville, Washoe county, Nev., 35 miles north of Gerlach. This has b opened to 400' and has produced nearly $200,000. Ore-shoot said to be 800' l and from 12 to 72" thick. Mill heads run $25.

Development: at Divide, sinking to be started at juncton of two v systems, when found. At Leadville, Nev., deepening main shaft 200', eventu to 1,000'.

Equipment: at Leadville, Nev., two 80-h. p. oil engines, compres two hoists, machine-drills, 50-ton concentrating plant, and complete camp 35 men. Mill was re-started in Sept., 1919, and 2 cars of concentrate shi monthly, worth between $8,000 and $10,000.

See Leadville Mines Co., under Nevada (in general) in this volume.

LE ROY DIVIDE MINING CO. NEVA

No record of officers or holdings obtainable.

LIBERTY BELL DIVIDE MINING CO. NEVA

Inc. 1919, in Nevada.

Property: 3 claims and fraction adjoining Gold Reef and Alto, ab 2,100' S. E. of the Tonopah Divide and Gold Zone mines.

LIBERTY DIVIDE MINING CO. NEVA

Office: care M. M. Detch, res. agt., Tonopah, Nev. W. S. Norris,

Officers: Hon. Chas. R. Evans, pres.; Walter S. Norris, v. p.; F R. Hackley, sec.-treas., with George W. Allen and M. M. Detch, directors.

Inc. Feb. 28, 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c par; 75 in treasury. Listed on San Francisco Stock Exchange.

Property: 3 claims and fraction, 55 acres, just N. of the Goldfield & O. group and E. of Rosetta.

Development: by shaft, down 50' in May, 1919.

Equipment: 40-h. p. electric hoist, also 6-drill compressor used joi with the Calumet Divide.

LINCOLN DIVIDE MINING CO. NEVA

Address: W. V. Richardson, Tonopah, Nev.

Officers: W. V. Richardson, pres.; A. E. Kane, v. p.; G. A. Read sec.-treas. D. T. Donovan, P. J. Donovan, directors.

Inc. May 19, 1919, in Nevada. **Cap.,** $150,000; par 10c; 750,000 treas

Property: 50 acres, adjoining Florence Divide on N. and 6,000' no of Gold Mountain.

LONE MOUNTAIN DIVIDE MINING CO. NEVA

Address: Tonopah, Nev. F. Abbot, agt.

Inc. April, 1919, in Nevada. **Cap.,** $150,000; par 10c.

Property: 18 claims west of Apex Divide. Also Lucy mine in P master Canyon, E. of Lone Mountain. A shaft was being sunk on Divide gr and a 60-ton shipment of $100 to $200 ore was sent to the MacNamara m Tonopah in November, 1919.

LOOKOUT DIVIDE MINING CORPORATION NEVA

Office: Tonopah, Nev.

Officers: A. T. Wilkinson, pres.; J. M. Fenwick, v. p.; M. J. Gray, s treas., with Julius Goldsmith and P. D. McLeod, directors. J. W. Morris, c engineer.

Inc. in Nevada. **Cap.,** $150,000; shares 10c par.

Property: 5 claims, 2 fractions, 3¼ miles northeast of Gold mount Material from shaft said to assay well.

LUCKY BOY DIVIDE MINING CO. NEVA

Address: F. T. Dunn, res. agt., Tonopah, Nev. Wm. Farrish,

Officers: Harry MacNamara, pres.; W. A. Nye, v. p.; L. W. Hor sec.; A. G. Raycraft, treas., with L. R. Robins and Wm. Farris, directors.

Inc. March 31, 1919, in Nevada. **Cap.,** 1,000,000 shares; 10c par; sessable. Listed on San Francisco Stock Exchange.

Property: 2 fractional claims, about 1,500' E. of Tonopah Divide viding property of the East Divide. Sinking shaft in 1919.

acres, ¾ mile E. of the Tonopah Divide, adjoining Tono-
north.
sank shaft and erected hoist, etc., in 1919.

DE MINING CO. NEVADA

. Richardson, Tonopah, Nev.
Oddie, pres.; A. E. Kane, v. p.; W. V. Richardson, sec-
onovan, P. J. Donovan, directors.
. April, 1919, in Nevada. **Cap.**, $150,000; par 10c.

Property: 40 acres adjoining California Divide, between the Operator and Portland groups, 9,000′ S. of Gold Mountain.

MIDWAY DIVIDE MINING CO. NEVADA

Office: 206 Nixon Bldg., Reno, Nev.

Officers: Dr. J. L. McCarthy, pres.; R. W. Cattermole, v. p.; J. F. Kunz, sec.-treas., with R. G. Myrtle and R. P. Burris, directors.

Inc. May, 1912, in Nevada. **Cap.**, 1,500,000 shares; $1 par; assessable; 468,800 treasury shares issued out of total of 650,000.

Property: 4 claims, 50 acres, adjoining the Dividend and Divide Consolidated.

Development: work started in April, 1919; shaft down 70′ by hand-work. Equipped with hoist, compressor, etc.

MINERAL ZONE DIVIDE MINING CO. NEVADA

Office: Tonopah, Nev.

Officers: R. M. Hampton, pres.; Bert Allen, v. p.; V. M. Place, sec.-treas., with Henry Hanson, T. F. Bannigan, and H. H. Hill, directors.

Inc. April, 1919, in Nevada. **Cap.**, $150,000; shares 10c par.

Property: 6 claims, 1¼ miles S. of Goldsmith Divide and over 4 miles S. E. of Gold Mountain.

MIZPAH DIVIDE MINING CO. NEVADA

Office: Tonopah, Nev.

Officers: J. H. Miller, pres.; F. M. Manson, v. p.; J. E. Adams, sec.-treas., with J. G. Kirchen, P. H. O'Neill, and Allen Rives, directors.

Inc. March, 1919, in Nevada. **Cap.**, $150,000; shares 10c par; assessable.

Property: 9 claims, 4,500′ N. E. of Gold mountain. Has breccia exposures and rhyolite dikes, with N. E. fissures that are to be opened on Boston & Mizpah claims.

Development: by shaft and machinery erected August, 1919.

MOHAWK DIVIDE MINING CO. NEVADA

Office: Tonopah, Nev.

Officers: J. H. Miller, pres.; William Watters, v. p.; J. E. Adams, sec.-treas., with A. G. Raycraft and B. F. Baker, directors.

Inc. March, 1919, in Nevada. **Cap.**, $150,000; 10c par; assessable; 750,000 outstanding. Listed on San Francisco Stock Exchange. Transfer office, Tonopah, Nev.

Property: the Stewart group of 4 claims and 2 fractions, 100 acres, N. E. of Divide Consolidated and 3,000′ N. of Tonopah Divide. Promising veins outcrop on property.

Development: shaft being sunk on vein thought to be continuation of Empire fissure of Divide Cons.

Equipment: 40-h. p. electric hoist, etc.; air is purchased from the Divide Consolidated.

MONARCH DIVIDE MINING CO. NEVADA

Office: Tonopah, Nev.

Inc. 1919, in Nevada. **Cap.**, $150,000; shares 10c par.

Property: a group of claims (Sunbeam and others) 2½ miles north of the Tonopah Divide.

MORNING GLORY DIVIDE MIN[illegible] NEVADA

Address: Tonopah, Nev.

Inc. Dec. 11, 191[illegible]

MUTUAL DIVID[illegible] NEVADA

Inc. 1919

Inc. in Nevada. **Cap.**, $200,000; shares 10c par.

Property: 5 claims north of Sutherland and about 2 miles north of t Tonopah Divide.

NOME DIVIDE MINING CO. NEVA

Office: Goldfield, Nev. Bert Ward, res. agt.

Officers: Chas. W. Brandon, pres.; J. W. Van Winkle, v. p.; with J. Walters, James Ford and Chas. McCall, directors.

Inc. May, 1919, in Nevada. **Cap.**, $150,000; par 10c; 750,000 tre shares.

Property: 12 claims, 141 acres, next to Marinetta and Yukon Divid

NORRIS DIVIDE MINING CO. NEVA

Address: Tonopah, Nev.

Officers: Walter Norris, v. p. and mgr.; J. T. Murphy, v. p.; C. Johnson, sec.-treas., with Walter Hogg, and E. Marks, directors.

Inc. May, 1919, in Nevada. **Cap.**, $150,000; shares 10c par.

Property: adjoins on the west the East Divide Extension, Big Di and Marne. The ground is supposedly crossed by the East Divide vein for a distance of 1,800'.

Development: sinking started and machinery ordered in June, 191

NORTH BEN HUR DIVIDE MINING CO. NEVA

Office: Goldfield, Nev. B. E. Garnett, agt.

Officers: F. C. Beedle, pres.; H. B. Ruhl, v. p.; B. E. Garnett, treas., with Albert Ninnis and A. B. Garnett, directors.

Inc. in Nevada. **Cap.**, $150,000; shares 10c par; 750,000 in treasury.

Property: 3 claims and a fraction, adjoins the Ben Hur, Chariot, P ing and Romance group. Developing, 1919.

NORTH DIVIDE MINING CO. NEVA

Office: Monadnock Block, San Francisco, Calif., and Reno, Nev. Boyd, agent.

Officers: J. E. Kerr, pres.; J. D. Brown, v. p.; H. B. Wade, sec.-t with A. M. Tridel and J. G. Crumley, directors. W. E. Davis, supt.

Inc. Feb. 7, 1919, in Nevada. **Cap.**, 2,000,000 shares; 10c par; asses Transfers at company office. Listed on San Francisco Stock Exchange.

Property: the Moonlight group, 6 claims, 120 acres north of the Divide and west of the Sutherland. Is one of the oldest properties district and covers strong veins.

Development: 3 shafts, 60 to 250' deep, opened up 3 veins several ago, which yielded gold ore. The 60' shaft is to be sunk to 300' and will 4 veins. Equipment good for depth of 1,000'.

NORTHWEST DIVIDE MINING CO. NEV

Address: Tonopah, Nev.

Officers: William Forman, pres.; W. J. Douglass, v. p.; C. C. sec.-treas., with W. E. Fuller (supt.) and M. H. Page, directors.

Inc. March 17, 1919, in Nevada. **Cap.**, 1,500,000 shares; 10c par; in treasury; 400,000 issued. Listed on San Francisco Stock Exchange. $40,000 cash in treasury July 1st, 1919.

Property: 7 claims, 70 acres, lying N. of Divide Consolidated, 3,500' N. of Tonopah Divide.

Development: sinking 200' shaft, down 50', in fair formation by 1919, and machinery erected. "January" Jones, of Reno, strongly adv ing the shares.

OLD TIMER DIVIDE MINING CO. NEV

Office: Tonopah, Nev. Ben. D. Luce, res. agt.

Officers: W. Douglass, pres.; Roger Dougherty, v. p.; B. D sec.-treas., with Wm. Watters, and R. Finn, directors.

Inc. April, 1919, in Nevada. **Cap.**, $150,000; 10c par; 750,000 treasury.

Property: the 2 Afterthought claims and 2 fractions, adj

le ground," on the trend of well-defined
d.
inking and exploration.

:O. NEVADA

.; A. G. Raycraft, v. p.; T. J. Lynch,
Dunn, directors.
Cap., 1,500,000 shares; 10c par. Listed

he Toggery Divide, developed by 400'

ill compressor, etc.

:O. NEVADA
ınd H. C. Brougher to develop claims near
:s N. W. of Gold Mountain.

)E MINING CO. NEVADA
onopah, Nev.
ke district, 6 miles south of Divide, Nye
r 3,000', and from 2 to 20' wide on surface.
3 cars of $28 ore were hauled to Sodaville.
shafts, none below 200'. New owners are

'ELOPMENT CO. NEVADA
, Nev.
C. A. Clinton, v. p.; F. W. Collins, sec.-
A. Bartlett, directors.
)0; shares 10c par; non-assessable; 750,000

ctions, 95 acres, in the N. W. part of the
ıed fracture zone or ledge leading from Gold

ıt shaft down below 100' in Oct., 1919.
of 200'.
cient for prospect work.

NG CO. NEVADA
nopah, Nev.
n, pres.; J. M. Fenwick, v. p.; M. J. Gray,
d Elmer Burt, directors.
000; shares 10c par.
action adjoining the Lookout Divide. Work

). NEVADA
E. Marks, res. agt.
res.; W. J. Douglass, v. p.; M. L. Cooper,
ycraft, directors.
)., 1,500,000 shares; par 10c; 500,000 treasury

roup of 5 claims, near the Myra, in the east-

NEVADA
enwick & Co., res. agts.
.; H. F. Danberg, v. p.; A. G. Raycraft, treas.;
mgr.
la. **Cap.,** $150,000; shares 10c par; 750,000 in

N. W. of the Tonopah Divide. Two dykes
l fair assays have been returned from the out-

ı vein at 70' in June, 1919. Fully equipped.

PENNSYLVANIA-TONOPAH GOLD MINING CO. NEVA

Office: J. F. Gaehring, v. p., Oak Lane, Philadelphia, Pa.

Property: 6 claims, nearly 4 miles N. W. of Gold mountain.

PERSHING DIVIDE EXTENSION MINING CO. NEVA

Office: Lovelocks, Nev.

Officers: L. A. Friedman, pres.; A. B. Harlon, v. p.; R. Nenzel, s with V. A. Twigg and C. H. Jones, directors.

Inc. April, 1919, in Nevada. **Cap.**, $150.000; 10c par: 750,000 trea shares.

Property: 4 claims adjoining Pershing Divide on the north, and o ated by same management.

PERSHING DIVIDE MINING CO. NEVA

Office: Lovelocks, Nev. R. Nenzel, res. agt.

Officers: L. A. Friedman, pres.; A. B. Harlan, v. p.; C. H. Jones. V. Twigg and H. Stimler, directors. J. K. Turner, cons. eng.; W. M. Sir supt.

Inc. 1919, in Nevada. **Cap.**, $150,000; 10c par; 750,000 treasury sh

Property: 9 claims. 110 acres, in the S. E. part of district, adjoi the Marne, Champion, and Romance. Formations are said to be favorable.

Development: surface trenching under way late in May, 1919.

PHOENIX DIVIDE MINING CO. NEVA

Inc. in Nevada. **Cap.**, $150.000; shares 10c par.

Property: 3 claims, ¾ mile N. E. of Sutherland and 7,500′ east north of Gold Mountain.

PILOT DIVIDE MINING CO. NEVA

Office: Tonopah, Nev.

Officers: M. R. Averill, pres.; L. L. Mushet, v. p.; E. R. Goetz, s A. G. Raycraft, treas., with A. J. Cormack and R. D. Frisbie, directors.

Inc. in Nevada.

Property: near the Klondyke Divide, 6 miles S. of Divide.

PITTSBURG DIVIDE MINING CO. NEVA

Inc. in Nevada. **Cap.**, $150,000; 10c par.

Property: 4 claims 1¼ miles N. E. of Gold mountain, and adjoining Treadwell.

POLICEMAN DIVIDE MINING CO. NEVA

Inc. in Nevada. **Cap.**, $150.000; 10c par.

Property: 7,000′ south of east of Gold Mountain.

PORTLAND DIVIDE MINING CO. NEVA

Office: Tonopah, Nev.

Officers: J. H. Miller, pres.; W. A. Bradley, v. p.; B. A. Rives, s treas., with Zeb Kendall, C. F. Wittenberg, and L. L. Mushett, directors.

Inc. April 7, 1919, in Nevada. **Cap.**, $300,000; shares 20c par; assessa 750.000 treasury shares.

Property: 7 claims, near the Operator Divide, showing well-defi contact, and mineralized fissure zones.

PYRAMID DIVIDE MINES CO. NEVA

Office: Tonopah, Nev.

Officers: Harry Dunseath, pres.; S. T. Bentley, v. p.-mgr.; Fra Moore, sec.-treas. T. M. Bentley, E. M. Moore, directors.

Inc. April 8, 1919, in Nevada. **Cap.**, $150,000; shares 10c par; 75 treasury.

Property: 11 claims, 2½ miles N. of the Tonopah Divide.

Development: the shaft at 75′ depth cut ore assaying from $2.6 $14.20 per ton, with streaks of higher grade. A hoist and head-frame w erected in November.

QUEEN DIVIDE MINING CO. NEVA

Office: 109 Russ Bldg., San Francisco, Cal.

Officers: W. F. Sherman, pres.; J. L. Ord, v. p.; F. N. Lathrap, s treas., with W. S. Owensby and Charles Kielhofer, directors. William Lich berg, supt.

ıc. May, 1919, in Nevada. **Cap.**, $200,000; 10c par; assessable. Shares listed on New York Curb.
roperty: 6 claims, 90 acres, adjoining Divide Syndicate, about 1 mile Gold Mountain.
levelopment: shaft down 50′ in June, 1919.

IBOW DIVIDE MINING CO. NEVADA

ffice: Tonopah, Nev. F. K. Pittman, agt.
)fficers: R. J. Cunningham, pres.; J. M. Fenwick, v. p.; E. P. Cullinan, reas., with H. G. Taylor, Ernest Cole, directors. Homer O'Connell, supt.
nc. in Nevada. **Cap.**, 1,500,000 shares; 10c par; 750,000 treasury shares.
roperty: 2 claims adjoining the Apex on S., and Royal groups on

D DIVIDE MINING CO. NEVADA

)ffice: Lovelocks, Nev. H. E. Loufek, agt.
)fficers: J. T. Goodin, pres.; F. E. Baker, v. p.; T. P. Ebert, sec.-treas.
nc. April, 1919, in Nevada. **Cap.**, $150,000; shares 10c par; half treas-tock.
roperty: Little Theresa group, 5 claims, 2 fractions, E. of High Divide, N. E. of Gold Mountain.
)evelopment: a shaft, down 70′ in July, 1919, opened ore that assayed $6.40 per ton.
Equipment: machinery reported ordered.

O DIVIDE MINING CO. NEVADA

)ffice: 25 Broad St., New York, and Goldfield, Nev.
)fficers: J. B. Kendall, pres.-mgr.; J. J. Wielip, v. p.: M. A. Kendall, reas., with T. W. Kendall, and C. B. Higginson, directors. W. C. Ralston, eng.
Cap., 2,000,000 shares; 10c par.
Property: 5 claims north of the Sutherland Divide. Also the old dise Valley mines, 6 claims at Spring City, in the Santa Rosa range, 50 miles ı of Winnemucca, a mine whose silver-gold output is said to be $3,000,000.
Development: sampling of the Paradise and Bullion mines in 1906 ved 14,000 tons of $18.05 ore, and on dumps 11,000 tons of $22.98 ore, cal-ed at $1.10 per oz. for silver. It was expected that shipments to smelters ld be started by October, 1919. Meanwhile, a shaft is being sunk.

IO DIVIDE MINING CO. NEVADA

Office: 301 Nixon Bldg., Reno, Nev. E. H. Mead, agt.
Officers: S. H. Wheeler, pres.; F. H. Norcross, v. p.; Wm. Woodburn, ;., with G. W. Davey and W. G. Kendall, directors. M. A. Diskin, sec. W. Tellier, supt.
Inc. March 27, 1919, in Nevada. **Cap.**, 1,500.000 shares; 10c par; non-ssable. Listed on San Francisco Stock Exchange.
Property: 5 claims to the south, adjoining the Grimes and Gold Zone. d assays are reported from surface quartz.
Development: shaft down 215′ early in August, 1919. At 10′ the shaft red a crushed and oxidized zone, carrying silver and gold worth $7 per ton, oxidized matter has persisted to the present depth.
Equipment: complete electric hoisting plant, etc.

VELATION DIVIDE MINING CO. NEVADA

Office: Tonopah, Nev.
Inc. in Nevada. **Cap.**, $15,000; shares 1c par.
Property: a group of 2 claims in the northwestern part of district, 3 s from Gold Mountain.

VERT DIVIDE MINING CO. NEVADA

Office: Tonopah, Nev.
Officers: A. Revert, pres.; T. E. Bonham, v. p.; Paul Revert, sec.-treas.
Inc. March 26, 1919, in Nevada. **Cap.**, 1,5000,000 shares; 1c par; non-ssable. Listed on San Francisco Stock Exchange.
Property: 4 claims, 1,200′ west of Tonopah Divide, and between which ıe Verdi.

Development: shaft down 250′ in July, 1919, is to be sunk 300′. sets of lessees are said to be working in favorable ground.

Equipment: hoist and compressor, the latter supplying air to the V Divide.

REX DIVIDE MINING CO. NEV

Inc. in Nevada. **Cap.,** $150,000; shares 10c par.

Property: 6 claims adjoining the Ajax, over 2 miles S. E. of Mountain.

ROMANCE DIVIDE MINING CO. NEV

Office: Goldfield, Nev. J. E. Ewing, agt.

Officers: A. H. Elftman, pres.; J. W. Dunfee, v. p.; Clyde Cannon, J. E. Ewing, treas., with C. W. Taylor, directors.

Inc. April, 1919, in Nevada. **Cap.,** $150,000: shares 10c par: 75 treasury shares.

Property: 5 claims adjoining Capital Divide on S. and Pershing vide on N. E., in the S. E. part of the district.

ROOSEVELT DIVIDE MINING CO. NEV

Office: Tonopah, Nev.

Officers: E. S. Berney, pres.; Fred Strassberg, v. p.; Milton Detch, A. G. Foster, treas. and mgr.

Inc. April, 1919, in Nevada. **Cap.,** $150,000; shares 10c par.

Property: 60 acres S. of the Sunbeam and 2 miles N. of Tonopah Di

ROSALIND DIVIDE MINING CO. NEV

Office: Kind Co. Store, Tonopah, Nev.

Officers: M. R. Averill, pres.: F. J. Klenzing, v. p.; L. M. Kind, treas., with W. J. Douglass and S. Fox, directors.

Inc. April 9, 1919, in Nevada. **Cap.,** $100,000; shares 10c par.

Property: 6 claims in the extreme N. E. part of the district, a 4 miles from Gold Mountain. Geologic indications considered good. Sin has been started.

ROSETTA DIVIDE MINING CO. NEV

Office: Tonopah, Nev.

Officers: C. W. Taylor, pres.; J. M. Fenwick, v. p.; Julius Goldst sec.-treas., also directors. D. F. Murphy, gen. mgr.; A. H. Elftman, cons.

Inc. Nov. 25, 1918, in Nevada. **Cap.,** 1,500,000 shares; 10c par. Li on San Francisco Stock Exchange.

Property: 4 claims, in the S. E. part of the district, surrounded Divide Syndicate, Trilby, Argonne, Anchor, and Operator. Examined by A Elftman, who considered that an extension of the Divide fault-vein is f 100 to 300′ wide, where it passes through the ground, numerous cross veins ning into it. The formation is well exposed for 1,000′. Pan tests give good sults in gold, and assays show silver.

Development: by August, 1919, main shaft was down 300′ on the M phy vein, and 400′ away another shaft was 60′ deep on the Rosetta vein. former found $22 ore at 260′, the latter followed a 6″ streak of rich gold ore.

Equipment: hoist, compressor, etc.

ROYAL DIVIDE MINING CO. NEV

Office: Tonopah, Nev.

Officers: J. L. Joseph, pres. and treas.; E. C. Simpson, v. p.; Otto F sec., with Hugh Brown, Joseph Golden, Joseph Seeley, L. Blumenthal and L. Norris, directors. Charles Mayotte, supt.

Inc April 10, 1919, in Nevada. **Cap.,** 1,500,000 shares; 20c par; ass able. Listed on San Francisco Stock Exchange.

Property: the Ford group and others, 13 claims, 4,500′ N. E. of To pah Divide.

Development: shaft down 50′ in June, 1919.

Equipment: 50-h. p. hoist, 75-h. p. compressor, drills, and enough t ber for depth of 500′.

RYAN DAVIS DIVIDE MINING CO. NEV

Office: Tonopah, Nevada.

Officers: Louis O'Neal, pres.; J. B. Davis, v. p.; J. C. Kind, sec.-treas.; F. E. Chapin and W. R. Porter, directors.
Inc. in Nevada. **Cap.,** $250,000; 10c par.
Property: a group that adjoins Iron Crown, and another claim near Hasbrouck: also owns a group of claims at Keeler, Calif.

PATRICK DIVIDE MINING CO. **NEVADA**
Office: Tonopah, Nev.
Officers: G. W. Allen, pres.; J. H. Shepard, v. p.; H. C. Price, sec.; n Barrier, treas., with Wm. Forman, directors.
Inc. April, 1919, in Nevada. **Cap.,** $150,000; shares 10c par.
Property: 4 claims, 100 acres, in the S. E. part of the district, adjoining Airedale on the north.

JNDERS DIVIDE MINING CO. **NEVADA**
Inc. 1919, in Nevada. **Cap.,** $150,000; par 10c; 750,000 in treasury.
Property: a group of 6 claims in the N. W. part of district, 3½ miles n Gold Mountain.

)OP DIVIDE MINES CORPORATION **NEVADA**
Address: Patton and Bonham, Tonopah, Nev.
Property: 5 claims in the Divide district. Funds for development were to be on hand August, 1919.

AMROCK DIVIDE MINING CO. **NEVADA**
Office: Tonopah, Nev. A. H. Keenan, agt.
Officers: M. J. Sullivan, pres.; P. A. McCarron, v. p.; A. H. Keenan, treas., with Roger Dougherty, and R. F. Wendover, directors.
Inc. April, 1919, in Nevada. **Cap.,** $150,000; shares 10c par.
Property: 4 claims, ½ mile W. of Royal Divide and 1¼ miles N. W. Tonopah Divide.

RRA DIVIDE MINING CO. **NEVADA**
Office: 421 Clay Peters Bldg., Reno, Nev.
Officers: A. A. Codd, pres.; H. F. Bruce, v. p. and cons. engr.; W. H. G. k, sec.-treas., with Al Modeen, and R. H. Bates, directors.
Inc. April, 1919, in Nevada. **Cap.,** $150,000; par 10c; 750,000 treasury es; 776,200 issued.
Property: 3 claims, 3,000' north of Tonopah Divide, surrounded by ide City, Horseshoe, Midway, Smuggler, Florence, and Knox. Also owns rol of the Morning Glory gold mine at Alleghany, Calif., which adjoins ntener mine and has a complete equipment costing $50,000, including a 5- n mill.
Development: a shaft is to be sunk, and crosscutting done to find the ide Extension vein.

NAL DIVIDE MINING CO **NEVADA**
Richardson, Woodson & Foster, fiscal agent, Tonopah, Nev.
Officers: G. C. Fetterman, pres.; A. B. Hall, v. p.; Milton Detch, sec.; . Foster, treas.; W. J. Douglass, cons. eng.
Inc. April, 1919, in Nevada. **Cap.,** $150,000; shares 10c par; assessable.
Property: 6 claims, north of Sutherland and over 1¼ miles north of opah Divide. Surface exposures said to be favorable and exploration under

VER BELL DIVIDE MINING CO. **NEVADA**
Inc. 1919, in Nevada.
Property: 4 claims, adjoining Treadwell Divide on east, about 2 miles h of east of Gold Mountain.

VER BOW DIVIDE MINING CO. **NEVADA**
Office: Goldfield, Nev.
Officers: S. T. Bentley, pres.; C. H. Ellsworth, v. p.; H. B. Ruhl, sec.- s., with G. W. Morris and G. M. Bentley, directors.
Inc. April, 1919, in Nevada. **Cap.,** $150,000; 10c par; 750,000 in treasury.
Property: 3 claims N. of Ben Hur, nearly 4 miles S. E. of Gold Moun- . Company also has lease and bond on a developed mine at Silver Bow, has 800' development tunnel with ore of $20 to $48 per ton in sight.

SILVER DIVIDE MINES CO. NEVA

Office: Tonopah, Nev.

Officers: H. C. Brougher, pres.; J. L. Joseph, v. p.: E. J. Erick sec.-treas., with George Wingfield, Gust Hanson (supt.), James Grimes, H. G. Humphrey, directors.

Inc. March 31, 1919, in Nevada. **Cap.**, 1,500,000 shares; 20c par; ass able. Listed on San Francisco Stock Exchange.

Property: the Bazaar group of 6 claims, adjoining the Gold Reef Gold Zone on the N. 2,200′ S. of Tonopah Divide.

Development: shaft down 400′ in December, 1919, and gasoline h erected. A continuation of the Tonopah Divide vein was reported cut on 400′ level.

SILVER DYKE DIVIDE MINING CO. NEVA

Office: Tonopah, Nev. H. C. Price, agt.

Officers: Harry McNamara, pres.; W. A. Nye, v. p.; H. E. Dugan, s treas., also directors.

Inc. 1919, in Nevada. **Cap.**, $150,000; shares 10c par.

Property: 4 claims and fractions adjoining Bonanza Divide.

SILVER HILL DIVIDE MINING CO. NEVA

Office: Tonopah, Nev.

Officers: C. O. Rogers, pres.; V. M. Place, v. p.; C. L. Rogers, s treas.; also directors.

Inc. May, 1919, in Nevada. **Cap.**, $200,000; shares 10c par; 1,000.00 treasury.

Property: 7 claims, 8 miles S. W. of Divide and about 2 miles N. of Gold Mountain. Said to show ore at surface.

Development: 335′ shaft. Has spent $30,000 on development.

SILVER KING DIVIDE MINING CO. NEVA

Office: Goldfield, Nev.

Officers: Jacob Berger, pres.; Charles Baad, v. p.; W. E. Colburn, s treas., with Gust Hanson and H. B. Ruhl, directors.

Inc. Feb. 25, 1919, in Nevada. **Cap.**, 1,000,000 shares; 10c par; 900 issued. Listed on San Francisco Stock Exchange.

Property: 3 claims, patented, 40 acres, 2,100′ W. of Tonopah Div and adjoining the Mecca and Hasbrouck Extension. Said to show two str veins.

Development: a 60′ shaft sunk on ore, several years ago, gave ass of $12 to $35 per ton. A new shaft was down 200′ in August, 1919, midway tween the two veins; at 172′ $12 ore was cut.

Reported $6,000 spent on development from March to June, 1919.

Equipment: hoist, compressor, etc., good for depth of 300′.

SILVER REEF DIVIDE MINING CO. NEVA

Office: Tonopah, Nev. E. J. Ramsey, sec.-treas.

Inc. 1919, in Nevada. **Cap.**, $150,000; shares 10c par.

Property: 6 claims in the S. E. part of the district, 3¼ miles fr Gold Mountain.

SILVER STAR DIVIDE MINING CO. NEVA

Office: State Bank & Trust Co. Bldg., Tonopah, Nev.

Officers: W. J. Douglass, pres.; Roger Dougherty, v. p.-treas.; Alb Erickson, sec.; with G. H. Lewis (mgr.), D. Holland, directors. F. H. Niels supt.

Inc. May 5, 1919, in Nevada. **Cap.**, 1,500,000 shares; 10c par. Ann meeting, May 10.

Property: 5 claims, 120 acres, north of Mizpah, contains quartz vein rhyolite and breccia. Assays said to yield from $2.50 to $17 per ton.

Development: by vertical shaft, down 50′ in July, 1919.

Equipment: 32-h. p. electric hoist and compressor.

SILVER STATE DIVIDE MINING CO. NEVA

Office: Tonopah, Nev. H. C. Price, agt.

Officers: Harry McNamara, pres.; W. A. Nye, v. p.; H. E. Dugan, sec.-.. with H. C. Price and Tim Connolly, directors.
Inc. April 24, 1919, in Nevada. **Cap.**, $150,000; shares 10c par.
Property: in the Klondyke district, 6 miles south of Divide, adjoining Golden State.

VER TOP DIVIDE MINING CO. **NEVADA**
Address: Ed. Bevis, Tonopah, Nev.
Inc. in Nevada. **Cap.**, $150,000; shares 10c par.

VER WEDGE DIVIDE MINES CO. **NEVADA**
Office: Tonopah, Nev. E. J. Ramsey, sec. and res. agt.
Inc. 1919, in Nevada. **Cap.**, $150,000; shares 10c par.
Property: 6 claims adjoining Telephone Girl and Legal Divide.

VER ZONE DIVIDE MINES CO. **NEVADA**
Office: Tonopah, Nev.
Officers: James Grimes, pres.; W. J. Douglass, v. p.; E. J. Ramsey, treas., with F. F. Garside and R. F. Wendover, directors.
Inc. May, 1919, in Nevada. **Cap.**, $150,000; shares 10c par.
Property: 6 claims, adjoining Divide Charter and Banner Divide.

UX DIVIDE MINING CO. **NEVADA**
Inc. March, 1910, in Delaware. **Cap.**, $150,000; 10c par; 750,000 in sury.
Property: 7 claims, 4,500' long, about 2 miles N. W. of Tonopah Di- and N. W. of the Hasbrouck mine.

UGGLER DIVIDE MINING CO. **NEVADA**
Address: Elmer Bisbee, agt., Tonopah, Nev.
Officers: John Miller, pres.; A. F. Price, v. p.; C. N. Miller, sec.-treas.; E. N. Bannon and W. Lucot, directors.
Inc. April 1, 1919, in Nevada. **Cap.**, 1,500,000 shares; 10c par; assess-. Listed on San Francisco Stock Exchange.
Property: the 3 Lone Cabin claims, 4,500' north of Tonopah Divide, to have one of the strongest fracture systems in the district.
Development: sinking under way and machinery erected. In sinking shaft, which was 100' deep in December, 1919, stringers were cut, assaying to $36 per ton. The 200' level is well mineralized.

UTH DIVIDE MINES CO. **NEVADA**
Office: Tonopah, Nev.
Officers: J. G. Crumley, pres.; F. K. Pittman, v. p.; C. E. Oyster, sec.-s., with L. L. Crumley, and A. H. Elftman (cons. engr.), directors.
Inc. April, 1919, in Nevada. **Cap.**, 1,500,000 shares; 10c par; 750,000 in sury.
Property: 5 claims, in the S. E. part of the district, 2 miles from Gold ntain, adjoining the Gold Wedge Divide on the south. Work was done sev- years ago, with fair prospects. Developing.

UTHERN DIVIDE MINING CO. **NEVADA**
Office: Tonopah, Nev. Care R. H. Tune, res, agt.
Officers: C. P. Campbell, pres.; Wm. Huggard, v. p.; R. H. Tune, sec.-s.
Inc. May, 1919, in Nevada. **Cap.**, $150,000; par 10c; 750,000 shares in sury.
Property: 40 acres, patented, about 3 miles south of Tonopah Divide e.

ARKS DIVIDE MINING CO. **NEVADA**
Inc. 1919, in Nevada.
Property: 2 claims, 3 miles south of Gold mountain and S. W. of the ck Hawk Divide.

ANDARD DIVIDE EXTENSION MINING CO. **NEVADA**
Inc. in Nevada.
Property: 6 claims north of Sutherland Divide and 2½ miles north of ld Mountain.

STANDARD DIVIDE MINING CO. NEVA

Office: Tonopah, Nev. H. H. Brown, agt.

Officers: J. C. Martin, pres.; G. A. Trubody, v. p.; H. A. Darms, sec treas., with Wm. Watters and W. J. Douglass, directors.

Inc. April 11, 1919, in Nevada. **Cap.**, $150,000; 10c par; 750,000 treasury.

Property: 5 claims, about 110 acres, 2½ miles north of Gold Mou tain, adjoining the Sunbeam and the New England shaft.

STERLING DIVIDE MINING CO. NEVA

Office: M. E. Scott, res. agt., Reno, Nev.

Officers: Capt. A. S. Proskey, pres.; H. E. Scott, sec.; A. N. Sa bury, treas.

Inc. April, 1919, in Nevada. Stock non-assessable.

Property: 5 claims, ¾ mile N. E. of the Ben Hur.

SUNBEAM DIVIDE MINING CO. NEVA

Office: Tonopah, Nev.

Officers: E. S. Berney, pres.; Fred Grob, v. p.; M. M. Detch, sec.; G. Foster, treas.-mgr., with W. A. Foster, directors.

Inc. April 12, 1919, in Nevada. **Cap.**, 1,500,000 shares; 10c par; asse able; 550,000 issued. Listed on San Francisco Stock Exchange.

Property: 7 claims, 2¼ miles north of the Tonopah Divide.

Development: by 150′ shaft, sunk on a rhyolite dike. Assays show rock to carry from $1 to $2.80 per ton, but stringers at 120′ returned from $17 $96 per ton. At 150′ the stringers assayed $133, and 12″ vein $10.50 per t Fully equipped.

SUNNY DIVIDE MINING CO. NEVA

Office: Room 1 Journal Bldg., Reno, Nev.

Directors: A. G. Miller, pres.; C. H. Duborg, v. p.; A. LeCuver, sec treas., with G. H. Kent, W. T. McNeil, and O. J. Clifford, directors.

Inc. in Nevada. **Cap.**, $150,000; 10c par.

Property: 7 claims, 1¼ miles S. W. of Tonopah Divide, and adjoini the Aztec Divide on the south.

Development: sinking and erecting machinery. Installed 12-h. p hois

SUTHERLAND DIVIDE ANNEX MINING CO. NEVA

Office: Goldfield, Nev.

Officers: H. B. Ruhl, pres.; F. C. Beedle, v. p.; B. E. Garnett, sec treas., with T. F. Potthoff, and A. B. Garnett, directors.

Inc. April, 1919, in Nevada. **Cap.**, $150,000; shares 10c par.

Property: 4 claims adjoining the Sutherland Divide on the north. Pro pecting.

SUTHERLAND DIVIDE EXTENSION MINING CO. NEVA

Address: T. O. Ward, res. agt., Reno, Nev.

Officers: Jos. McEachin, pres.; R. G. Ward, v. p.; T. O. Ward, sec treas.; above, with T. J. Lynch and F. P. Dunn, directors.

Inc. March, 1919, in Nevada. **Cap.**, $10,000; 1c par; 500,000 in treasu

Property: about 75 acres, adjoining the North Divide on the north

SUTHERLAND DIVIDE MINING CO. NEVA

Office: Goldfield, Nev.

Officers: C. R. Evans, pres.; J. B. Kendall, v. p. and mgr.; R. W. Ca termole, sec.-treas., with C. H. Webster and F. B. Mechling, directors.

Inc. May 8, 1918, in Nevada. **Cap.**, 1,500,000 shares; 10c par; no assessable, 1,150,000 outstanding. Listed on San Francisco Stock Exchange.

A statement issued December 17, 1919, showed that receipts had total $25,418, including $23,788 from sale of 471,000 shares. Disbursements we $12,745 for development and supplies; $7,116 for equipment and erection o same, and $2,228 on property account. The balance on hand was $616.

Property: 6 claims, 130 acres, 1½ miles N. of the Tonopah Divid mine. Examined by J. B. Kendall, and A. H. Elftman, who said that outcrop assayed $2.20 in gold; silver increases with depth; and that sinking should b done to 600′. Ground is crossed by a well-defined vein proved by various ope

and shallow shafts, from two of which ore was shipped by former lessees; 800' E. of the new shaft now shows $6.50 ore.
Development: by 530' incline shaft sunk on a fault vein, opened on 00' level by 30' crosscut and 239' of drifts, and a 25' crosscut on the 400' with a 201' drift on the vein. The 400' showed some $10.55 ore, and nar- seams of rich ore ($70) were found on the 300' level. This same shaft is to have produced ore for shipment some 15 years ago, the ground being d early in 1901 by the South Tonopah Mining Co., the second mining com- to be incorporated in the Tonopah region.
Equipment: 50-h. p. hoist and all the machinery needed for develop- to depth of 1,000'.
The stockholders, at a meeting held on January 10, 1920, authorized a re- ization, the new company, called the New Sutherland Divide Mining Co., ve 1,500,000 assessable shares, new shares to be exchangeable for old at

EPHONE GIRL DIVIDE MINING CO. **NEVADA**
Office: Portland, Ore., and Tonopah, Nev. H. R. Cooke, res. agt.
Officers: J. J. McGregor, pres.; E. B. Ingram, v. p.; James Moffatt, James Monahan, treas., and directors.
Inc. in Nevada. **Cap.,** $150,000; shares 10c par; 750,000 in treasury.
Property: 6 claims in the extreme S. E. part of the district, 4 miles Gold Mountain and N. E. of the Ajax mine.

)MPSON DIVIDE MINING CO. **NEVADA**
Office: Tonopah, Nev.
Officers: George Wingfield, pres.; H. C. Brougher, W. J. Douglass, v. E. J. Erickson, sec.-treas., with Hugh Sutherland, directors.
Inc. May 14, 1919, in Nevada. **Cap.,** 1,500,000 shares; 20c par; assess- Listed on San Francisco Stock Exchange.
Property: 7 claims, 90 acres, adjoining Belcher Extension, Royal and Divide properties. Is about 4,500' N. W. of Tonopah Divide. Fully ped. Sinking main shaft.

GERY-DIVIDE MINING CO. **NEVADA**
Office: 139 No. Virginia St., Reno, Nev. Eva Keenan, res. agt.
Officers: T. J. O'Donnell, pres., Ernst & Cranmer Bldg., Denver; F. utchins, v. p.; J. N. Hyman, sec.-treas. (115 Broadway, New York), with . Graham, G. W. Bachman, E. B. Caldwell, directors. A. H. Warner, supt.
Inc. April 19, 1919, in Nevada. **Cap.,** $150,000; 10c par. Listed on San cisco Stock Exchange, and New York Curb. Corporation Trust Co., 37 St., New York, transfer agent.
Property: 12 claims, 200 acres, adjoining the Gold Zone on north, and ' south of Tonopah Divide. Located in 1902 by James Grimes. Many g dikes or iron-stained fracture ledges of appreciable silver value are said averse claims. Examined by A. H. Warner.
Development: 4 shafts had been sunk, deepest 200', before Grimes to present company. All surface work had shown minimum assays of 1 oz. r per ton. At 135' in main shaft, ore carrying free gold was opened. New t, to be sunk 500', was down 325' on July 27, 1919, at which depth driving under way. Leases have been let to the Doctor Divide Mining Co. and to A. Hooten, of Reno. Both are sinking shafts.
Equipment: all motor-driven, includes 30-h. p. electric hoist, com- or, blower, transformers, 36' head-frame, drills, shops, with accommod- s for 30 men.
All work stopped in 1919. Early, 1920, company had spent $40,000, was tly in debt and stock had dropped from 50c to 4c.

GERY EXTENSION MINING CO. **NEVADA**
Office: Reno, Nev. James Boland, res. agt.
Officers: W. A. Hooten, pres.-mgr.; J. R. Chamberlain, sec.-treas.; James Boland and R. G. Withers, directors.
Inc. June, 1919. in Nevada. **Cap.,** 1,500,000 shares; 10c par; 750,000 d.

Property: 2 claims, 600′ N. of Myra Divide. Also has a lease on T gery Divide. Sinking under way.

Equipment: gasoline hoist and compressor.

TOMBOY DIVIDE MINING CO. NEVA

Office: Tonopah, Nev., F. F. Garside, res. agt.

Property: the Virginia group, 4 claims, near Lookout Divide; also "B" group of 5 claims in Lone Mountain section.

TONOPAH BANKERS DIVIDE MINING CO. NEVA

Officers: A. W. Copps, pres.; W. P. O'Meara, v. p. and mgr.; F. Gillette, sec.; Thomas Normile, treas., with F. C. Jordan and P. C. Thorn rectors. W. P. O'Meara, supt.

Property: 4.500′ north of Tonopah Divide; with the High Divide nex, High Divide, Harmill, and Hennessy ground in between.

Development: contract let for sinking first 50′ in 1919.

TONOPAH DIVIDE JUNIOR MINING CO. NEVA

Office: Tonopah, Nev. W. T. Brown, res. agt.

Officers: H. H. Brown, pres.; L. R. Robins, v. p.-gen. mgr.; W. Gomm, sec.-treas., with Gust Hanson and James Grimes, directors.

Inc. Feb. 24, 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c par; assessable. Listed on San Francisco Stock Exchange and New York Curb.

Property: 3 claims, adjoining the Tonopah Divide at S. W. corner the Grimes Divide.

Development: shaft sinking under way, down 150′ June, 1919. Eq ment: electric hoist, etc.

TONOPAH DIVIDE MINING CO. NEVA

Office: Tonopah, Nev.

Officers: H. C. Brougher, pres.; George Wingfield, v. p.; W. J. D lass, v. p.; E. J. Erickson, sec.-treas., with E. W. Blair, directors. S. C. Mit asst. sec.-treas. William Watters, supt.; E. A. Julian, gen. mgr. and cons. G. H. Garrey, cons. geologist.

Inc. June 3, 1912, in Nevada. A reorganization of the Tonopah G Mountain Mining Co.

Cap., 1,250,000 shares; $1 par; 1,010,800 issued. Listed on San Fr cisco and New York Stock Exchanges. Annual meeting, first Wednesday March. Tonopah Banking Corporation, registrar.

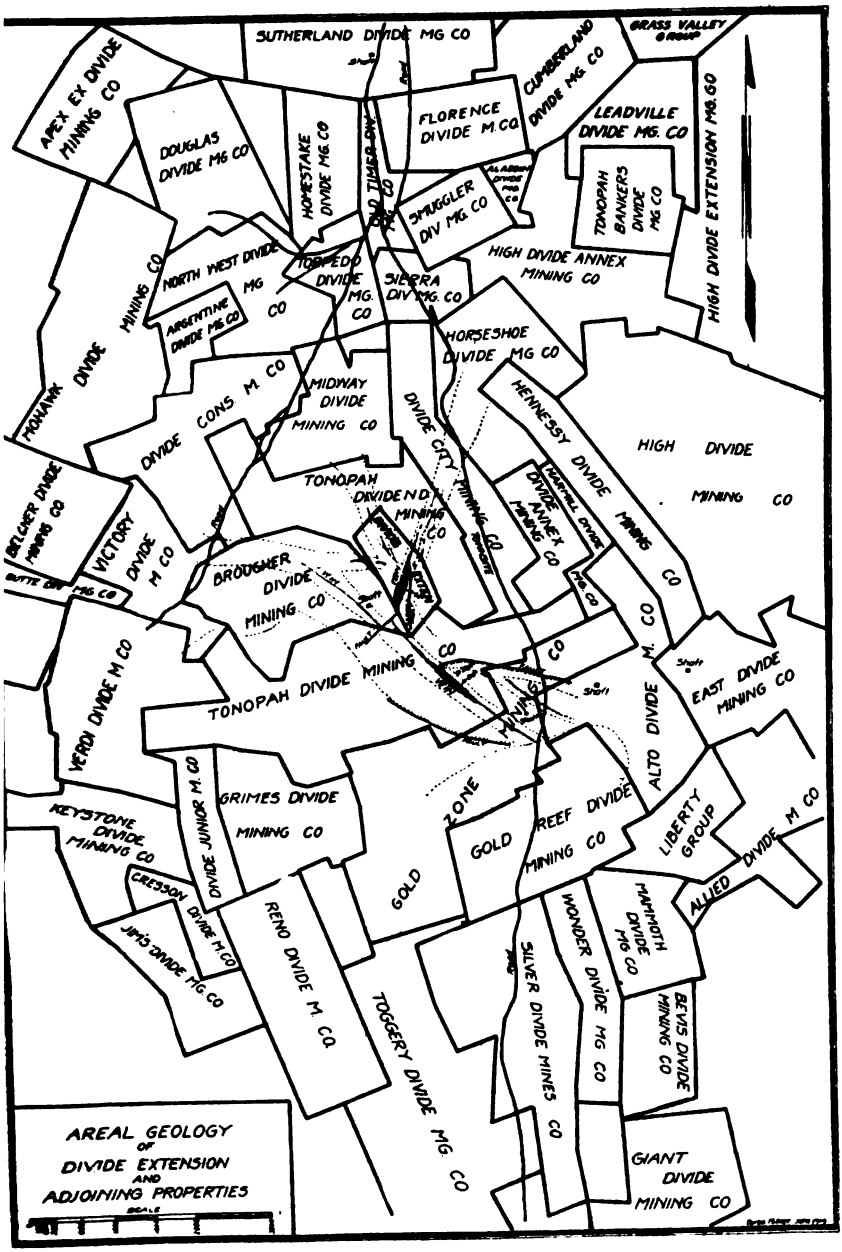
Balance sheet as of December 31, 1918, shows assets amounting to $1,035 of which mine property is placed at $956,367, and development at $58,503. C rent assets were then $20,464, and liabilities $24,815. By June 30, 1919, th liabilities had been paid off and there was a cash balance of $4,842.

Property: 13 claims, patented, 150 acres, in the center of the Div district, on the eastern slope of Gold Mountain.

Geology: the Divide vein, as the main ore fissure of the mine is cal is a shear-zone in the Divide breccia, a rock formed of rhyolite fragments. vein is large, varying from 15 to 30′ across and has sharp walls. A vertical p mineral slip runs with the vein, but crosses it, and is accompanied by many s pathetic minor slips with all sorts of strikes and dips. This fracture has b followed by the levels, which accounts for some apparent irregularities of orebody. The ore shoot is often bounded by clay seams, but in places the v ues fade out into the wall rock. At one place the ore is 90′ across, though averages 20 to 25′ in width. The outcrop is a soft altered rhyolitic bre stained with red and yellow iron oxides, without conspicuous quartz, and rather unattractive appearance, although a red seam carries horn silver. rhyolite dike intersects the vein at a small angle at the northwestern end of 365′ level.

A second ledge, known as the Gold vein, outcrops on the property and w mined in former years. It runs E.-W. and would intersect the Brougher v to south, if not faulted. A crosscut to the Gold vein shows two normal fa running north 75° west and with steep south dip, bringing down the overl formation.

The gangue of the Divide ore is a kaolinized rhyolite breccia, in wh


SUTHERLAND DIVIDE MG CO
APEX EX DIVIDE MINING CO
DOUGLAS DIVIDE MG CO
HOMESTAKE DIVIDE MG CO
FLORENCE DIVIDE M CO
CUMBERLAND DIVIDE MG CO
GRASS VALLEY GROUP
LEADVILLE DIVIDE MG CO
HIGH DIVIDE EXTENSION MG CO
TONOPAH BANKERS DIVIDE MG CO
STRUGGLER DIV MG CO
HIGH DIVIDE ANNEX MINING CO
NORTH WEST DIVIDE MG CO
ARGENTINE DIVIDE MG CO
TORPEDO DIVIDE MG CO
SIERRA DIV MG CO
HORSESHOE DIVIDE MG CO
MIDWAY DIVIDE MINING CO
DIVIDE CONS M CO
DIVIDE CITY MINING CO
HENNESSY DIVIDE MINING CO
HIGH DIVIDE MINING CO
TONOPAH DIVIDE N.D. MINING CO
BROUGHER DIVIDE MINING CO
VICTORY DIVIDE M CO
TONOPAH DIVIDE MINING CO
EAST DIVIDE MINING CO
ALTO DIVIDE M CO
VERDI DIVIDE M CO
GRIMES DIVIDE MINING CO
KEYSTONE DIVIDE MINING CO
GOLD ZONE
GOLD REEF DIVIDE MINING CO
LIBERTY GROUP
ALLIED DIVIDE M CO
RENO DIVIDE M CO
TOGGERY DIVIDE MG CO
SILVER DIVIDE MINES CO
WONDER DIVIDE MG CO
MAMMOTH DIVIDE MG CO
BEVINS DIVIDE MINING CO
GIANT DIVIDE MINING CO
AREAL GEOLOGY OF DIVIDE EXTENSION AND ADJOINING PROPERTIES
SCALE

PROPERTY MAP OF CENTER OF DIVIDE DISTRICT, NEVADA.

scarcely any silicification can be noted. On the 165′ level an oxidized molybdenum mineral, powellite, a molybdate of lime, constitutes an important portion of the gangue, but this material decreases with depth.

Development: by a 600′ shaft with drifts on vein at 165, 265, 365, 47 and 585′ levels. The ore has a length of 300 to 510′ and an average width of 1 to 25′, with a maximum of 110′. Crosscuts at 50′ intervals with careful sampli of the mine, show the main orebody to have an average width of 21½′, a average length of 400′, and a developed depth of 500′, equivalent to 330,800 to of $27.60 ore, at a gross value of $9,108,000 and a net value of $6,138,000, wh is about $6 a share.

This estimate was made by A. I. D'Arcy, former manager, in Novembe 1919. It does not include any value for the ore of the Gold vein, nor of th ore shoot recently found to the N. E. of the shaft. The possible value of th ore below water level, may easily exceed in value, that of the ore so far d veloped.

The mining cost during the first half of 1919 was $6.93 per ton. Shaft sin ing cost $40.62; drifts and cross-cuts, $12.54; and raises, $8.47 per foot.

Equipment: all machinery is motor-driven (with three 50-k. w. trans formers), and includes a large hoist at surface, auxiliary hoist at 370 ft dep one 350 and one 1,200 cu. ft. compressor. Plant includes assay office, houses, e for 100 men, and complete outfit for extensive operations.

Production: ore shipments to the Goldfield Consolidated mill beg in October, 1918, and continued at rate of 220 tons per week until January, 19 when shipments were transferred to the MacNamara mill at Tonopah. In Ja the output was 60 tons daily. This ore is drawn from all part of the mine, b mainly from development on the four main levels and connecting raises. Offic figures are as follows:

		Per Ton					Tot
Year	Tons	Value	Loss	Extracted	Cost	Profit	Profi
1919 (half).....	6,464	$28.24	$2.67	$25.57	$16.71	$8.86	$57,7
1918 (quarter)...	788	20.89	2.28	18.61	17.98	0.63	1,2

With a mill of its own the company should be able to bring its total cost down to at least $9 per ton of ore mined. Hauling ore and treatment now co $8.403 per ton. See estimate of reserves given above.

TONOPAH DIVIDEND MINING CO. NEVA

Office: Tonopah, Nev.

Officers: J. R. Cunningham, pres.; Julius Goldsmith, v. p.; E. P. Cal linan, sec.-treas., with Ernest Cole and Herman Albert, directors. G. J. Mu phy, supt.

Inc. March 4, 1918, in Nevada. **Cap.**, 2,000,000 shares; increased Ap 1, 1919, from 1,500,000; 10c par, 1,280,000 issued. Listed on San Francisco Sto Exchange.

The Dividend is controlled by H. G. Humphrey, of Reno; Zeb Kenda George Wingfield, J. H. Miller, and others, all of whom are interested in Divi Extension.

Property: 6 claims, 85 acres, adjoining Tonopah Divide on south Brougher, Divide Extension and Divide Consolidated. Threatened litigati with the Midway Divide was adjusted in April, 1919.

Development: trenching in June, 1919, had exposed the Divide Exte sion vein, near the joint boundary, where it is joined by an E.-W. vein forma a large fractured area that is enriched to a high degree. At one point, assa ranging from $50 to $150 were obtained across 12′ of this material. The o is said to contain argentite and stephanite. The Dividend main shaft, 1,50 the N. W. is 500′ deep. On the 300′ and 500′ levels, crosscuts driven to cut th vein, had not yet reached it in January, 1920. The new shaft, close to the ea line of the Divide Extension, showed 6½′ of $60 ore at 50′ depth.

Equipment: electric hoist, compressor, drills, etc.

OPAH GOLD MOUNTAIN MNG. CO. **NEVADA**
e-organized in May, 1912, as the Tonopah Divide Mining Co., which see.

OPAH HASBROUCK EXTENSION MNG. CO. **NEVADA**
)ffice: Tonopah, Nev., P. J. Somers, res. agt.
)fficers: P. J. Somers, pres.; Jos. F. Ford, v. p.; B. J. Byrne, sec.; K. Ford, treas.
nc. May 4, 1918, in Nevada. **Cap.,** 1,500,000 shares; 10c par.
roperty: 4 claims adioining the Hasbrouck mine on west. Sinking and equipment ordered.

OPAH HASBROUCK MINING CO. **NEVADA**
)ffice: Box 1235, Tonopah, Nev.
)fficers: G. A. Kernick, pres.; H. F. Bruce, v. p. and cons. engr.; B. ilson, sec.-treas.; also directors. A. A. Codd, res. agt. at Reno; J. A. aughlin, supt.
nc. Feb. 6, 1918, in Nevada. **Cap.,** 1,500,000 shares; 10c par; 750,000 d. Listed on San Francisco Stock Exchange. Registration Security Co., Francisco, transfer office.
Property: 6 claims, 130 acres, 3,000′ W. of the Tonopah Divide, be- n which are the Hasbrouck Annex, Kernick, and Verdi.
Development: a 200′ shaft, sunk about 16 years ago, opened 10 to 25′ illing ore. A tunnel driven on the vein somewhat later yielded 1,000 tons of nd a recent extension of the tunnel cut another vein. The ore is in rhyolite. lay, 1919, the old shaft was deepened to 400′, the old workings re-opened 50 to 100 tons of ore per week mined and shipped to the MacNamara mill onopah. A substantial tonnage blocked out by old and new work on the and 400′ levels, the ore being 15′ wide and assaying $12 to $50 per ton. ping 100 tons weekly.
Equipment: hoist, 4-drill compressor, etc.

:PEDO DIVIDE MINING CO. **NEVADA**
Office: 205 Nixon Bldg., Reno, Nev.
Officers: Wm. Watters, pres.; J. L. McCarthy, v. p.; J. F. Kunz, sec.- .. with Roger Dougherty and Richard Finn, directors. A. I. D'Arcy, cons. neer.
Inc. April, 1919, in Nevada. **Cap.,** $150,000; shares 10c par.
Property: 50 acres north of the Divide City, and 3,000′ north of Tono- Divide, adjoining the Midway and Homestake mines. Shaft being sunk machinery erected.

\DE DOLLAR DIVIDE MINING CO. **NEVADA**
Address: C. L. Farr, Ogden, Utah.
Property: the Rim Divide group of 7 claims in the N. W. part of dis- , near the Goldsmith Divide, acquired on August 14, 1919. Work has been ted. Examined by Rolla E. Clapp.

EADWELL DIVIDE MINING CO. **NEVADA**
Office: Tonopah, Nev., J. K. Pittman, res. agt.
Officers: F. M. Manson, pres.; J. H. Miller, v. p.; Allen Rives, sec.- s.. with Zeb Kendall, J. E. Adams and A. G. Raycraft, directors.
Inc. April 2, 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c par; assessable.
Property: 8 claims, about 1¼ miles N. E. of Gold mountain and nearly)ining the Mizpah Divide on the East. Is prospecting.

EASURE DIVIDE MINING & LEASING CO. **NEVADA**
Address: 218 North Virginia St., Reno, Nev.
Officers: J. G. Huntington, pres.; S. H. Rosenthal, v. p.; H. F. McCray, : P. R. Whytock, cons. engr.; Thomas Bosanco, supt.
Inc. 1919, in Nevada. Treasury shares were being sold at 15c in De- ıber.
Property: a 2-year lease on part of the Polo claim of the Revert Di- : Mining Co. The leaseholder has 5 years after the lease expires in which reat the ore.
Development: in December, 1919, shaft was down 30′ on the Revert, wing 14″ of 224 oz. silver ore. Machinery has been erected.

TRILBY DIVIDE MINING CO. NEVA

Office: Tonopah, Nev.

Officers: Henry Malloch, pres.; E. H. Bisson, v. p.; A. R. Miller, treas., with R. E. Connolly and Eleanor Sooy, directors.

Inc. March 28, 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c par; assessable. Listed on San Francisco Stock Exchange. Transfer office: Mills Bldg., San Francisco, Cal.

Property: 4 claims, 50 acres, adjoining the Belmont Divide, the Ro and Argonne. Examined by A. H. Elftman. Surface exposures said t good.

Development: sinking and erecting hoist in May, 1919. By Au shaft was down 100', where samples yielded a few dollars per ton.

TRINITY DIVIDE MINING CO. NEVA

Office: Tonopah, Nev., and Lovelock, Nev.; H. H. Hunter, Jr., res.

Officers: F. E. Baker, pres.; H. E. Loufek, v. p.; V. M. Place,, sec.-tr with J. G. Huntington and H. H. Hunter, Jr., directors.

Inc. May, 1919, in Nevada. **Cap.,** $150,000; shares, 10c. par.

Property: 3 claims, one of the outsiders, 4 miles S. E. of Gold Moun and 1½ miles S. of the Goldsmith Divide.

UNION DIVIDE MINING CO. NEVA

Office: Tonopah, Nev. F. K. Pittman, res. agt.

Officers: J. B. Hutchinson pres.; A. S. Haskell, v. p.; J. T. Wall, s treas.; above with Frank K. Pittman and Peter Halloran, directors.

Inc. April, 1919, in Nevada. **Cap.,** 1,500,000 shares; 10c. par; assess 750,000 in treasury.

Owns 4 claims adjoining the Signal and north of the Sutherland.

VERNAL DIVIDE MINING CO. NEVA

Property: near Verdi Divide, west of Tonopah Divide.

VERDI DIVIDE MINING CO. NEVA

Office: Tonopah, Nev. and Reno, Nev. Paul Revert, agt.

Officers: A. Revert, pres.; G. E. Benham, v. p.; C. S. Stevens, s treas., with C. C. Bridgeman, directors.

Inc. March 21, 1919, in Nevada. **Cap.,** 1,500,000 shares; 1c. par; n assessable. Listed on San Francisco Stock Exchange.

Property: 6 claims, adjoining Tonopah Divide on its west end T tract was located 18 years ago, and a 240' shaft sunk.

Development: a new shaft was put down in 1919, and an electric h and compressor installed. Careful sampling of 100 tons of ore on the d show it to average $25 per ton, indicating that the old shaft and workings worth reopening.

VICTORY DIVIDE MINING CO. NEVA

Office: Goldfield, Nev.

Officers: A. I. D'Arcy, pres.; H. E. Clark, v. p.; Andrew Walz, 2nd v. H. B. Ruhl, sec.-treas.; with C. A. Heller, directors; B. E. Garnett, asst treas.; S. M. Wilson, supt.

Inc. Jan. 11, 1919, in Nevada. **Cap.,** 2,000,000 shares; 10c par; 1,885 issued. Listed on San Francisco Stock Exchange. New York Trust C registrar.

Revenue in 1919 was $89,562, mostly from sale of shares; expenses w $44,464; cash on hand at end of year was $45,098.

Property: 3 claims and 3 fractions adjoining the Divide Consolidate Verdi, Brougher, and Belcher.

Development: 2-compartment shaft was 220' deep in January, 1920, a a crosscut at 200' showed ore that assayed $5 to $24 per ton.

VINDICATOR DIVIDE MINING CO. NEVAD

Office: 155 Main St., Tonopah, Nev. F. T. Dunn, agt.

Officers: A. J. Rigali, pres.; D. W. Ryan, v. p.; P. E. Brown, sec with W. H. Hart (supt.) and E. J. Robertson, directors.

Inc. in N **Cap.,** $150,000; shares, 10c. par.

Property: 5 claims, 60 acres west of the Hasbrouck groups and 1¼ s west of Tonopah Divide. Also owns 4 claims in Lone mountain district.
Development: shaft sinking under way in a brecciated rhyolite. Equip- t purchased in 1919 cost $12,575.

ST DIVIDE EXTENSION MINING CO. **NEVADA**

Office: Tonopah, Nev.
Officers: J. F. Good, pres.; R. C. McCarthy, v. p.; J. W. Dunfee, v. p.; A. Wright, sec.-treas., and H. C. Kane, directors.
Property: 2 claims adjoining those of the West Divide Mining Co.

ST DIVIDE MINING CO. **NEVADA**

Office: Goldfield, Nev.
Officers: L. L. Patrick, pres. and mgr.; H. B. Ruhl, v. p.; B. E. Gar- t, sec.-treas., with K. M. Patrick and Al. McCoy, directors.
Inc. May, 1919, in Nevada. **Cap.**, 1,500,000 shares; 10c par; non-as- sable. Listed on San Francisco Stock Exchange.
Property: 5 claims, in the West Divide district, 5 miles W. of Tonopah ide on west slope of Lone mountain. The main vein trends N. E.-S. W., l dips E. It has been opened by trenching for a length of 2,000′ and shows idth of 2 to 7′. An east vein also opened by a surface trench, shows ore run- g 98.8 oz. silver per ton. An old 150′ tunnel, driven in 1906 and 1911, yielded tons of 160-oz. ore. This tunnel is said to show 18″ of 8 to 12-oz. ore, and of rich ore.
Development: a shaft with a drift at 60′ depth shows ore assaying up to oz. silver per ton, over 40 tons being available for shipment.
Equipment: includes a complete plant for sinking.

ESTERN DIVIDE MINING & MILLING CO. **NEVADA**

Office: 421 Clay Peters Bldg., Reno, Nev.
Officers: S. E. Meserve, pres.; A. H. Butler, Jr., v. p.; with G. A. Ker- k, A. A. Codd, and H. F. Bruce, directors. E. E. Glass, sec.-treas.
Inc. February 12, 1919, in Nevada. **Cap.**, $150,000; 10c par. Listed on n Francisco Stock Exchange.
Property: 8 claims, 150 acres E. of the Hasbrouck Annex and 1,500′ W. of Tonopah Divide.
Development: includes an old 900′ tunnel, which cut a vein at a point 0′ in. This is to be further prospected. Sinking shaft. Well equipped.

ILSON DIVIDE MINING CO. **NEVADA**

Office: Tonopah, Nev.
Officers: J. R. Cunningham, pres.; J. M. Fenwick, v. p.; E. P. Cullinan, c.-treas., with M. J. Fitzgerald and T. M. Sheets, directors. Homer O'Connell, ipt.
Inc. April 2, 1919, in Nevada. **Cap.**, $150,000 shares; 10c par. Listed on an Francisco Stock Exchange.
Property: 4 claims, 75 acres, over 1 mile from Tonopah Divide and ad- oining the Mohawk Divide. Equipped and sinking shaft.

ONDER DIVIDE MINING CO. **NEVADA**

Office: Goldfield, Nev.
Officers: D. S. Ward, pres.; Joseph Bruder, v. p.; F. E. O'Neal, sec. nd supt.; E. Marks, treas.; L. F. Detweiler, directors.
Inc. March 21, 1919, in Nevada. **Cap.**, 1,500,000 shares; 10c. par; non- ssessable. Listed on San Francisco Stock Exchange.
Property: 2 claims, adjoining the Mammoth Gold Reef and Silver Di- ide, developed by 50′ shaft. Sinking, 1919.
Equipment: electric hoist and compressor installed.

ANKEE DIVIDE MINING CO. **NEVADA**

Office: Divide, Nev.
Officers: Hon. C. R. Evans, pres.; G. H. Howard, v. p.; C. P. Johnson, ec.-treas., with J. W. Crane and J. T. Murphy, directors.
Inc. April, 1919, in Nevada. **Cap.**, $150,000; shares, 10c par.
Property: 1 claim, 3 fractions in the S. E. section of the district ad-

joining the Liberty, Bingo, Champion and Gold Seam. Said to show veins carrying good ore.

Equipment: includes hoist and electric compressor.

YELLOW ASTER DIVIDE MINING CO. NEVA

Property: over 3 miles S. E. of Gold Mountain.

YUKON DIVIDE MINING CO. NEVA

Office: Tonopah, Nev.

Inc. 1919, in Nevada.

Property: 90 acres in Klondyke section of the Divide district, 6 m south of Divide mine.

ELY DISTRICT.

BOSTON & ELY CONS. MINING CO. NEVA

A consolidation of the Boston-Ely Mining Co., Smokey Development C and Ely Northern Copper Co

Address: Room 821, 25 Broad St., New York City.

Officers: L. E. Whicher, pres.; C. C. Burger, v. p.; R. M. Atwater, treas., with W. W. Cohen, W. F. Bartholomew, Geo. R. Presby, H. W. Bar W. N. McGill and A. L. Kingsbury, directors. L. J. Corwin, sec. Ray Guyer, gen mgr.; S. H. Williams, mgr. at Ely.

Inc. 1919, in Delaware. **Cap.,** $1,000,000: $1 par; 897,210 outstandi N. Y. Trust Co., transfer agent. Stock traded in on Boston Curb.

Property: 572 acres in Robinson mining district, White Pine coun about 140 miles from Cobre on the Southern Pacific R. R.

The Boston-Ely ground is 4½ miles from that of the Smokey group, Nevada Consolidated and Consolidated Copper mines lying between. T Smokey and Ely Northern are 1/3 mile apart All have rail connecti nearby.

The mines have been idle for many years and are fully described in for volumes of this book: Ely No. C. Co., Vol. VIII; Boston-Ely, Vol. XI; Smok Development, Vol. XI.

Company also owns an interest in the Colonial Silver Mines at Oaxaca, Me and in some oil-lands.

Geology: the copper-bearing ores occur in contact deposits betwe limestone and porphyry, as well as in the porphyry itself.

Development: by 1,230′ shaft in the Boston-Ely, which, with drifts a machinery, cost $180,000; this shaft is 3,000′ from the Alpha shaft of Cons dated Coppermines; by 1,800′ tunnel in the Smokey, costing $60,000; by 3 tunnel in the Ely Northern costing $15,000.

Work in 1919 included clearing out the Smokey tunnel, in which a sh is to be sunk at a point 1,665′ from the portal to explore the sulphide vein a porphyry areas below the tunnel.

Outlook for company is considered favorable, as indications on the E Northern, possibilities in the Smokey, and proximity (3,000′) of the Bosto Ely to the Consolidated Coppermines Alpha mine, give it several chances t make a producer.

BOSTON-ELY MINING CO. NEVAD

Consolidated with Smokey Development and Ely No. Copper as Bosto Ely Cons. Mining Co., which see. Fully described in Volumes XI and XIII.

BUTTE & ELY COPPER CO. NEVAD

General office: 1500 Alworth Bldg., Duluth, Minn. **Principal offic** Room 302, O'Rourke Estate Bldg., Butte, Mont. Mine P. O.: Kimberly, Whi Pine county, Nev.

Officers: Jos. B. Cotton, pres.; John D. Pope, v. p.; John W. Neukom sec. and asst. treas.; Thos. B. Adams, treas.; H. A. Holp, asst. sec.: al directors.

Inc. July 27, 1905, in Montana. **Cap.,** $500,000; shares $1 par; stoc was made assessable, 1907. Is a subsidiary of the Consolidated Copperm Co., which owns 422,625 shares. On December 31, 1918, had $295,772 in cash cash assets in treasury. Net income for 1918 was $3,845. Stock is listed the Butte Mining Exchange. Annual meeting, first Monday in June.

roperty: 12 claims, patented, 210 acres, in the Robinson district ad- g the Nevada Consolidated, White Pine county, includes a valuable water 20 miles distant, said to be capable of supplying 2,000,000 gal. daily; also res irrigable land near water rights.

)evelopment: 3 shafts, 1 with steam hoist, 310′ deep, showing dis- ated ore. Mining was suspended late in 1907, but churn-drilling was d on in succeeding years intermittently, developing several bodies of low- disseminated ore, said to show an average of 1½% copper.

n 1916 the Nevada Consolidated Copper Co. mined for account of Butte y 2,218 tons of ore from the Liberty Bell and Westphalia claims. This ssayed 1.375% copper and yielded 39,777 pounds of electrolytic copper. ie Liberty Pit is extended westward, the above and several other Butte & laims will be stripped and mined on the same terms as apply to mining of ermines ore under its contract with the Nevada company.

TENNIAL DEVELOPMENT CO. **NEVADA**

:ly, White Pine Co., Nev. Probably dead. See Vol. XII.

SOLIDATED COPPERMINES CO. **NEVADA**

)ffice: 120 Broadway, New York. **Mine office:** Kimberly, White Pine y. Nevada.

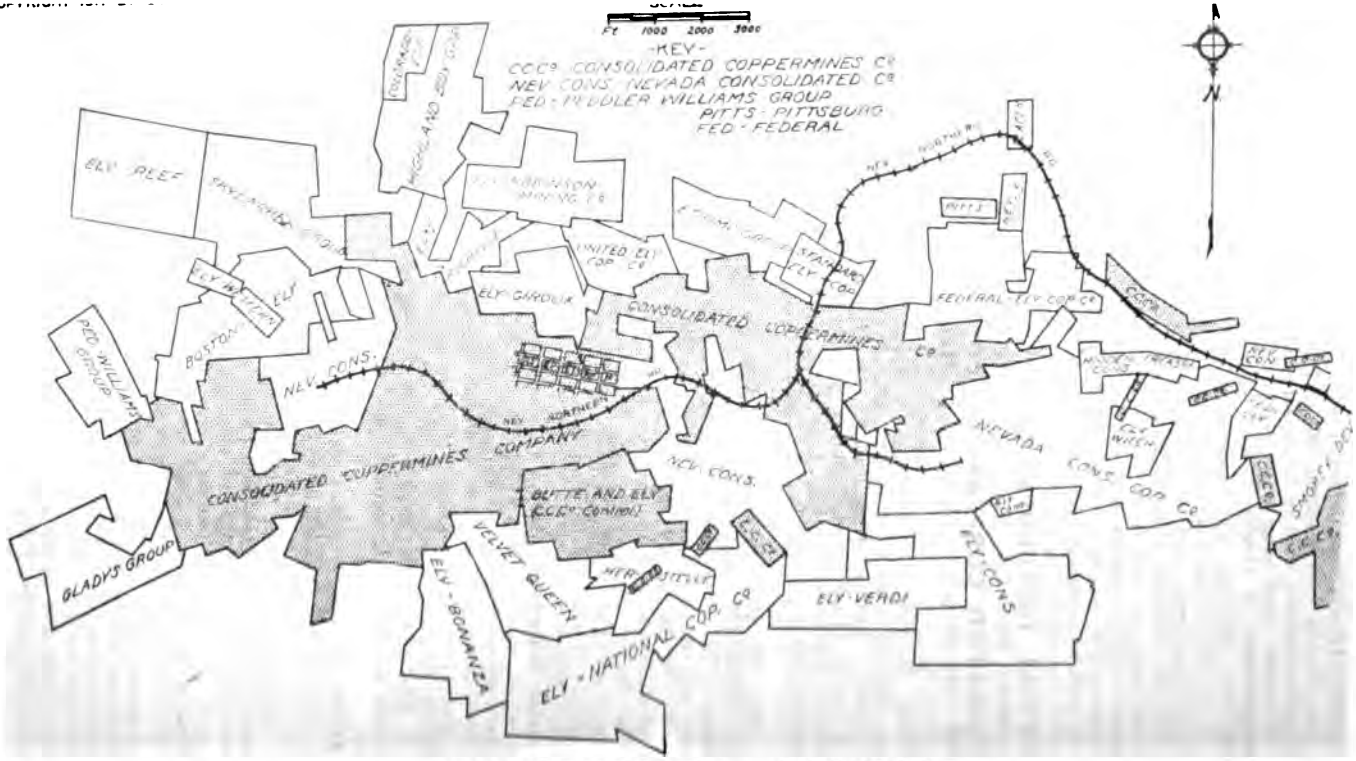
)fficers: Joseph B. Cotton, pres. and gen. counsel; Thomas A. Mer- v. p.; Robert Linton, v. p.-mgr. dir.; Fred. R. Kennedy, sec.; Ernest R. hau, treas.; Samuel Brenner, asst. sec.-asst. treas.; Edwin F. Gray, con. with Ira B. Humphreys, Arthur J. Selfridge, Frederic R. Kennedy, Isidore sheim, C. Lawrence Perkins, I. W. Bernheim, and Martin Pascus, directors. . Munroe, gen mgr.; H. B. Paull, auditor; E. P. Mathewson, cons. metallur-

Inc. May 20, 1913, in Delaware. **Cap.**, $8,000,000; shares $5 par; non- sable; $4,802,795 outstanding June 30, 1919. Bonds authorized $3,500,000, nortgage 7% convertible, due 1928; $3,063,700 outstanding ($436,300 con- d and retired), redeemable by lot at 110 plus accrued interest on any est day. In May, 1919, the unissued bonds, amounting to $1,000,000 were ed shareholders, and underwritten by Carl H. Pforzheimer & Co. of New . The funds are to carry out intensive mine development, holding the ld copper until the market improved. Guaranty Trust Company, New York, fer agent; Bankers Trust Company, New York, registrar. Stock listed on York Curb.

Financial Statement: during the year ended December 30, 1918, copper, and silver sold realized $3,786,658. Of this, $45,429 was operating profit. e was a general deficit of $111,995, when general expenses, bond interest, discount were deducted. A combined balance-sheet of Consolidated Cop- ines and Giroux Consolidated shows assets totaling $1,992,924, and liabili- $1,538,922, making an excess of assets amounting to $454,002. Liberty Bonds int to $297,554; cash, $99,520; supplies, $278,473; and metals, $1,029,079. s payable are $200,000; accounts payable, $311,392; and advances on copper, 7,530.

Property: the Coppermines company owns in fee 1,151 acres of mining erties and claims, and 120 acres of unpatented lode locations, together with acres of ranch lands having valuable water-rights. It also controls through tock ownership of about 99%, the Giroux Consolidated Mines Co., 2,000 of patented mining claims and 1,800 acres of ranch lands, which have valu- water-rights; and through its stock ownership in the Butte & Ely Copper 209 acres of patented mining claims. The total area of claims, exclusive ie Mexican properties, is 3,480 acres of patented mining claims and 4,365 of ranch lands, beginning 2 miles west of Ely.

The Sultana mine, the Mexican property of the Giroux company, 11 claims rising about 459 acres of mineral lands, includes the San Jose mine, about le W. of Copete, in the Sierra de Oro, 25 miles E. of Carbo and about 35 s from Hermosillo. Property shows a contact vein of 50 to 100′ width, ten limestone and porphyry, opened by 3 shafts, No. 2, the main working ' sunk on an incline, 1,200′ deep. The San Jose mine shows, in the bottom



ELY-ROBINSON DISTRICT.

WHITE PINE COUNTY NEVADA

el, a vein of about 40′ width, carrying oxidized ores to shallow depth, succ-ded by sulphides. The Mexican property as a whole shows low-grade copper : with fair gold value. Total production to January, 1908, was $542,000. nes have not been in operation for several years, owing to unsettled political ıditions in Mexico.

Geology: there are three classes of ore deposits occurring on the vada properties (1) chalcocite disseminated in porphyry forming concen-ting ore similar to that of the Nevada Consolidated Co., lying in large con-uous masses that can be mined at low cost, some by open-pit steam-shovel thods, others by underground methods; and (2) heavy sulphide ore, high iron and higher in copper than the disseminated ore; and (3) direct smelting : in fissure and replacement deposits in limestone at or near limestone-porphyry ıtacts.

The porphyry ore is very friable and readily amenable to concentration. e Morris and Brooks orebody has a proven length of over 2,000′, a width of ′ and depth of 100′ to 175′, but drilling has not yet been extended downward the bottom of the orebody, along the south side. Another large orebody has :n proved on the west end of the Liberty Eureka pit on the Ora and adjacent ims. Drilling has disclosed considerable ore in the ground between these o orebodies, and farther east on the Minnesota and adjoining claims lling and underground work has exposed sulphide ore in the Old Glory ne. However, the lands are so extensive that only a small part of the prop-y has been thoroughly drilled. During 1918, there was 6,980′ of drilling done, ′ for ventilation and 1,470′ for re-checking old holes. The other work was a preliminary nature in areas more or less isolated from the proven orebodies.

Contact and limestone replacement orebodies have been developed only on : Alpha. The ore-bearing zone has been developed in this mine for a length 650′ and width of 200′ and opened on the 850′ to 1,600′ level and the shaft, 40′ deep is still in this material. The Alpha mine has the only deep explora-n work so far done to explore this limestone-porphyry contact. It is con-lered that the Coppermines Co. has several thousand feet along the south ıtact and a similar length along the north contact, much of which is favorably ırded. Regular shipments of this direct smelting ore were commenced in : spring of 1917, since when 82,917 tons of 7.67% ore has been shipped. It estimated that over 100,000 tons of 8% ore is exposed.

Development: porphyry ores have been developed by over 100 drill-les, totaling 66,936′; also by extensive underground work on the Morris-ooks, Minnesota, Old Glory, and other claims. The Morris-Brooks mine was ened in 1917, and worked until January, 1919, to test the adaptability of the nch-raise caving system, and to provide ore for the Kimberly mill, wherein periments were made to determine the best treatment. During this period, 3,590 tons were mined and milled. Future extraction will be by stripping and am-shoveling. Reserves in this mine have been estimated at over 2,000,000 ıs. New work in this mine during 1918 totaled 17,146 ft., being done solely open the property for economical extraction of ore. The total is 63,377 feet.

The Alpha mine has extensive lateral work on the 770, 1,000, 1,200 and 1,500′ ·els. The Alpha No. 1 shaft is 1.200′ deep, and No. 2 is 1,440′ deep, connects th the same workings, and is to be sunk 200′ deeper. During 1918, develop-:nt in the Alpha totalled 8,487′. New work up to April 30, 1919, was 4,940′; : total is 20,546′. Exploration has proved definitely the existence of a series N. W.-S. E. slip-planes in the altered zone (probably due to faulting), along ıich commercial bodies of ore are found. These slips have been followed rtically for a distance of 450′. On the 1,000′ level new ore has been cut 300′ :st of any other known ore on this level; larger bodies exist at 1,100′ than at 00′. On the 1,200′ level continuous ore from a few feet to 50′ wide has been llowed for a length of over 400′ and averages 8% copper; while on the 1,300′ ·el equally rich ore has been found. A diamond drill hole at the extreme :stern end of the 1,300′ level, passed through 20′ of ore averaging 7.28 per cent. pper lying between the 1,300 and 1,400′ levels. At greater depth the drill cut ugh 65′ of ore that averaged 7.1 per cent. copper, extending down to a

depth of 1,555′. This orebody lies about 400′ east of the first hole drilled, sh ing 33′ of 7.65 per cent. ore.

In January, 1920, active development was in progress at the Taylor on the north contact. On the 150′ level a crosscut passed through 50′ of sulp ore reported to average about 2% copper and $1.50 gold and silver, with sulphur. A crosscut is also being run on the 250′ level.

Ore reserves (May 1, 1919):

Class of ore	Tons	Copper.
Fully developed disseminated sulphide porphyry....	9,957,700	1.41
Partly developed disseminated sulphide porphyry....	9,695,000	1.25
Total	19,653,034	1.33
Heavy sulphide	156,000	3.21
Alpha oxide	100,000	8.00

Mine equipment: at No. 2 Alpha shaft includes a 26x48″ Allis-Chal double-cylinder hoist capable of handling 5-ton skips in counter-balance to d of 1,800′, at a hoisting speed of 1,500′ per minute; also a 20x48″ Allis-Chal hoist for the cage.

Pumping equipment consists of two pumps of 600 gallons and one of 1, gallons capacity per minute at the main pumping station on the 1,200′ l There is also an 800-gal. pump on the 1,400′ level.

A three-mile private railway connecting the principal shafts with the Nev Northern Railway, has grades averaging about 1.5%. Equipment includes sev Porter locomotives of 600 tons tractive power, and sufficient ore-cars for pr requirements.

Ore treatment: careful concentration tests were made on the porp ores by J. M. Callow, of Salt Lake, whose results were used in re-mode the old mill at Kimberly. Concentration is principally by flotation. The modeled concentrator having a capacity up to 1,000 tons per day, was wo until January, 1919.

During the last four months of operation, the mill recovered 82.31% f 1.336% ore. Concentrate carried 18.33% copper and 9.39% moisture.

The company employed Frederick Laist, of the Anaconda Copper Mi Co., to design reduction works. His conclusions are based on (1) the co tration of 2,000 tons daily of 1.4% porphyry ore; (2) the concentration of tons daily of 2.9% sulphide ore; and (3) the smelting of 150 tons daily of A 7.5% oxide ore. Assuming that these ores can be delivered at reduction w at $1.10 per ton for the first, $5 for the second, and $10 for the third, for a p of not less than 10 years, Mr. Laist recommends building a concentrator to h 2,000 tons daily of porphyry and 150 tons of sulphide; also a 3,000-k. w. po plant, and a 500-ton reverberatory smelting plant for concentrates and oxide The equipment will include waste-heat boilers, turbo-generators, coal-dust f reverberatories, and Great Falls converters. These works will be at Kimbe thus saving the 28 cents a ton freight to Ely. The total estimated cost of p ducing copper is given as 12.35 cents per pound. The cost of the works w be $2,500,000. In November, 1919, E. P. Mathewson was engaged to erect new works.

Direct smelting ores as well as the concentrates from the Kimberly c centrator have been treated at the Steptoe plant of the Nevada Consolida Copper Co. under a five-year contract made in 1917.

Nevada Consolidated agrees to mine and treat for account of the Co Coppermines, from properties at the west end of Liberty Pit, 415,000 to ore during the period ending August 15, 1918, and after that date at least 75,0 tons per year. Coppermines company, reserved the right to cancel the cont any time after August 15, 1918, upon giving three months' notice.

Production: during 1918, the company and its lessees extracted fr the 3 mines 496,793 tons of ore, yielding 15,768,481 lb. of copper, 4,338 o gold, 17,415 oz. of silver, 768,101 lb. of zinc, 178,451 lb. of lead, and 323,170

anganese. During the first four months of 1919 the respective totals were
tons ore, 1,516,296 lb. copper, 362 oz. gold, 1,259 oz. silver, 653,804 lb.
15,144 lb. lead, and no manganese.
Management of the company is now in strong and able hands, and a pro-
ive operating policy is practiced.

AMALGAMATED COPPER CO. **NEVADA**

ompany controlled since 1911 by Jesse Knight, pres., Provo, Utah, who
51% interest.
nc. 1907, in Utah. **Cap.**, $100,000; shares 10c. par.
Property: 6 claims, and a townsite, about 1 mile from the Steptoe
er, of the Nevada Consolidated Copper Co., at McGill, White Pine county,
s silver-lead ores. Several carloads of ore shipped in 1917. No recent
reported.

BELL MINING CO. **NEVADA**

ompany probably dead. Stock worthless. Fully described Vol. XI, Cop-
landbook.

CONSOLIDATED COPPER CO. **NEVADA**

ompany inactive. **Office:** 414 Judge Bldg., Salt Lake City, Utah.
s: Ruth, via Ely, Nev.
Officers: at last accounts, S. M. Levy, pres.; D. B. Shields, v. p.; Gideon
er, sec.; John Pingree, treas., with Grant Snyder, directors. C. W. Geddes,
engr. and mgr.
Inc. October 2, 1906, in Utah. **Cap., $1,500,000; $1** par; changed Janu-
1917, from $1,000,000, shares $10 par, assessable, of which 300,000 shares
donated to treasury by incorporators; 887,765 shares listed on Boston
Stricken from New York Curb June, 1918. Registrar and transfer agent,
d States Corporation Co., 65 Cedar St., New York.
Property: 3 groups, 20 claims, 370 acres, in the Ely district, White Pine
y.
The Ely property, 15 claims, about 300 acres is on the south side of the
al belt, near the Ruth and Jupiter groups of the Nevada Consolidated.
loped by 3 vertical shafts. The 625′ Brilliant shaft has silver-lead ore on
00′ level, and near the bottom is said to show a 100′ bed of disseminated
er ore, below commercial grade. The American shaft is 500′ deep. No
done in recent years, but property held intact.

COPPER CO. **NEVADA**

Office: 815 Ernest & Cranmer Bldg., Denver, Colo. No representa-
at Ely, Nev. Idle since 1907. Fully described Vol. XI, Copper Handbook.
vorably regarded.

GIROUX COPPER CO. **NEVADA**

Idle. **Office:** R. S. Nichols, sec., 111 Broadway, New York City.
address: Kimberly, White Pine county, Nev. Windsor Trust Co.,
York, trustee.
Inc. 1909, by B. W. Coleman, Graham F. Putnam, and Roswell S.
ols. **Cap.**, $5,000,000; shares $5 par. Stock listed on New York Curb
prospect. In November, 1912, majority holdings were pooled, and $75,000
s treasury stock offered public, proceeds to be handled by Windsor Trust
as trustee, exclusively for payment of contractors sinking shaft on com-
's property at Ely, Nev.
Property: in Robinson mining district. No returns secured, and com-
advertised delinquent for $91 taxes in January, 1916.

-MIZPAH COPPER CO. **NEVADA**

Property: the Modoc group, near Ely, Nev. Assessment work neg-
d and property probably forfeited. See Vol. XI, Copper Handbook.
Principal promoter was A. M. Kearns, 1st Natl. Bank Bldg., Denver, Colo.

NORTHERN COPPER CO. **NEVADA**

Merged in 1919 into the Boston & Ely Consolidated Mining Co., which see.

REVENUE COPPER CO. **NEVADA**

Office: 830 Equitable Bldg., Denver, Colo.

Officers: F. C. Goudy, pres.; L. F. Twitchell, v. p.; J. P. M. Hump sec.-treas.; above, with R. E. Sloan and A. E. Reynolds, directors.

Inc. 1907, in Colorado. **Cap.,** $1,000,000; shares $1 par. Internati Trust Co., Denver, registrar. Annual meeting first Tuesday in March.

Property: 132 acres, known as the Revenue group, at Ely. Pine county, near the Chainman and Altman mines. Idle for several years.

ELY VALLEY MINING & MILLING CO. NEV

Dead. Fully described in Vol. XIII. Property now owned by the Sa Mining Co. of Nevada, which see.

ELY VERDI COPPER CO. NEV

Address: Geo. Wingfield, pres., Goldfield, Nev. Mine near Ruth, Ely.

Directors: S. R. Roberts, John Berry, of Ely; A. P. Sawyer, and L. L. Savage, of Goldfield; M. R. Brown and H. S. Anderson, of Pierre, S. D.

Inc. May, 1912, in South Dakota. **Cap.,** $5,000,000; shares $5 par. reorganization of company of same name that was listed on New York in 1909.

Property: a large group of claims south of the Copper Flat st shovel pit of the Nevada Consolidated, in White Pine county. Only asses work being done.

ELY WITCH COPPER CO. NEV

Officers: J. E. Bamberger, pres., 163 So. Main St., Salt Lake City, U D. M. Hyman, v. p.-treas; H. Cohen, sec.; Ernest Bamberger, gen. mgr., ceding with H. G. McMillan and W. W. Armstrong, directors, at last acc

Inc. November 22, 1906, in Maine. **Cap.,** $5,000,000; shares $5 par. Stock listed on Boston Curb, but inactive at last accounts.

Property: 7 claims, 1 fractional, 54 acres, patented, bought for $2 lying in the porphyry zone between the Ruth and Cumberland-Ely mines o Nevada Consolidated, White Pine county, shows large blowouts of iron-st porphyry.

Development: by 300′ shaft, with levels at 100′ intervals, and by nels of 1,200′, 600′ and 1,050′, with 3,500′ of workings. Development was appointing, for, while claims cover the main monzonite belt of the district underground work on 300′ level showed values too low to work. Drill Nevada Consolidated Co. is the logical thing to do and that company can pro work this property since it is now handling 1.6% ore at a profit. Company speculative promotion at time Nevada Consolidated was floated, and pr lean on development, has been idle since.

FEDERAL ELY COPPER CO. NEV

Idle. **Office:** 26 Mining Exchange Bldg., Salt Lake City, Utah. **office:** Ely, Nev.

Officers: J. A. Cunningham, pres., at last accounts.

Inc. 1914, in Utah. **Cap.,** $150,000; shares, 15c. par; reduced 1916 $5,000,000; shares $5 par; assessable; 12 assessments levied to March, 19

Property: 21 claims, 3 fractional, 400 acres, also the Huesser ran 600 acres, 15 miles north of Ely, in the Steptoe valley, White Pine county, 1906, and a millsite. Mining lands are the Panama claim, bought 19 $10,000, lying about one-half mile north of the Star Pointer shaft of the Consolidated; 8 claims north of the Nevada Consolidated; 3 claims be the Cumberland-Ely and Turner-Ely, and the Queen of the West group, in inson Cañon. Company is said to have paid $225,000 for its lands.

Geology: property north of the Nevada Consolidated shows lime beds dipping to the east, said to be underlaid by cupriferous monzonite to carry 3 parallel shear zones, each about 400′ in width, 600′ apart, s a little copper and lead ore. The limestone capping on the Savage claim to carry lead ore. Churn-drill borings are said to have given a satis showing of ore, and there also was some test-pitting and surface trenching

Development: by tunnels aggregating about 1,600′ and 4 shallow 3 said to show copper sulphides at depth of 100′, the main shaft said to

contact of 3 ore zones, which seems peculiar, if the ore zones are parallel, laimed.

The Queen of the West shaft shows, at depth of 110', a sulphide orebody onsiderable size, averaging 3% copper, 1 to 2 oz. silver and 40 to 50 cts. gold ton. The Kessler shaft, about 100' deep, near the tunnel, shows lead carates of fair tenor. Mine has a small steam plant.

Company has done little save levy assessments for several years, doing ly enough work on the claims to meet annual assessment requirements. ir claims were surveyed for patent in 1912 and reported partly patented in . Operated by lessees at last accounts.

OUX CONSOLIDATED MINES CO. **NEVADA & MEXICO**

General office: suite 3300, 120 Broadway, New York City. **Mine offices:** iberly, Nevada, and Carbo, Sonora, Mexico.

Officers: Albert C. Hubbell, pres.; Henry B. Paull, 1st v. p.; Ernest Brochau, 2nd v. p.; Joseph B. Cotton, general counsel; Frederic R. Kennedy, ; Thomas B. Adams, treas; foregoing with Samuel Brenner, Albert E. mphreys, Jr., John D. Clarke, directors. H. T. Munroe, gen. mgr. and ada agent. Samuel L. Heslet, Mexican mine agent.

Inc. April 14, 1903, in Delaware. **Cap.**, $7,500,000; shares $5 par; issued 07,100. American Trust Co., Boston, registrar. Boston Safe Deposit & st Co., transfer agents.

The Giroux is now controlled absolutely by the Consolidated Coppermines , through exchange of Giroux stock for that of the Coppermines company. e latter company now owns about 98% of the total Giroux stock outstanding. description of properties and operations see Consolidated Coppermines Co.

DONALD-ELY COPPER CO. **NEVADA**

Office: Boston Bldg., Salt Lake City, Utah. **Mine address:** J. P. Tur-, supt., Ely, White Pine county, Nev.

Officers: D. C. McDonald, pres. and gen. mgr.; Col. Enos A. Wall, p.; Geo. W. Parks, sec., Boston Bldg., Salt Lake City, Utah; Frank Knox, as., with Frank J. Westcott, Geo. W. Lamb and Hon. Thos. Kearns, directors; P. Jennings, cons. engr. and mgr.

Inc. November, 1906, in Utah. **Cap.**, $1,000,000; $5 par; issued, $790,000. bentures, $100,000, at 6%, maturing November 15, 1915. Shares were listed the Salt Lake Stock Exchange, but withdrawn.

Property: 28 claims, patented, 325 acres. 19 claims held under bond and se. Property, on the lime belt, in the N. E. part of the Ely district, carries contact deposits, between porphyry and limestone, showing prominent iron crops. Management estimated veins as 20' wide carrying oxidized ores, aying 1 to 40% copper, and about 80 cts. gold per ton.

Development: is by the 415' Wall tunnel, showing 21' of heavy iron. e mine as a whole has about 3,000' of workings.

Equipment: includes a 25-h. p. gasoline hoist, 40-h. p. steam hoist, and 5-drill air compressor. There are 6 buildings, including necessary shops. A mping plant and pipe line supply water from a spring at nearby ranch.

An old 50-ton mill, with rolls and cyanide plant, remains from a former nership. The 100-ton concentrator has a gyratory crusher and 3 sets of lls. In May, 1914, drifting was in progress. Idle for several years.

EVADA CONSOLIDATED COPPER CO. **NEVADA**

Controlled by Utah Copper Co.

Office: 120 Broadway, New York. **Operating office:** McGill, White ne county, Nev. Mine near Ruth, White Pine county, Nev.

Officers: Daniel C. Jackling, pres.; Chas. Hayden, v. p.; with Stephen ch, E. A. Guggenheim, Wm. Pierson Hamilton, H. O. Havemeyer, W. Bennett, Wm. B. Thompson, Chas. M. MacNeill, W. Hinckle Smith, C. Potter and C. B. Lakenan, directors; C. K. Lipman, treas.

Operating officials: C. B. Lakenan, gen. mgr.; C. V. Jenkins, sec.; W. S. nderground supt.; F. E. Grant, shovel-pit supt.; Geo. C. Riser, mill E. D. Moffatt, cons. eng for mills; R. E. H. Pomeroy, smelter supt.

November 7, 1904, in Maine, as a merger of the Boston & Nevada

Copper Co. and White Pine Copper Co. **Cap.**, $10,000,000; $5 par; $9,997,2[illegible] issued; original cap., $5,000,000 increased February 5, 1908, to $8,000,000, [illegible] again increased November, 1909, to present figure. A former issue of $3,000,[illegible] first-mortgage 6% convertible gold bonds, due April, 1918, has been retire[illegible] Old Colony Trust Co., Boston, and Guaranty Trust Co., New York, registrar[illegible] Boston Safe Deposit & Trust Co., Boston, and D. A. Crockett, 120 Broadw[illegible] New York, transfer agents. Shares listed on the New York and Boston [illegible] exchanges. Annual meeting, third Friday in April.

Comparative General Balance Sheet: Nevada Cons. Copper Co. a[illegible] Nevada Northern Ry. Co.—

Assets:

	Net Property and Equip.	Def'd Chgs. to Oper's	Metals on Hand	Other Current	Total
1918.....	$10,566,087	$5,450,974	$6,809,668	$8,802,466	$31,629,1[illegible]
1917.....	10,986,337	5,454,520	6,533,188	11,044,595	34,018,6[illegible]
1916.....	11,634,365	4,935,838	9,265,014	6,473,648	32,308,8[illegible]
1915.....	12,198,977	4,136,970	4,998,829	2,512,439	23,847,2[illegible]
1914.....	13,361,672	3,739,988	3,114,863	1,229,737	21,446,2[illegible]

Liabilities:

			——Surplus—— Stock and		
Year	Capital	Current	Secur. Sold	Earned	Total
1918.....	$9,997,285	$3,569,630	$7,071,850	$10,990,429	$31,629,1[illegible]
1917.....	9,997,285	3,074,677	7,071,850	13,874,828	34,018,6[illegible]
1916.....	9,997,285	2,300,219	7,071,850	12,939,511	32,308,8[illegible]
1915.....	9,997,285	1,576,544	7,071,850	5,201,536	23,847,2[illegible]
1914.....	9,997,285	1,756,982	7,071,850	2,620,143	21,446,2[illegible]

Comparative Income Account: Nevada Cons. Copper Co.:

Year	Operating Revenue	Operating Expenses	Net Op't'g Profit	Total Income	Total Deduct's	Balance* Dec. 31
1919.....	.....	.....	$8,345	$1,225,357	$2,999,185	$1,773,8[illegible]
1918.....	$16,787,657	$14,437,281	2,350,376	3,402,071	6,648,235	9,934,36[illegible]
1917.....	20,279,723	11,635,375	8,644,347	9,937,599	9,110,716	13,180,52[illegible]
1916.....	24,366,292	9,996,023	14,370,269	15,435,359	7,931,272	12,353,64[illegible]
1915.....	11,685,276	6,544,593	5,140,683	5,905,602	3,346,672	4,849,55[illegible]
1914.....	7,052,499	6,335,522	716,977	1,763,021	2,542,037	2,290,62[illegible]

* Includes balance from previous year. ** Deficit.

Dividends: Begun October, 1909, rate 37½c. per share quarterly; pa[illegible] $1.50 in 1910 and 1911; $2 in 1912; $1.50 in 1913; $1.12½ in 1914; $1.50 in 191[illegible] $6.75 in 1916; $4.15 in 1917; $3.25 in 1918; $1.50 in 1919 to December 31; a gra[illegible] total of $43,019,634. Last distribution, 25 cents on March 31, 1920.

Company absorbed the Cumberland-Ely Copper Co., paying $7,554,184 [illegible] therefor, August 30, 1910. Shareholders of the Cumberland-Ely were given [illegible] opportunity of exchanging stock on the basis of 3¼ shares for 1 share Nev[illegible] Consolidated. The Nevada Consolidated is controlled by the Utah Copper C[illegible] through ownership of 1,000,500 shares. The Nevada Cons. Copper Co. con[illegible] through stock ownership the Nevada Northern Railway Co.; also owns, thro[illegible]

NEVADA CONSOLIDATED COPPER CO.
Our Statistical Department will furnish complete information on application.
HAYDEN, STONE & CO.
Memb[illegible]ork, Boston and Philadelphia Stock Exchanges
25 Broad [illegible]V YORK 87 Milk Street, BOSTON

hase and absorption, the physical assets of the Steptoe Valley S. & M. Co., h was dissolved October, 1914.

Property: 106 claims patented, 27 unpatented. Distributed as follows: er Flat Group—33 patented claims, covering about 355 acres; 23 unpatented, Group—57 patented, 705 acres; and 4 unpatented. Veteran Group—14 ited; and 2 outlying patents; also 40 acres for water supply and railroad g. and 182 acres for dumping overburden.

Geology: The geologic features of the property are somewhat similar ose of Morenci, Arizona, and Bingham, Utah. An area of Paleozoic lime- s and shales is intruded by a great mass of monzonite porphyry, tilting breaking the sedimentaries and forcing its way into them in dykes and Alteration of both sedimentaries and monzonite is extensive, and inclu- of great masses of country rock in the intrusive are common.

The main orebodies are found in monzonite porphyry; all of the porphyry however is not ore bearing. Small bodies of high-grade copper ore are ntered in the sedimentaries near the contact, and occasional occurrences lver-lead ore are met at some distance from it. These latter are of small rtance. In the porphyry, commercial ore occurs at depths varying from 700' below the surface, and up to 450' thick. Copper occurs as chalcocite, ocite coating pyrite, and some chalcopyrite, in seams and disseminated gh the mass of porphyry. As the copper-content fades out gradually in , the bottom limits of pay ore are determined largely by commercial factors. capping of leached porphyry, is for the most part barren, though there are ional occurrences of copper carbonates, silicates, oxides, etc., in it. Suffi- carbonate ore was found in the capping of the Copper Flat orebody to y the smelter with flux. A considerable part of the property is covered rhyolite, the remains of an extensive lava flow occurring long after the onite intrusions. Todate, no orebodies have been found in the rhyolite. he end of 1918, a total of 27,280,088 yards of capping had been removed, g 39,704,385 yards in place.

Development: has so far proved the existence of three main orebodies, ly: the Copper Flat, Ruth, and Veteran, and several of lesser importance— imberly, Ingersoll, Wedge, and Jupiter.

The Copper Flat orebody, which is the largest and most important, is mined am-shovels, and was disclosed in three places known as the Eureka, Liberty, Hecla pits. These three pits have been consolidated into one. The big pit oughly the shape of a dumbbell, with the former Eureka and Liberty pits east and west end respectively, and the Hecla in the middle. Its longest sion E.-W. is 4,100' and N.-S. 2,500'. It covers an area of 124 acres and its deepest point 250' below the surrounding country. Entrance for trains l in the northerly part of the Eureka and Liberty ends. These entrances ade from an assembly yard, where ore trains are made up for the Nevada ern R. R., which handles them from this point to the smelter, 26 miles t.

n mining, benches are maintained at about 50' intervals. To loosen up the ial ahead of the shovels, 6" holes, placed at proper intervals in the benches, n down by churn-drills. Nine drills of the No. 5 Keystone type are kept s work; 1½ in ore, 3½ in waste, and 4 as extras are kept in the pit to ize the amount of moving. Holes are spaced about 35' apart, 10 or 12' back the edge of the bank and average 50 to 55' in depth. They are sprung or ered by light charges before they receive the blasting charge.

After blasting, the material, ore or waste as the case may be, is loaded into ad cars by steam-shovels. In this work nine 95-ton Bucyrus shovels, having rhoef 4-cu. yd. dippers, are used. A good general average is 1,200 cu. yd. eam shovel shift of 10 hours.

Transportation of ore from the pits to the assembly yard, and of waste to anous dumps, e of by 15 saddle-back locomotives, 2 being of s, 2 of 81 to 7 of 45 tons, and one of 35 tons weight. In ne 56-to switch engine is employed in general service. for the fro om the mines to the mill are furnished by

the Nevada Northern R. R. and are of 55 ton, all steel Ingolsby type. There are about 200 of these in service. Overburden is handled with 70 wood and steel dump cars of 18 and 20 yard capacity.

Normally, over 10,000 tons of ore and 14,000 yards of overburden are handled daily.

Other pit equipment consists of one 30-ton locomotive type crane, one employes' car used to transport men to and from work; a repair car equipped with tools, compressor, and boiler; ten coaling cars of special design for the shovels; 4 flat cars for transporting drills, casing, etc.; and two powder cars, one a refrigerator used to preserve explosives at the right tempertature. Adequate machine, blacksmith, carpenter, engine and car shops with full equipment are maintained.

The Ruth orebody lies about 1¼ miles east of the Copper Flat deposit. Here the capping is too deep, from 110 to 540′ thick to mine it economically by steam-shovels, hence it is mined by underground methods.

The Ruth mine is served by two shafts, the Star Pointer—the main working shaft, a 4-compartment vertical, 25′-6″x5′-6″ inside dimensions; and the Ingersoll, an incline, 5′x8′-6″ inside dimensions. The two shafts are about 2,600′ apart, 600′ and 550′ deep, respectively, and connected on the 500 and 600 levels. To date about 14½ miles of underground workings have been driven, also several thousand feet of churn-drilling.

Ore is mined by the branch-raise caving system, which consists in driving raise series at 25′ intervals at right angles to motor haulage-ways. From the branch-raises, finger-raises are put up to open the orebody at 12½′ intervals both parallel and normal to the direction of the haulage ways. The orebody is undercut at the tops of the finger-raises, caved, and ore drawn off through the fingers and branches to the haulage ways. This method was described by W. S. Larsh in a paper read before the A. I. M. E. of New York, in February 1918. The advantage of all caving systems is primarily one of cost, but also always of complete extraction of orebodies. In the Ruth mine, certain blocks on the 300 to the 600′ level, inclusive, were expected to produce 1,741,374 tons of 2.15% ore, but actually yielded 1,776,183 tons, averaging 2%.

Material is moved underground by twelve 10-ton electric mine locomotives of 60 h. p. and 90 h. p., of 250 volt d. c. trolley type. Fifty 88 cu. ft. saddle-back steel cars, holding about 4 tons each are used.

In the Star Pointer shaft, ore is hoisted by a 400 h. p. 550 volt a. c. Nordberg hoist in 6 ton self-dumping skips running in balance. The shaft is also equipped with a 200 h. p. geared hoist handling a double deck cage capable of holding 40 men. From the tipple ore is distributed in a 3,000 ton bin by means of chutes and loaded from the bin into Nevada Northern R. R. 55-ton cars, which pass beneath it. A heavy duty hoist and 3,200 cu. ft. compressor were added in 1918. The Ruth mine produced 591,545 tons of 2.195% ore in 1916; 991,164 tons of 2.013% in 1917; 1,316,144 tons of 1.87% in 1918. The mine can produce a daily output of 5,000 tons, and the new hoist can handle 6,000 tons from a depth of 600′.

The Ruth is further equipped with 2 Ingersoll-Rand, P. R. E.-2, 3,000 cu. ft. air compressors direct connected to 550 h. p. synchronous motors, 3 phase, 25 cycle, 600 volts. About 80 air drills are in use. Direct current at 250 volts for the underground trolley system is furnished by three 150 h. p. Allis-Chalmers motor-generator sets of the Bullock type. A saw-mill, equipped with saws, framing machinery, and handling about a half-million foot, board measure, of timber per month; a blacksmith shop and a small machine-shop are maintained.

Nearly all of the waste, and some of the material for mining is hoisted through the Ingersoll shaft in a 2-ton capacity skip. Equipment here consists of a 112 h. p., 550 volt a. c. Wellman-Seaver-Morgan electric hoist.

The Kimberly orebody has been developed only by churn-drills. No underground workings and no mining. Drilling has proved the existence of 644,000 tons of 2.02% ore.

The Wedge and [illegible] lies are small, the former containing 4[illegible] tons of 3.12% materi[illegible] developed by underground workings. [illegible] mining is being done [illegible] present.

he **Veteran** mine, taken over from the Cumberland-Ely, west of and ing the Consolidated Coppermines Giroux holdings, is not producing, ions at this property having been discontinued indefinitely. Mine contained tons of ore, averaging 3.89% copper.

re reserves: extensive churn-drill borings on the Copper Flat, Liberty, n, Ruth and other properties, have proven a tonnage estimated January , as 67,993,117 tons of ore, averaging 1.59% copper and representing an pply of about 17 years. A revision of reserves was made in 1916, the timate being an increase of over 17,000,000 tons. Of this, 22% is in the mine, remainder at Copper Flat.

omparative Table of Recoverable Developed Ore:

nded	Tons	Copper, %	Year ended	Tons	Copper, %
30, 1907.....	14,432,962	1.97	Dec. 31, 1913.....	39,108,590	1.65
30, 1908.....	20,000,000	1.94	Dec. 31, 1914.....	41,020,296	1.68
30, 1909.....	29,000,000	1.94	Dec. 31, 1915.....	50,525,289	1.65
30, 1910.....	40,360,823	1.70	Dec. 31, 1916.....	67,993,117	1.59
31, 1911.....	40,853,371	1.66	Dec. 30, 1917.....	70,025,322	1.58
31, 1912.....	38,853,551	1.67	Dec. 30, 1918.....	68,549,644	1.57

hurn-drill prospecting from the beginning of operations to end of 1918 564 holes averaging 362½'. In the Ruth the cost of drilling was $3.52 ot, an increase of $1.14.

lectric power is used throughout, current being brought from the Steptoe r, at 40,000 volts, and stepped down to 600 volts by seven 200-k. w. trans- rs in a concrete station at the Ruth mine.

re is shipped to the Steptoe smelter, at McGill, separately described below, 27-mile standard-gauge railway, equipment including 400 self-dumping rs. This line is a part of the Nevada Northern railway, having a standard- line of 165 miles in length, running from the mines and Ely to a junction he Southern Pacific railway at Cobre station. The Nevada Northern Rail- Co., controlled through stock ownership by the Nevada Consolidated, is lized at $2,000,000, with a $1,000,000 bond issue, at 5%, the line doing a l business in addition to handling the traffic of the Nevada Consolidated r Co. In 1918, it carried 4,661,943 tons of ore from all mines in the district, 5 tons of commercial freight, and 380,937 passengers.

lining costs:

	Moving overburden, cents per yard	Steam-shovel mining, cents per ton	Ruth mine, per ton
.....	41.20	41.69	$1.2855
.....	34.43	31.32	1.0251
.....	30.09	23.70	1.2021
.....	28.85	15.24	.....

eneral taxes represent a considerable proportion of mining charges, being to 46% in 1916.

eduction works: The concentrating mill and smelter owned by the ny are at McGill, White Pine county, Nev. Lands cover 8 square miles, water rights. The property is on the eastern side of Steptoe valley, on the at the foot of the Schell Creek range, 14 miles N. E. of Ely and 22 miles the mines, on the line of the Nevada Northern railway. The smelter site comprises 320 acres, 1 mile long and ½ mile wide, on a hillside with 10% permitting the works to be terraced, and handling material by gravity hout. Lands carry water-rights to Duck creek, and to the McGill ranch, ted as capable, jointly, of furnishing water for a 15,000-ton plant.

he mill is one of the largest and best in existence. Late in 1917 its ty was increased [illegible] 14,000 tons daily. All main buildings steel frame and [illegible]n the unit system. It is nearly a mile ite smelter, and [illegible] hard silicified, altered porphyry ore,

containing tiny specks of chalcocite, pyrite, and some chalcopyrite ... 1.5% copper. In 1918 the ratio of concentration was 8.22 to 1, ... concentrate assaying 8.33% copper and recovery 67.28%.

The coarse ore bins are of timber, 15' deep, 20' wide and 288' lo... capacity of 5,900 tons. They are built about the center line of the mil... behind the center line of the fine ore-bins. The ore is dumped on g... ... iron with openings of 13.5".

From the coarse ore-bins the ore goes through chutes at the b... ... 60" steel apron-feeders driven at a speed of 2.2' per min... ... capacity of each feeder is 75 tons per hour. The two feeders in... ... the center line of the plant can be run at 9' per minute, deli... ... per hour. The feeders, with the exception of these two, deliver t... ... pan conveyors, each 118' long, traveling at a speed of 28' per mi... ... a total capacity for the two of 1,700 tons per hour. The high-spe... ... pan conveyors deliver to two 60" traveling grizzlies of 3.5" ope... ... a speed of 40' per minute. The oversize from the grizzlies is de... ... McCully crushers. The discharge from the McCully crushe... ... from the grizzlies is elevated by two 42" belt conveyors to tw... ... of ¾" wire, 1"x1½ mesh, inclined at an angle of 36 to 48°. ... these screens is re-ground by two Garfield rolls, 72"x20", set ... ... Four ball-mills were added to the re-grinding plant dur... Discharge from the rolls and undersize from the screens is elevate... ... conveyors which distribute to the fine ore-bins by mean... ... The new coarse crushing plant was put into commission a...

In order to avoid sliming, the flow-sheet is arranged for step... From the fine bins the ore passes by belt feeders over automatic scale... ... 36"x15" rolls set for an opening of ¾" and run at 85 r. p. m. wi... ... introduced beneath washing to a pair of bucket elevators. The bu... these elevators are 8"x8"x18" and the elevators deliver to two trom... ... by 8' long, having one section of 3/16" and one of 5/16" per... The oversize goes to another set of rolls 36"x14" set for a 5/16" ope... ... at 116 r. p. m. The undersize of 5/16" goes to a set of rolls ... ... a ¾" opening and run at 122 r. p. m. The undersize of 3/16" ... 2 m. m. trommels 36" diam. by 8' long. The oversize of the 2 m. m... ... to a fourth set of rolls 36"x15" with an opening of 1/16" and ... ... p. m. All of the above rolls deliver to the same elevators so th... ... finally pass 2 m. m.

The undersize of 2 m. m. passes to 10 double deck Wilfleys mak... ... concentrates and middlings to five Wilfleys. The five Wilfleys m... ... concentrates and send tailings to the regrinding system. The tailings ... double deck tables pass to four Steptoe classifiers, having four spi... ... The overflow is sent to a 50' Dorr thickener, delivering u... ... the slime department and overflow to the reclaimed water system. ... product goes to the regrinding system after being dewatered. Th... ... to four Wilfleys which make final concentrates and send ... ... regrinding system. The third spigot delivers to eight Wilfleys, ... concentrates, middlings to the regrinding system and tails to wa... ... dewatered in Steptoe tanks. The fourth spigot delivers to Callo... ... to four Wilfleys and overflow to slime department ... ... produce final concentrates and send tailings to Callow t... ... to Johnson vanners.

Each unit is equipped with two Hardinge mills 8'x30" direct driven ... ... gears. The feed to these is delivered at 65 to 75% solid b... ... wheel. The product is delivered by two bucket elevators ... ... making four spigot products and an overflow. The ... ... delivering underflow to the slime department and ... ... The first spigot delivers to two Wilfleys, mak... ... tailings to the regrinding system. The second ... ... Wilfleys making tailings to waste and sending middling

description of this plant by R. E. H. Pomeroy, was published in B (Feb., 1920) of the A. I. M. & M. E.

The reverberatory furnaces are charged with calcines mixed with lin dumped through slide-gates, from hoppers, suspended from the charg Each furnace has 2 tap-holes on one side, from one of which matte is off into matte cars of about 30-ton capacity. These cars are tilted and c poured into the converters by an electrically-driven mechanism mounted car frame. Slag is skimmed twice every shift, the skimmings going to iron box leading to a lined launder, in which a jet of water granulates t and washes it to the dump. Slags carry 50 to 45% silica, 6 to 12% calciun 25 to 35% iron oxide and 8 to 14% alumina. The reverberatory buildin dust chamber of 1,000′ square section, 155′ long, leading to a 300′ brick c 15′ in diameter at top. The total charge reduced in these furnaces in 19 654,650, a decrease of 86,774 tons.

The blast-furnace building, between the reverberatory and converter ments, has a single blast-furnace, 42x240″ at the tuyeres, and 84x240″ shaft, with a capacity of 300 to 500 tons of charge per day, the furnac so planned that it can be enlarged if desired to 80′ in length. The furnac above the ground level, with a height of 16′ from the tuyeres to the c floor, operating with a 10′ column charge and 40-oz. blast pressure. Th 4 steel water jackets on each side, and 1 at each end, and each side has 2 inch tuyeres, 10″ apart, receiving blast from a 30″ bustle pipe. The jackets each have separate blast boxes and independent air and water c tions, so that any jacket may be removed by breaking 3 simple conn Charging is done by cars dumped pneumatically, matte is tapped into la cars and slags granulated and sluiced, as in the reverberatory building. discharge through a 108″ downtake to a 12x15x250′ brick flue, terminating main roaster flue. The blast-furnace is not in operation.

The converter building is about 600′ from the reverberatory furnac receives molten matte from cars, behind and above the converters, the c being poured into a launder, while the shells remain in position for blast building has two 5-motor Shaw electric cranes, each with a hoist capa 60 tons besides 2 auxiliaries of 25 tons each. There are 2 of the old stall 96x150″ shells of the barrel type built for acid linings, but now used wit nesite brick linings. There are also 2 Peirce-Smith barrel-type converter originally 25′ 10″ long by 10′ diameter shell. One of these was lengthe the smelter to 33′ 11″. They originally had 30 tuyeres each but these hav increased to 35 and 46, respectively. The blast pressure used is nominally gauge at an altitude of 6,327′. The Peirce-Smith converters produce ab and 60 tons of copper per day on 40% matte.

Blister copper is poured into ladles and transferred into a brick-linec cylindrical receiver. This is mounted on rollers and rotated on its own a an electrical motor, so that the molten blister copper is poured through a pouring spoon into moulds on a horizontal straight-line chain and sp conveyor. These moulds discharge on a submerged apron conveyor which traveling in the water horizontally for a few feet turns on an incline and the copper ingots out of the water and lands them on the loading pla They contain 99.5% copper, weigh about 400 lbs., and after trimming and weighed on accurate scales, they are shipped in box cars.

The converter's slag is taken back to the reverberatory furnaces in side-tilting pots operated by compressed air. Flux for the converters co of concentrator slimes and silicious carbonate ore from the Copper Fla mixed and dried in 2 oil-fired rotary driers at the converter building handled and charged by boats. The hoods from the converters lead to a br flue running along over the charge floor for the extent of the converter bu covered by stalls. It is then connected by a circular flue 10′ diam. to a dust chamber which in turn connects to a brick stack 100′ from the groun diameter at top.

The power plant has 4 batteries of two 400-h. p. Babcock & Wilcox w tube boilers each and one battery of two 600-h. p. Stirling water-tube bo

batteries have Foster and 3 others have Babcock & Wilcox internal super-
rs, and there is a separate Foster super-heater for the steam supplied by
everberatory waste-heat boiler plant of ten 400-h. p. boilers. Steam is
ated at 160-lb. pressure, and can be super-heated 100° F. All boilers are
by Green chain-grate stokers, coal being fed from overhead bins by chutes
to the stoker hoppers. Each double battery of boilers has a 9x40′ steel
with induced draught, furnished by 5 Sturtevant fans, each connected
a 30-h. p. Sturtevant slide-valve engine, running at 150 to 175 r. p. m.
Each battery of boilers is equipped with fuel economizers of about 3,360
t. heating surface, set between the boilers and the induced draught fan;
are dampered so that they can be cut out for cleaning while the boilers are
rvice. A 3,000-gal. capacity Kennicott water purifier supplies make-up
for all boilers.

The engine-room, main floor, contains the generating engines, blowers, 3
ers and a switchboard, and the basement contains condensers, air pumps
oil filters. The electrical equipment consists of two 1,100-h. p. 22x48x48″
-Chalmers Corliss cross-compound engines, with 800 k. w. Bullock a. c.
rators mounted on the shafts; two 2,000-h. p. 31x66x48″ Nordberg Corliss
-compound engines with 1,500-k. w. Bullock a. c. generator mounted on the
s, and one 2,500-k. w. steam-driven Westinghouse turbo generator. Cur-
is generated at 600 volts and carried to a concrete transformer station,
pped with seven 200-k. w. Bullock water-cooled transformers, stepping
nt up to 40,000 volts, for transmission to the mines; four 750-k. w. water-
d transformers, and four 1,000-k. w. water-cooled transformers, stepping
nt up to 13,200 volts for transmission to the mills; 13,000 and 40,000-volt
e coils and lightning arresters.

A 3,000-k. w. turbo-generator was added during 1917, to take care of increased
r consumption at the mill, and one of 600-k. w. was to be ordered in 1919.

The smelter blowing plant, in the engine-house, includes a 350-h. p. 14x28x36″
m-compound engine direct-connected to a No. 10 Connersville blower with
city of 300 cu. ft. of air per revolution, making 120 r. p. m. This is for the
-furnace. For the converters air is supplied at 10-lb. gauge pressure by one
-Chalmers blowing engine, 16″ and 24″ diam. steam, 34″ and 34″ diam. air
8″ stroke of 6,000 cu. ft. capacity; one Nordberg 25″ and 54″ diam. steam
nd 52″ diam. air by 48″ stroke of 12,000 cu. ft. capacity, and one Nordberg
nd 56″ diam. steam, 54″ and 54″ diam. air by 48″ stroke of 18,000 cu. ft.
city. These are all of the cross-compound steam, tandem, air and steam

A 20,000 cu. ft. steam-driven turbo-blower was added in 1916 to supple-
the blowing engine in supplying air for converters, etc.

A cross-compound air-compressor with steam cylinders 11″ and 21″ diam.
air 21″ and 12″ diam. and 18″ stroke of 1,080 cu. ft. displacement, compresses
o 100-lb. This was originally for tamping converter linings, but is now
for pneumatic tools of various kinds at the shops and the mill, and a
nd one of similar capacity was ordered during 1917, but delayed by abnormal
itions. A 2,000 cu. ft. 2-stage, steam-driven compressor was added in 1916.

In connection with the works are a number of thoroughly appointed shops,
ding a boiler, machine and carpenter shop, foundry, warehouse and round-
e.

The Steptoe works were started in April and the finished copper shipped in
ust, 1908. Nearly 1,500 men are normally employed at the plant.

Production:

	Tons Treated	Cu. %	% Rec.	Ratio Conc.	% Cu. in Cncts.	Net Prod. Lb. Cu.	Cost per Lb. Cts.	Sell. Price Cts.
.....	2,185,425	1.58	.....	.....	....	43,971,892	16.19	18.67
.....	3,999,526	1.51	67.28	8.22:1	8.33	81,037,777	16.60	21.049
.....	4,064,095	1.46	73.08	7.-8:1	7.67	86,884,271	11.68	23.750
.....	3,922,634	1.63	73.87	7.45:1	8.98	90,735,287	8.13	25.83
.....	3,081,520	1.54	70.18	7.18:1	7.77	62,726,651	8.23	17.65
.....	2,640,294	1.48	68.48	6.05:1	6.14	49,244,056	9.82	18.39

Gold and silver extracted during 1918 was sold for $661,429, compared with
750 in 1917, and $801,818 in 1916.

The property has been splendidly developed, and is being managed ability and success. Operations during 1919 were reduced to 50% of cap and were stopped for a month through a strike.

NEVADA UNITED MINES CO. NEV

Address: 441 Equitable Bldg., Denver, Colo.

Officers: W. J. Chamberlain, pres.; H. F. Crocker, v. p.; R. J. P sec.; E. S. Kassler, treas, with H. B. Northrop, F. N. Bancroft, W. G. H A. G. Bowen and A. G. Burton, directors.

Inc. February 6, 1906, in Arizona. **Cap.**, $3,500,000; $1 par; 2. issued.

Property: 50 claims, 38 patented, about 600 acres, 18 miles from White Pine county, said to show "chamber" deposits of lead ore in lime Ore contains lead, silver, and iron.

Development: by tunnels totaling 2,400′ to 350′ depth. Mining caving system, and output was about 2,800 tons monthly in 1917.

Property is now worked by Nevada United Mines Leasing Co.

NEVADA UNITED MINES LEASING CO. NEV

Operating under lease the property of the Nevada United Mines Co. at Ely, White Pine Co.

NEW ELY CENTRAL COPPER CO. NEV

At a special meeting of the stockholders held December 20, 1913, it voted to deed to the Consolidated Coppermines Co. the entire property o New Ely Co., and in pursuance of this vote a deed was executed and deli the Cons. Coppermines Co. thereupon taking possession of all the proper the former company. The stock and bondholders deposited for exch 475,464 shares of the 500,000 outstanding shares and $167,550 of the $17 outstanding bonds up to Dec. 31, 1915. The new Ely Central Copper Co. be dissolved when all stock and bonds have been exchanged. Fully desc in Vol. XIII.

PRINCESS COPPER CO. NEVA

Idle. **Address:** C. W. Freed, pres., 1007 First Ave., Salt Lake Utah.

Mine office: Ely, White Pine county, Nev. F. J. Austin, sec.; H Clark, treas.

Inc. 1911. **Cap.**, $1,000,000; shares $1 par.

Property: 30 claims, about 550 acres, acquired of the Ely Resurrec Copper Co., in the Robinson district, lying a little north and east of Ely.

Mine has 2 short tunnels and a 140′ shaft, said to show 18′ of ore assa up to 5% copper, with gold and silver values, and some high-grade ore assa up to 46% lead and 110 oz. silver per ton, with gold values. Management p resumption of development work.

SMOKEY DEVELOPMENT CO. NEVA

Consolidated 1919, with Boston Ely Mng. Co. and Ely Northern Copper as Boston Ely Cons. Mng. Co., which see.

EUREKA DISTRICT.

ALKALI MINES CO. NEVA

Mine address: Eureka, Eureka county, Nev. W. E. Sanders, supt.

Property: the Windfall mine, developed by a 500′ shaft. **Ore:** conta gold, silver and lead.

Equipment: includes a crushing plant and 150-ton cyanide plant returns available since 1916.

BULLWACKER CONSOLIDATED MINES CO. NEVA

Address: W. A. Barnes, Eureka, Nev.

Officers: W. A. Barnes, pres.-treas.; B. F. Shepherd, Jr., v. p.; J. Cottle, sec., with E. S. McCurdy and A. Toriggino, directors.

Inc. 1919, in Nevada. **Cap.**, $600,000; $1 par.

Property: the Bullwacker and Silver West claims, 80 acres, on A hill adjoining the Eureka-Holly mine on the west. The claims were l in 1869, and have produced $500,000 from above the 300′ level. The 400′ shaft is to be repaired and sunk another 100′.

)ESUS-EUREKA MINING CO. **NEVADA**
Property sold to Eureka-Croesus Mining Co. q. v.

)ESUS EXTENSION MINING CO. **NEVADA**
Address: R. M. Bradley, Austin, Nev.
Company being organized in December, 1919.
Property: 4 claims on Prospect mountain, W. of the Eureka-Croesus.

:EKA-CLIMAX MINING CO. **NEVADA**
Address: Box 8021, Reno, Nev.
Officers: Tasker L. Oddie, pres.; M. D. Fairchild, v. p.; Ed. Malley, Al Revert, directors. J. L. Jose, sec.-treas.
Inc. 1919, in Nevada. **Cap.,** $150,000; 15c. par.
Property: 3 claims, 70 acres, which have produced $100,000 worth of rich on Prospect Mtn., said to be the high-grade section of the Eureka dis- Eureka county. The Deadbroke mine opened by a long tunnel from some rich ore was produced in the 70's, has been reopened.
n the "Nevada Mining Press" of November 25, 1919, it was advertised "while the Eureka-Croesus Mining Co. as such owns no interest in the ka-Climax Mining Co., those who own the Eureka-Climax, and all of its g operations will be conducted by the technical staff of the Eureka-Croesus. ecretary and treasurer of the Eureka-Climax Mining Co. is assistant secre- nd treasurer of the Eureka-Croesus, under whose supervision the accounts ooks of the company will be kept, in the office of the Eureka-Croesus g Co. at Eureka.
ugene Davis of the Eureka-Croesus Mining Co., has taken a large interest Eureka-Climax and will give it the same energy and push that has made le the rapid development of the Eureka-Croesus properties."

EKA-CROESUS MINING CO. **NEVADA**
)ffices: 20 Broad St., New York City, and Eureka, Nev.
)fficers: Frank L. Torress, pres.; Chas. N. Sigison, v. p.; with H. Carle- lack, Henry O. Evans and Walter W. Slack, directors. John D. Peckner, eas.; G. O. Bradley, cons. metallurgist; James Huebner, supt.
nc. in Delaware. **Cap.,** $1,500,000; shares $1 par; fully paid. U. S. oration Co., registrar and transfer agents. Stock listed on New York

roperty: 17 patented and 5 unpatented claims, at Eureka, Eureka v. includes the Ruby-Dunderberg, Connelly, and a number of old mines rly owned by various companies.
eology: the orebodies are replacements of fractured Paleozoic lime- , and include stocks, lodes, and bedding plane deposits, largely as irregular ular masses, from a few feet up to 100′ in thickness, and twice as much in ntal extent. In the workings above the 400′ level practically all the ore ial is oxidized, and it was left in the mine because there was no known d of treating it at a profit. The galena ores found in the deeper levels are different, and if a substantial tonnage of such ore is opened up by further as seems quite possible, the company has a definite source of income.
evelopment: the Catlin or main working shaft, is but 425′ deep, with ive workings on the 200 and 400′ levels and a winze 300′ deep, sunk below 0′ level.
umerous oreshoots were cut at various geologic horizons on these 2 , and the bottom of the winze is reported to be in $90 ore. More or less rade ore is being found in new work, a small shoot cut on 200′ level in aber, 1919, assaying 362 oz. silver per ton with 60% lead and $6 gold.
th levels connect with the workings of the old Dunderberg mine.
e present workings are said to total 2 miles, with 8 miles more of old that can be reopened. New work for last half of 1919, totals 2,500.′
eserves: estimated by R. W. Foster at 2,368,635 tons of ore of an value of $31 per ton, including 100,000 tons on dumps and 40,000 tons of of a gross value of $73,483,800, or $59,271,990 net. This estimate is not

regarded as a safe one, because the estimated cost of $6 per ton for reco the values in the oxidized material is as yet purely a matter of opinion.

Equipment: includes an electric power plant, 150-h. p. engine, ve ing blowers, hoist, 680 cu. ft. compressor, surface tram, orebins, and 1,0 mill to be erected in units of 250 tons each. Transportation to the main l Southern Pacific is over the Eureka to Palisade line (the Eureka & Ne controlled by Eugene Davis, who, while not on the Eureka-Croesus direct is in control of the company and dominates its policy.

Costs at present are given at about $17 per ton, so that ore assaying $20 per ton can not be utilized. As ore is oxidized, no milling method than sulphidization and flotation has so far been found applicable, bu process is not yet beyond the experimental stage. The management state with the formation of a synthetic sulphide an excellent extraction can be by oil flotation, so that the proposition is "a simple manufacturing ente for years to come." A smelter will probably be erected as a power-plant c erected near Eureka to utilize the oil shales so abundant nearby.

EUREKA-HOLLY MINING CO. NEV

Address: W. A. Barnes, v. p.-mgr., 576 Mills Bldg., San Francisco. L. W. Hope, supt., Eureka, Nev.

Cap., $500,000; issued $245,000.

Property: 11 claims, 296 acres, on Adams hill, Eureka, contains dep of lead-silver ore in limestone. There are also 320 acres of ranch and w rights. Property was the old Idaho mine, acquired in 1917, and reputed to yielded $150,000 from surface workings. Shipped $50,000 worth of high-g silver-lead ore in 1918, and management reported 60,000 tons of milling blocked out in the mine, March, 1919. About 20 men employed.

Development: by 500′ shaft, being deepened to 700′. Two orebod the east and west—are being opened. The former is the largest, and has yi $68,000 so far. Dimensions of the shoots are said to be 5 by 15′ on 100′; 500′ on 200′; 18 by 70′ on 300′; and 30 by 150′ on 400′ level. Reserves in veins are estimated to be 60,000 tons of $17 ore.

Equipment: includes two 75-h. p. semi-Diesel engines, hoists, (su and underground), 8-drill compressor, and plans for a 100-ton mill.

Is a promising property sponsored by reputable people.

EUREKA-NEVADA MINING CO. NEV

Office: 625 Dooly Block, Salt Lake City, Utah. **Mine office:** Eur Nevada.

Officers and directors: W. J. Robinson, pres.-mgr.; L. Holbrook W. C. Albertson, sec.-treas.; A. G. Burritt, cons. engr. D. States, supt.

Inc. July 17, 1917. **Cap.,** $10,000; shares 1c. par; 800,000 issued. S assessable when treasury stock is exhausted. Annual meeting, second M in July.

Property: Lucidtuffa group of 3 patented claims, 60 acres, on Pro mountain, at Eureka, Eureka county. Ore occurs in shoots in fissure and as a chamber deposit in limestone. Shipping ore said to average $ ton in gold, silver, and lead.

Development: by 1,200′ tunnel to depth of 450′. A small force ployed by company and 5 lessees reported extracting shipping ore in 1919.

HOLLY MINING CO. NEV

See Eureka-Holly Mng. Co.

HOPE CONS. MINING CO. NEV

Address: Eureka, Nev. J. H. Rogers, pres.-mgr.

Inc. 1918. **Cap.,** $500,000; shares $1 par.

Property: on Ruby hill, Eureka, Eureka county, developed by Prospecting in 1919.

RICHMOND-EUREKA MINING CO. NEV

Controlled by U. S. S. R. & M. Co.; property under lease and bond to ing & Development Corporation, q. v.

Address: P. O. Box 385, Boston, Mass.

Officers: C. G. Rice, v. p.; F. W. Batchelder, sec.-treas.; with Albert s, A. J. Seligman, C. A. Wimpfheimer, C. A. Hight, N. W. Rice, F. Y. rtson, and Sidney J. Jennings, directors. A. P. Mayberry, supt.
Inc. September 28, 1905, in Maine. **Cap.**, $3,600,000; $10 par. Annual ing, fourth Wednesday in September.
Property: several patented and unpatented claims (about 200 acres) at ka, Nevada. Geology of the district described in U. S. Geological Survey, . 7, 1884. Mine was first worked in 1869, and produced up to 200 tons up to 1910, when the Eureka-Palisade railway was washed away. When railway was repaired, the increased rate demanded made the extraction of available low-grade ore unprofitable and regular mining operations have yet been resumed. Speiss from the dumps has been shipped to the U. S. lting, Refining & Mining Co.'s plants for experimental treatment.
Development: by shafts and extensive openings. Reserves have been nated as equal to 500 tons daily for 8 years. Mine has never been pros- ed below water-level, and there remains a large section of ground above level also unexplored. Whenever circumstances warrant, work can be med.
Equipment: 1,400-h. p. steam boiler plant, 1,500 cu. ft. compressor, hoist ,200′ capacity, steam pumps of 650 gal. capacity from 1,350′ depth, machine- , 500-ton orebin, etc.
The Mining & Development Corporation of Maine, controlled by E. O. er and H. P. Henderson of 60 Broadway, took a lease and bond on the erty in October, 1919, agreeing to spend $200,000, or $10 per share in lopment, etc.

BY HILL DEVELOPMENT CO. **NEVADA**
Address: E. O. Holter, or H. P. Henderson, Mining & Development p'n, 60 Broadway, New York City.
Inc. 1920, in Delaware.
Company operates the Richmond Eureka and Eureka Cons. mines un- lease and bond given the Mining & Development Co. The Ruby Hill also an option until 1922 on 254,000 shares of Mng. & Dev. Co. stock, giving 100,000 es of its own stock for the option and mine control.
Property: the two bonanza silver-lead mines which made the camp of ka famous in the early eighties and which produced silver bearing ore to the value of 34 million dollars before the demonetization of sil- in 1896.
The main or Locan shaft, 1,200′ deep is to be unwatered, and the deep nd beyond the Ruby Hill fault is to be explored. The chance of find- a displaced section of the orebodies or new orebodies is a legitimate ure based on geological inference, but flotation and other new methods oncentration, together with the restoration of the old price of silver enable company to work the low-grade ores known to exist in the old ings.

GOLDFIELD DISTRICT.

MS GOLDFIELD MINING CO. **NEVADA**
Property purchased, January, 1916, by the Reorganized Cracker Jack Mining which see. Stockholders of the Adams Co., were permitted to exchange stock for stock of the Reorganized Cracker Jack Co., remaining outstanding at time.

ANTA MINES CO. **NEVADA**
Reorganized 1918, and name changed to Reorganized Atlanta Mines Co., h see.

D. CONSOLIDATED MINING CO. **NEVADA**
Address: Goldfield, Nev. L. K. Koontz, pres.
Inc. May, 1908, in South Dakota. **Cap.**, $3,000,000; shares $1 par. ury, 1,000,000 shares. Listed on San Francisco Exchange. Shares varied 2 to 4 cts. in 1918, and 2 to 7 cts. in 1919. Organized as a merger of the ield C. O. D. and the Gold Bar Mining companies, taking over the C. O. D., en Eagle and Zoe from the C. O. D. Co.; the Gold Bar from the Gold

GOLDFIELD COMBINATION FRACTION MINING CO. NEV

Address: Reno, Nev.

Officers: Geo. Wingfield, pres.; W. E. Zobel, v. p.

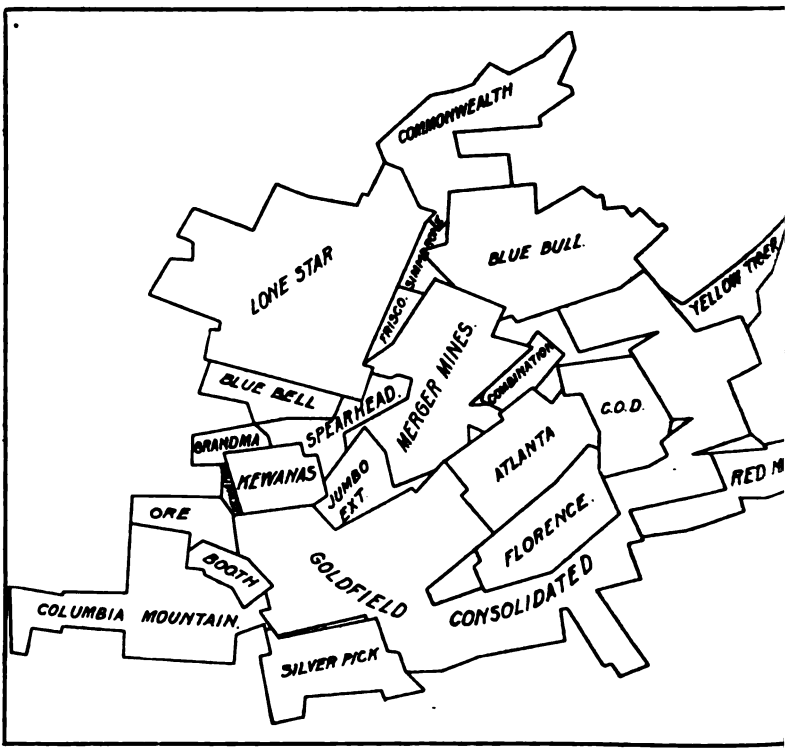
Inc. June 10, 1905, in South Dakota. **Cap.,** $1,000,000: shares $1 936,617 issued. Listed on N. Y. Curb and San Francisco Exchange.

Property: at Goldfield, Esmeralda county.

GOLDFIELD CONSOLIDATED EXPLORATION CO. NEV

Office: Crocker Bldg., San Francisco, Calif. E. A. Julian, gen. Is a subsidiary of Goldfield Cons. Mines Co., formed in 1916 to examin develop properties submitted for sale.

The balance sheet of the Goldfield Cons. for year ending December 31. shows $284,073 invested in the Exploration Co.



PROPERTY MAP OF GOLDFIELD, NEVADA.

Properties: a mine in Arizona and one in California both exte developed. During 1918, 277 properties were submitted and 7 examined. N options have been taken up and all work on the mines held was disco early in 1918 owing to labor conditions and high costs.

GOLDFIELD CONSOLIDATED MINES CO. NEV

Office: Reno National Bank Bldg., Reno, Nev.

Officers: Geo. Wingfield, pres.; J. D. Hubbard, v. p.; C. F. Burton treas.; E. A. Julian, gen. mgr., with J. H. Carstairs, L. A. Gibbons and Hoyt, directors. A. H. Lawry, cons. eng.

Inc. November 13, 1906, in Wyoming. **Cap.,** $50,000,000; shares issued, 3,559,148 shares. Stock listed on San Francisco and Salt Lake Ex and New York and Boston Curbs. John S. Cook & Co., Goldfield, Nev.

Company office, Reno, transfer agt. Annual meeting, third Monday in ch.

Company is a merger of Goldfield-Mohawk, Red Top, Jumbo, Laguna Gold- . Goldfield and Combination mining companies. In 1911, company acquired :gerone Fraction and the Bull Dog and Jumbo Fractions. Company owns re stock of the Goldfield Cons. Milling and Transportation Co. and the Gold- Cons. Expl'n. Co. (q. v.); a 25% stock interest in the C. O. D. Cons. Min- Co., and 87% stock interest in the Aurora Cons. Mines Co., Mineral county, .. and an interest in the Dolly Varden Mines Co., B. C. All of these com- es are described under their own titles.

Annual report for 1918 shows: Total earnings, $796,409; operating ex- es, $804,211; operating loss, $7,802. Assets include: Property, $28,396,844; s to subsidiaries, $904,865; cash, $136,062; undivided profits, $1,880,816.

At the end of 1919, company had, cash, $268,935; accounts, etc., receivable, .965; supplies, $106,197; securities, etc., $35,336; junking value of plants at lfield and Aurora, $230,000.

Dividends: 20c. in 1907; 90c in 1909; $2 in 1910; $2 in 1911; $1.60 in : 70c in 1913; 30c in 1914; 45c in 1915; 5c in 1919, on December 31, a total 9.176,788, or $8.20 per share.

Property: 26 patented lode claims, and 1 unpatented claim, 390 acres, oldfield, Nev., with 6 working shafts, Combination, Mohawk, Red Top, Jum- lermont, Jumbo No. 2 and Laguna. Output is from several mines working re veins whose stoping width varies from a few feet to as much as 20 or 30'. Veins show orebodies with variations in which the commercial limit t dependent upon structural planes, the shoots swelling out and pitching with slight relation to the vein walls.

Geology: development has shown that (1) most of the orebodies have appeared as oxidized masses under silicified outcrops, invariably turning to iide ore; (2) silicification always accompanies mineralization, but many zones reccia are barren; (3) whenever ore is found in latite, it has always been exploited in the overlying dacite, and is a continuation downward of the ore-shoot; there is marked falling-off in value as the latite is reached, and ically all ores thus far mined in the latite are sulphides; (4) the bonanzas been confined to the dacite, with the exception of the Engineers' lease and v isolated shoots in the similar Milltown andesite; and (5) no pockets have t been proved under the Siebert lake beds, all known orebodies being in- ed by surface exposure.

Development: during 1918, 4,848' of work was done at an average cost 5.72 per foot. **Ore reserves**: estimated January 1, 1918, at 30,000 tons ging $10 to $12 per ton. A system of leasing outlying parts of the property royalty basis was decided upon in 1916. Several lessees mined good ore.

Equipment: is excellent and complete for daily output of over 1,000 *of ore.*

Production, Costs, and Profits Since Completion of Mill:

	Ore, Tons	Av. Rec. per Ton	Total Av. Cost per Ton	Operating Profit, Net per Ton Av.	Total	Dividends
.....	.....	....	....	....	.....	$177,957
.....	92,309	$11.25	$10.14	$0.12(d)	$3,434	.....
.....	249,791	8.10	6.67	0.54(d)	170,384	.....
.....	338,423	6.53	5.17	1.34	452,734	.....
.....	389,643	9.01 (c)	5.02	3.99	1,558,308	$1,601,617
.....	338,192	11.61	6.19	5.42	1,835,224	1,067,744
.....	349,465	14.14	6.32	7.82	2,731,945	2,491,403
a).....	415,786	18.40	6.65	11.75	4,886,399	5,694,637
b).....	330,549	30.74	7.97	22.77	7,526,846	7,118,296
b).....	266,868	38.50	10.97	27.53	7,347,692	7,118,271
b).....	194,480	34.72	8.88	25.84	5,026,620	3,201,239

a) 14 months ending December 31, 1912. (b) Year ending October 31. verage value per ton. (d) Loss.

In February, 1919, the entire holdings of the company were leased period of 5 years to the Goldfield Development Co., which see.

Goldfield Consolidated ranked as one of the greatest gold mines world, producing over $50,000,000 and disbursing over $29,000,000 in div

GOLDFIELD DEVELOPMENT CO. NE

Address: P. O. Drawer 119, Goldfield, Nev.

Officers: Corrin Barnes, pres.; A. I. D'Arcy, v. p.; H. G. McMaho treas., with A. H. Howe and Benj. J. Henley, directors. F. D. Bradley, lurgist; Elmer Burt, mine supt.

Inc. February 13, 1919, in Nevada. **Cap.**, $125,000; increased to $ in December, 1919; shares 5c. par; assessable; 200,000 shares in treasury S. Cook & Co., registrar. Annual meeting, third Monday in February.

The Development Company was organized to operate the holdings Goldfield Cons. Mines Co., including the mining property, 1,000-ton mill a road in the Goldfield district, Esmeralda county. Part of the ground h purchased and the balance taken under lease for a period of five year February 1, 1919, with the privilege of sub-leasing any part or all of the Thirty-six sets of lessees were at work December, 1919, and more leases granted. Little ore was in sight when work was started, but most of the have found and shipped ore.

The four main shafts, the Laguna-Redtop, Grizzly Bear, Clermo Combination, are all kept open, and a new shaft was sunk on the Comb Fraction (also held under lease), which will be the main haulage way the ore caved in the Combination mine. Management plans to mine Co tion hill by caving and thus obtain an output of 1,200 tons daily of low ore for the mill. The ore will be drawn from a strip of ground that from the north boundary of the Florence mine to the January shaft loca the January claim, a distance of about 1,000'. The ore is 40' wide and from the surface to the 380' level. Management estimates 1,500,000 tons averaging $5.60 gold per ton, and a total operating cost of $3.15 per ton. a detailed examination of the property, made prior to this company's ta over, more than 1,000 samples were cut and assayed. As a result of this ination it was concluded that the reserves will actually yield $5.50 per to cost of $4, giving a net profit of $2,225,000 for the ore already blocke Recent work, both in old ground and virgin territory has shown th resources of this acreage are not yet exhausted as rich ore has been which may "sweeten" the average given above.

Shipments by company and lessees from February 15 to April 1, am to 1,090 tons, valued at $21,246.

Company will start milling 500 tons of $15 to $20 ore daily about April this to be increased to 2,000 tons of $6 ore when mill is completed.

With its competent management and ample ore supply company s earn handsome profits.

GOLDFIELD GREAT BEND MINING CO. NEV

Office: 302 News Bldg., Goldfield, Nev.

Officers: C. S. Sprague, pres.; J. K. Turner, v. p.; Ben Gill, sec- with L. L. Dellinger and B. W. Ward, directors.

Inc. May 8, 1915, in Nevada. **Cap.**, $1,500,000; shares $1 par; assess all outstanding. Assessment No. 5, of 10c. per share, levied January. Stock listed on San Francisco Exchange.

Financial statement for period February, 1916, April, 1918, shows receipts, $90,214, including sale of 30,040 treasury shares, $1,502; assessmen 2, $14,498; assessment No. 3, $14,575; ore sales, $59,346. Expenditure same period amounted to $84,875. Report for 9 months ending January 1, shows: receipts, $24,731, including $14,781 from assessment No. 4, and $ from ore sales. From January to July, inclusive, income was $16,880 expenses, $13,610; accounts and bills payable were $4,901.

Property: 7 patented claims, 112 acres, in Diamondfield sectio Goldfield, Esmeralda county. Claims show a quartz vein in andesite, with dip and E.-W. course. Oxide and sulphide ores occur in shoots said to ave $60 per ton. **Development:** by shafts to 500'. The mine was unwatered

round work begun in 1915. A drift is being driven E. from the 375' f the main shaft toward the Lockhart shaft to intersect the downward on of oreshoots exposed on the 236' level. From February, 1916, to 1918, 4,633' of new work was done at a cost of $54,579 or $11.78 per foot; new work done in 1918 cost $19 per foot, and 655' of new work in 1919 4.11 per foot.

uipment: 75-h. p. hoist, compressor, pump and an old mill which will ly be re-built.

oduction: (net) in 1916 (4 months), 106 tons, yielding $3,168; in ,800 tons, yielding $46,533; in 1918, 715 tons, yielding $12,937, a total tion of 2,621 dry tons. Operations to April, 1918, showed an operating $25,529. First seven months of 1919 yielded 85 tons of $21.48 ore.

FIELD MERGER MINES CO. NEVADA

ldress: Reno, Nev.

ficers: Elmer H. Cox, pres.; J. Ross Clark, v. p.; C. F. Burton, sec.-Trustees: Geo. Wingfield, John Erikson, Edgar Ames and E. A. Mizner.

c. 1908 in Washington. **Cap.**, $5.000.000; shares $1 par. Stock listed Francisco Exchange.

operty: St. Ives and Velvet claims, the latter causing considerable on with the Jumbo Extension during 1915, for which see Vol. XII.

velopment: by shaft to 1,750' and winze 150' below, opening veins oots of copper-gold-silver ore. Work on the 1,350' level developed 2% ore, but no gold. In 1917-18 work was started on the 1,750' level in an to find the extension of the Atlanta orebodies. Owing to excessive deep work was abandoned in September, 1919, and transferred to the el where bunches of high-grade ore had been found.

ging by results at other mines in the district, depth holds little promise.

FIELD ORO MINING CO. NEVADA

e several years. Controlled by New York Oro Corporation.

ldress: Goldfield, Esmeralda county, Nev. Ben Gill, sec.

c. 1912 in Arizona. **Cap.**, 3,000,000 shares; $1 par; 2,500,000 outstand-

operty: 33 acres at Goldfield, Nev., developed to 800' depth, where ays were reported. Company also developed Vulture mine in Wonder

FIELD SHALE MINING CO. NEVADA

t of business. Property worked by Spearhead Gold Mining Co., which see.

FIELD SUNRISE GOLD MNG. CO. NEVADA

ldings purchased 1918 by Grandma Cons. Mines Co., which see.

FIELD-TULE CANYON PLACER CO. NEVADA

rectors: F. M. Field, A. B. Harms, Harry B. Ruhl and F. J. Harms.

c. April, 1919. **Cap.**, $150,000; shares 10c par; 750,000 in treasury.

operty: 5 placer claims in Tule canyon, Esmeralda county, 30 miles of Goldfield. By October, $5,000 had been spent in development and upply: 6 men were working, and gravel washing was under way.

DMA CONSOLIDATED MINES CO. NEVADA

ldress: Goldfield, Nev.

ficers: C. S. Sprague, pres.; J. K. Turner, v. p.; Ben Gill, sec.-treas., . T. Somers, Jr., and S. A. McCandless, directors.

c. 1905, in Arizona. **Cap.**, $2,500,000; shares $1 par; 1,262,493 issued. nent of 1c. per share levied February and July, 1917; January and July, May, 1919. Listed on San Francisco Exchange.

tement of accounts for 9 months ending March 1, 1919, shows: receipts, including $12,256 from assessment No. 4; $1,600 bills payable; treasury les, $1,940. Expenditures include: mine development, $11,353.

ganized to acquire and develop the Grandma claim of the Grandma Co. In 1916 company acquired stock control of the adjoining Goldfield Gold Mining Co., and in 1918 final payment was made on the Sunrise

y.

perty: at Goldfield, Esmeralda county, shows a quartz lode in dacite

with 60° dip and N. W.-S. E. course. Sulphide ore contains gold, silver copper.

Development: by 827′ vertical shaft. During 9 months to Mar 443′ of work was done. A northwest crosscut on the 815′ level at 95′ ente quartz vein 20′ wide, which is to be explored, before resuming sinking shaft to the true shale-latite contact.

Equipment: includes newly-installed compressor and pump.

Future of the company depends on results in the contact area.

GRANDMA MINING CO. NEV

Shareholders could exchange their stock for equal amount in the Gra Cons. Mines Co. which now owns practically all the stock of the original Gra company.

JUMBO EXTENSION MINING CO. NEV

Office: Ben Gill, sec., Goldfield, Nev.

Idle, save for work in progress at the Jumbo Copper Mountain Mining which see. Full details of the Goldfield property in Vol. XIII.

JUMBO JUNIOR MINING CO. NEV

Address: Goldfield, Nev.

Officers: J. L. McCarthy, pres.; A. I. D'Arcy, v. p.; Floyd Cable treas., with Joseph Bruder and H. E. Clark, directors.

Cap., $1,500,000; shares $1 par; non-assessable. Stock listed on Francisco Exchange.

Property: the Spearhead Fraction claim, 6 acres, located betwee Jumbo, Kewanas and Spearhead properties at Goldfield, Esmeralda county chased of the Spearhead Fraction Mining Company.

Development: was centered on ground below the 880′ level and was opened a few inches to 24″ in width, from which better than $10 ton of gold-silver-copper ore was shipped in 1917 and 1918.

KEWANAS EXTENSION MINING CO. NEV

Inc. 1915, in Goldfield, Nev. **Cap.**, $1,000,000. Is a small well lo property, 18 acres, adjoining Kewanas on the north and in direct line wit ore zone, as developed on its north drift. It adjoins the Booth mine at Gold Is controlled by the Sprague interests and other California men who underwritten the stock at 5c. a share. Gave the Booth company 25,000 s of stock for a sideline agreement, thus avoiding litigation.

KEWANAS MINING CO. NEV

See Reorganized Kewanas Gold Mining Co.

LONE STAR CONS. MINING CO. NEV

Office: 10 E. 43rd St., New York City.

Officers: N. H. Wheeler, pres.-gen. mgr.; G. B. Hartley, v. p.-s W. D. Miller, sec.; W. H. Vesey, treas., above with J. I. Wheeler, direc A. H. Elftman, cons. engr.

Inc. April 17, 1912, in Nevada. **Cap.**, $2,500,000; $1 par; assessa all issued. Security Transfer & Registrar Co., New York, transfer agents registrar. Stock listed on Salt Lake and San Francisco Exchanges. Str from New York Curb, October 1, 1918, after a stock-rigging scandal alleg have been instigated by an officer of the company and a bankrupt broke concern. Three assessments, totaling 5 cents called to date. Annual meeting Wednesday in April. Company reports a total of $50,000 expended in de opment work. Shares have varied from 1c. in 1918, and 6c. in January, to 29c. in each year.

Property: 24 claims, 450 acres, 17 patented, in Goldfield mining trict, Esmeralda county, Nevada; and 7 unpatented claims in Indian m district, Mono county, California, on which no work has been done.

Development: the Goldfield property is developed by 252′ vertical and 500′ of drifts and crosscuts on the 250′ level of the Nelligan shaft. was unwatered in February, 1919, and the east and west crosscuts advanced commercial ore developed as yet. Not favorably regarded.

Reported on by Emory J. Arnold, A. H. Elftman and M. Duvall.

FLOWER BULLFROG MINING CO. **NEVADA**
Reorganized, 1917, as Cons. Mayflower Mines Co., which see.

LTOWN EXTENSION GOLD MINING CO. **NEVADA**
Address: Goldfield, Nev.
nc. 1915 in Nevada. **Cap.**, $1,500,000; $1 par; 800,000 shares in treasury st accounts.
Company was organized to secure title to the Louis Fraction and Milltown nsion claims at Goldfield, which were explored on the 700′ level by a crosscut from the Yellow Tiger Co.'s shaft to the property of the Red Lion Cons. Co., which lies on the opposite side of Milltown Ext.
The Milltown Extension and the Jerry Johnson Mng. Co. each owned a half est in the Cripple Creek Deep Leasing Co., operating a lease on the Jerry son mine at Cripple Creek, Colo. During the war it was impossible to te the lease at a profit and it was forfeited after the expenditure of all ary funds.
Property holdings of the company are not favorably regarded.

EMPIRE GOLDFIELD MINES CO. **NEVADA**
Address: Goldfield, Nev. **Officers:** C. D. Terwilliger, pres.; Chas. Witrg, v. p.; F. M. Manson, treas., with E. Marks, directors.
nc. 1915, in Nevada. **Cap.**, $1,500,000; shares $1 par.
Property: 3 claims and a fraction, 50 acres, adjoining the Lone Star e E. and Commonwealth property on the N. at Goldfield, formerly owned e Empire Gold Mining Co.
Development: by an old 150′ shaft and 150′ crosscut said to have dis- a 16″ streak of $20 ore. Shaft to be sunk to 500′ to reach the latite-shale ct.
Equipment: includes electric power and 40-h. p. electric hoist. Com- is still in existence, but presumably idle.

GOLDFIELD SIERRA MINING CO. **NEVADA**
Described in Volume XIII. Merged December, 1919, with the Yellow Tiger olidated Mining Co., which see.

GOLDFIELD SIMMERONE MINING CO. **NEVADA**
nc. 1915, in Nevada.
Property: the Simmerone Fraction at Goldfield, Esmeralda county and ear lease and bond on the adjoining Blue Bull group, worked through the erone workings. The Simmerone, acquired 1914 at sheriff's sale, is de- d to 250′.
unds exhausted in 1917 and company presumably dead.

EER CONS. MINES CO. **NEVADA**
ully described in Volume XIII. Reorganized as Reorganized Pioneer Co., which see.

HILL FLORENCE MINING CO. **NEVADA**
ffice: Reno, Nev. **Officers:** Murdo MacKenzie, pres.; H. G. McMahon, gen. mgr.; A. H. Howe, sec.-treas., with Corrin Barnes and Dave Ward, Drs.
c. November 20, 1916, in Nevada. **Cap.**, 2,500,000 shares; 10c par: all nding; assessable. Stock listed on San Francisco Exchange. Assessment of 1c. per share levied May, 1919. Company is a consolidation of the Hill Mining, Florence American Mining and Florence Extension Mining nies.
roperty: 5 claims, 70 acres, owned outright, and 10 acres held under at Goldfield, adjoining the Florence Goldfield on the S. and W. Ore ns gold, silver, and copper, occurring in a quartz vein in andesite. The rty carries the extension of the Florence vein.
velopment: by 800′ vertical shaft. During 1918 a total of 1,700 linear f new ground was opened up by drifts, crosscuts and winzes on the 500′ 00′ levels. Developments on the 600′ proved disappointing and manage- is concentrating all work on the S. drift of the 500′ level to reach the ice Goldfield vein. By September a 4′ vein had been cut 450′ S. of the

E.-W. fault on the Florence Goldfield. The vein was opened for 70', sho an 18" shoot of $40 ore.

Company has a lease on a block of ground at depth of 430' to 650' i Florence Goldfield mine, immediately beneath the rich ore mined by the I ganized Cracker Jack.

Equipment: includes double drum electric hoist, compressor and tric power.

Company has an excellent speculative chance of finding bonanza ore.

RED LION CONSOLIDATED MINES CO. NEV

Described in Volume XIII. Merged December, 1919, with Yellow Consolidated Mining Co., which see.

REORGANIZED ATLANTA MINES CO. NEV

Is a reorganization of the Atlanta Mines Co., fully described in Volume

Address: Reno, Nev., and Goldfield, Nev.

Officers: Geo. Wingfield, pres.; W. E. Zoebel, v. p.; C. F. Burton, treas., with B. J. Henley and L. N. French, directors. A. I. D'Arcy, mgr.

Inc. 1918, in Nevada. **Cap.**, $1,000,000; 20c par; 4,250,000 outstan assessable. Assessment No. 2, of 1c. per share levied March, 1919. Liste San Francisco Exchange.

Property was conveyed to the new company in consideration of assum by the new company of all indebtedness of the Atlanta. Stock was excha share for share upon payment of 1c. assessment, stockholders having a 4 exchange privilege.

Property: 74 acres, patented, at Goldfield, Esmeralda county, Nev. cludes the Atlanta, Black Bear and Union Jack mines, adjoining the Florenc the east and the Goldfield Cons. on the north.

Geology: ground contains extension of the Goldfield Cons. orebodie the shale-latite contact. Exploratory work carried on through the St. shaft of the Goldfield Cons. cut the Atlanta vein on the 1,750' level. This is 40' to 100' wide, runs N. S. and dips at 45°. The ore is pyritic with t hedrite, and varies from gold ore, free from copper, to ore carrying 9% to copper. The great ore-shoot thus far shows bands of medium grade ship ore, but was as a whole, a low-grade concentrating ore that may average $8 ton, besides a shoot of shipping ore 6'-15' thick that averaged $20 per ton. orebody extended 110' upward and for 380' on the strike, and was opened winze below the 1,750' level.

Development: by 1,750' Merger shaft. During 1918 the winze was s from the main or 1,750' level to depth of 1,900', and in March, 1919, $59 g copper ore was encountered in an east crosscut driven to cut the Atlanta ve

Production: began April, 1915. Total shipments to April, 1916, fr the 1,750' level, 239 tons, netting $1,347.

The geology of the district is described in Prof. Paper No. 66 of the U Geological Survey, 1909, by Ransome, and by J. E. Spurr, in Econ. Geol February, 1916. Property promises to be a producer of low-grade concentrat ore from which it should be able to make profits.

REORGANIZED BLUE BULL MINING CO. NEVA

Office: P. O. Box, 2012, Reno, Nev.

Officers: Geo. Wingfield, pres.; W. E. Zoebel, v. p. and asst. sec.; C Burton, sec.-treas.; preceding, with L. N. French, directors.

Inc. 1912, in Nevada. **Cap.**, $1,500,000; shares $1 par; all outstandi assessments totaling 8c. called to end of 1918. Listed on San Francisco Excha Share prices, 1c. low, 5c. high, 1918-19. Annual meeting, third Monday December. Company was organized to acquire title to the property of the Bl Bull Mining Co., sold at sheriff's sale June 14, 1912. Latter company's sto was exchanged share for share for new stock on payment of 1c. per share

Property: 8 claims, 148 acres, in the Goldfield district, Esmerald county, Nev.

Development: by a 730' shaft with workings on the 500 and 700' leve ope[illegible]ictor and Blue Bull veins. Crosscuts have been run into t [illegible]ed Mining Co. ground under a leasing agreement. Con

ial ore was found on the 500′ level, but not on the 700. Work on the 100 250′ levels during 1918 disclosed a vein 50′ long, from 6 to 18″ wide, aver- g $100 per ton in gold, silver and copper.
Property is a prospect.

)RGANIZED BOOTH MNG. CO. OF GOLDFIELD NEVADA

Address: Goldfield, Nev.
Officers: Geo. Wingfield, pres.; W. E. Zoebel, v. p.; C. F Burton, sec.-
i.
Inc. 1912, in Nevada, as a reorganization of the Booth Mng. Co. Stock exchanged, share for share, on payment of 1c. **Cap.**, $1,000,000; share ar; assessable; 999,957 outstanding. Annual meeting, third Monday in mber. Listed on San Francisco and Salt Lake City Exchanges; traded in ew York Curb. Stock transferred at company's office. Five assessments, egating 7c. have been levied; the fifth, 2c. per share, was in January, 1915. e prices, 2c. low, 22 high, 1918; 9c. low, 40c. high, 1919.
Dividends: No. 1, 5c per share, paid March 6, 1916; No. 2, 15c. on l 6; No. 3, 10c., on April 26; No. 4, 5c., on June 6, making a total of $349,984 that year. On May 15, 1919, a cash dividend of 5c. per share and a stock lend of 1 share of Tonopah Divide stock for each 50 shares of Booth stock was declared payable from proceeds of sale of stock of the Reorganized anas Mining Co., 250,000 shares of Spearhead Gold Mining Co. Reorganized, 2,000 shares of Tonopah Divide Mining Co.
For an account of litigation, etc., see Vol. XIII.
Property: formerly owned by the old Booth Mining Co., consists of claim adjoining the Red Top and Laguna mines of the Goldfield Cons. In ember, 1915, all development work was suspended, and it was reported the agement would endeavor to purchase another property.
The company is said to have the distinction of being the only non-producing e that receives an income without incurring the slightest expense for operating.

)RGANIZED CRACKER JACK MINING CO. NEVADA

Address: Goldfield, Nev.
Officers: E. P. Junor, pres.; Geo. K. Cremer, v. p.; H. G. McMahon, treas. and mgr., with C. H. Shirtz and J. A. Erickson, directors.
Inc. December 18, 1915, in Nevada, as a reorganization of the Cracker Mining Co. **Cap.**, $150,000; shares 10c. par; assessable; all outstand- Company being financed by assessments. On December 21, 1915, a call of 1c. share was made, each stockholder in the old company being required to pay assessment before receiving share for share of the new company. Listed on Francisco Exchange. Share prices, 1c. low and 6c. high in 1918; 2c. low 10c. high, 1919.
Property: 5 claims, 2 patented, 140 acres, at Goldfield, adjoining the dstorm-Kendall on the east; said to have had $50,000 expended on it for elopment. In January, 1916, the company purchased the adjoining 3 claims, cres, formerly owned by the Adams Gold Mining Co., which had been sold taxes. Adams group has a vertical shaft 320′ deep with levels at 115′ and depth, said to show gold-silver ore in a 20′ vein in rhyolite. Work on the level has been carried to a point 1,150′ E. of the shaft, and drifts are being nded N. and S. on the Cracker Jack and East veins. A winze sunk on the vein at 50′ from the 320′ level is reported to have intersected the Cracker vein in April, 1919. By November there was exposed 8′ of $25 ore. rves above 120′ were estimated at 50,000 tons of $8 ore. At 440′ ten feet of ore was cut.
Equipment: includes electric hoist, compressors and drills. Property prospect.
In addition to the work being carried on in the main property, the company s a 5-year lease on part of the ground of the Goldfield Consolidated Mines and the Florence Goldfield Mng. Co., where extensive developments are g carried on at a depth of 400′. This work is being prosecuted through the t of the Red Hill company. The lease secured from the Florence Goldfield block 220 by 150′ from surface to 530′ and another from surface to 430′.

REORGANIZED DIAMONDFIELD TRIANGLE MNG. CO. NEVA

Address: Ben Gill, treas., Goldfield, Nev.; J. K. Turner, cons. engr.

Inc. 1917, in Nevada. **Cap.**, $2,000,000; shares $1 par. Is a reorgan tion of the Diamondfield Triangle Mng. Co.

Property: 7 claims in Diamond district, developed by vertical shaft to show a promising quartz vein.

Idle since 1917, pending re-financing of company. Stockholders invite exchange their stock, share for share and payment of 1c. assessment.

REORGANIZED KEWANAS GOLD MINING CO. NEVA

Address: Reno, and Goldfield, Nev.; Geo. Wingfield, pres., W. E. Zo v. p.; C. F. Burton, sec.-treas.; A. I. D'Arcy, mgr.

Inc. July, 1913, in Nevada. **Cap.**, $1,500,000; shares $1 par; all outst ing; assessable. Last assessment levied August, 1919. Listed in Salt Lake and San Francisco; traded on New York Curb: Share prices, 1c. to 10 cts. 3 c. to 8c. in 1919.

Company is a reorganization of the Goldfield Kewanas Mining Co., w became bankrupt in 1913. As a result of the apex suit filed in 1915 by R ganized Booth Mining Co., which see, the latter company received 250,000 sh Kewanas stock which was disposed of during 1918.

Property: 2 claims and a fraction, about 40 acres, east of the Lag group of the Goldfield Cons. at Goldfield.

Development: by means of the winze on the Kewanas ground an east crosscut into it from the 700′ level of the Laguna shaft of the Gold Cons. Work up to July, 1918, consisted of exploration of the vein exposed the 840′ level; 550′ N. of the winze the vein split, one branch strikes N. W. other N. E., with shale between. Both branches have been explored; so no large bodies of pay-ore have been exposed, but development is to be tinued on this prospect.

SANDSTORM-KENDALL CONSOLIDATED MINES CO. NEVA

Address: Reno, Nev.

Officers: Geo. Wingfield, pres.; W. E. Zoebel, v. p.; A. I. D'Arcy, 1

Inc. in Nevada. **Cap.**, $1,500,000; shares $1 par; assessable; outstand 1,326,724. Listed in San Francisco.

Property: 70 acres at Goldfield, developed by shaft to 500′ with a wi to the 700′ level. Ore carries gold and is a contact deposit between ande and rhyolite. At last accounts the company was doing development work and above the 350′ level, and prospecting at 260′ to find ore that yielded years ago.

The mine is a prospect.

SILVER PICK CONSOLIDATED MINES CO. NEVA

Offices: 262 Russ Bldg., San Francisco, Calif., and Goldfield, Nev.

Officers: Herman Zadig, pres.; A. S. Wollberg, v. p.; E. S. Van Dy gen. mgr.; C. D. Olney, sec.-treas., with M. Grothyohn, J. J. McCarthy and O Newcomer, directors. G. F. Dyer, supt.

Inc. September, 1911, in Nevada. **Cap.**, $1,500,000; $1 par; assessab all outstanding. Shares listed on San Francisco Exchange. Share prices to 10c., 1918; 5c. to 15c. in 1919.

Property: 5 patented claims, 60 acres at Goldfield, Esmeralda coun being developed by 1,300′ shaft on the Deserted claim and a 280′ shaft on No End claim. A large body of low-grade sulphide ore is exposed in the Deser but there is no quantity of commercial ore yet. Company has taken a 5-y lease from 1919, on south end of Mohawk No. 1 claim, north end of Moha No. 2 claim, and north end of Combination No. 1 claim of Goldfield Cons. M Co., comprising about 20 acres. Work being advanced towards leased gro from 1,300 and 700′ levels of Silver Pick shaft in September, 1919.

SPEARHEAD GOLD MINING CO. (REORGANIZED) NEVAD

Office: 421 Clay Peters Bldg., Reno, Nev.

Officers: Geo. A. Kernick, pres.; H. Berg, v. p.; A. A. Codd, sec treas.; H. F. Bruce, supt., with A. A. Busey, directors.

Reorganized March 25, 1916, in Nevada. **Cap.**, $1,500,000; increased fr

)0,000: shares $1 par; assessable; 10 assessments levied to date: 1,500,000 ed. Listed on San Francisco Exchange. Annual report for year ending mber 31, 1918, shows: receipts, $50,343; expenditures, $26,382; cash on hand, 113.

Property: 2 claims, 27 acres, at Goldfield, adjoins the Kewanas, Jumbo nsion and Merger Mines Co. on the east. Several years ago lessees sank 4 ts, 80′ to 100′ in depth. Mine was worked intermittently until October, with the idea of continuing the 240′ shaft to the shale-latite contact. This nation was cut at 880′ and the shaft bottomed at 910′. In sinking, 3 wide tz veins of no value were passed through. At 910′ depth stringers contain- chalcocite and chalcopyrite were cut, some said to assay $30 per ton. During , a total of 2,127′ of work was done on the 250, 285′ and 910′ levels. High- le ore was encountered in a zone of silicified shale on the 910′ level and ral raises were driven towards the shale-latite contact, which was reached 50. No ore was found.

During 1919 new work, mostly on the 910′ level totaled 2,049′, but only a few ns of rich ore were cut.

Company had a lease on the Never Sweat claim of the Blue Bell Mining adjoining. Spearhead 450 and 910′ levels are headed toward this claim.

Equipment: 60 h. p. hoist, compressor, drills, etc.

RNAL MINING CO. OF GOLDFIELD **NEVADA**

Main and transfer office: 351 Bullitt Bldg., Philadelphia, Pa. **Mine** :e: Goldfield, Nev.

Officers: Meyer Schamberg, pres.; N. S. Keith, sec.-treas.

Inc. 1904, in Arizona. **Cap.,** $1,500,000; $1 par; increased, 1915, from 00,000.

Property: 2 claims, in Diamondfield district, Goldfield, adjoins Gold- l Bull Dog Mng. Co. and is controlled by same interests. Developed for a hundred feet, partly by lessees. Has shipped in a small way.

LLOW TIGER CONSOLIDATED MINING CO. **NEVADA**

Office: Goldfield, Nev.

Officers: H. A. Riedel, pres.; with H. G. McMahon and A. I. D'Arcy, :ctors. G. B. Bettles, mgr.

Cap., $450,000; shares 10c par; assessable; 1,764,176 shares in treasury. essments are limited to 2c. per share per annum. No. 1 of 1c., was due uary 10, 1920. Stock is listed on San Francisco Exchange. Shares quoted c., 1918 and 1919.

Cash at end of 1919 amounted to $20,000.

Property: 350 acres, next south of the Goldfield Consolidated and E. he Columbia Mountain fault, including ground of the Red Lion Consolidated ies Co., Desert Chief Consolidated Mining Co., and the New Goldfield Sierra ning Co., absorbed in December, 1919. Ore carries gold and copper.

The Yellow Tiger has a 750′ shaft. The first work to be done by the consoli- ed interests will be intensive surface prospecting and geologic investigation. The new life put into these long dormant properties may result in discovery ore.

LLOW TIGER MINING CO. **NEVADA**

Reorganized as Yellow Tiger Consolidated Mining Co., which see.

ROCHESTER DISTRICT.

SOCIATED MINES DEVELOPMENT CO. **NEVADA**

Office: 617 Pacific Bldg., San Francisco, Cal. C. N. Miller, pres.; E. N. mon, sec.

Inc. in Nevada. **Cap.,** $500,000; shares $500 par.

Property: at Rochester, Pershing county, includes the Wild-Cat and er patented claims, the Taylor Hill, Colorado and the Plainview-Plainsite up; also a stock interest in the Tohoqua mine, Gerlach, Nev. Claimed to e $200,000 worth of silver and gold ore in sight and no debts at last accounts,

BUCK & CHARLEY MINING CO. **NEV**

Controlled by General Mines Co.

Address: Reno Natl. Bank Bldg., Reno, and Lower Rochester, Myron Warner, supt.

Cap., $1,000,000; $1 par; 250,000 in treasury.

Property: 160 acres, at Lower Rochester, Pershing county, deve by tunnels, showing 2 shoots of oxidized ore. The vein is reported to be 12 to 15′ wide, assaying up to $70 in gold and silver.

An air-compressor and electric hoist were being installed in April. New management plans development at depth.

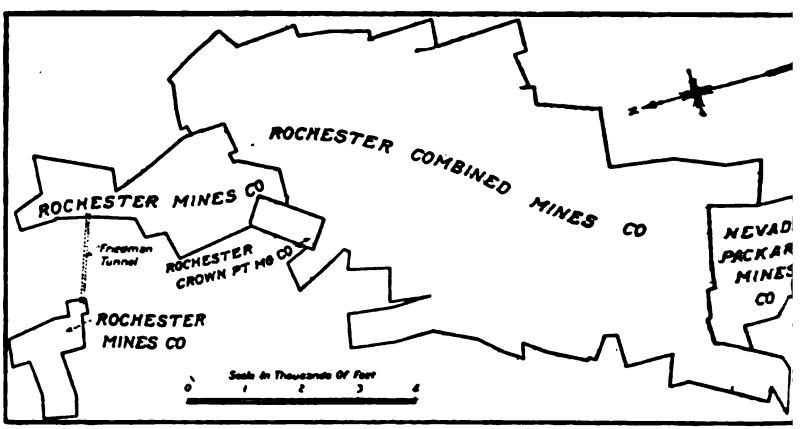
NENZEL CROWN POINT MINING CO. **NEV**

Described in Vol. XIII. A merger with neighboring companies the Rochester Nevada Silver Mines Co., was abandoned March, 1920 company continues its independent operations.

NEVADA PACKARD MINES CO. **NEV**

Office: Reno, Nev. Mine at Rochester, Pershing county, Nev.

Officers: Mark Walser, pres.; W. M. Gardiner, v. p.; Frank Marg **see.**



PROPERTY MAP OF ROCHESTER, NEVADA.

Inc. 1913 in Nevada. **Cap.,** $1,250,000; $1 par; 1,164,492 issued. Sto listed on San Francisco Exchange and Boston Curb. Transfer office: Re Nevada.

Dividends, first paid December 20, 1916, amounting to 5c per share; of 2½c. on September 30, 1918; 3d of 2½c. on April 20, 1919.

Annual report to June 1, 1918, shows: current assets, $49,272; liabilit $24,188; total earnings, $235,910; operating profit, $48,373.

Property: 7 claims, about 130 acres, in the Rochester mining distr said to show ore in silicified schist netted with quartz stringers. It is essenti highly altered sericitized rhyolite, varying from a soft and friable talcos schistose product to an extremely tough silicified variety. Cerargyrite is valuable constituent of the ore. Sulphides are not common. Ratio of gold silver is about 1 to 300. Quartz veinlets are some times high in gold.

Development: by 400′ shaft and 5 tunnels, longest over 1,400′. Thr ore-zones have been opened, and a fourth is indicated. A total of 2,659′ work was done during the fiscal year ending June, 1919, at an average cos **$31 per foot.**

Equipment: is complete including 125-ton mill, with rolls, tube-mill agitation in cyanide, counter-current decantation, Oliver filters and Merrill

tion system. Mill feed is about $9 per ton. Plant is of excellent design cost $85,000. Recovery is 95%. Treatment costs $1.56 per ton, and all es at property, $5 per ton. Power obtained from Nevada Valleys Power at $8 per h. p. a month.

Production: mill treated 32,605 tons in 1916-17, making an extraction 88%, and in 1917-18, 31,390 tons, with an extraction of 88.5%. Output scal year ending June 1, 1918, was 250,378 oz. silver and 357 oz. gold at a cost of $5.003 per ton, compared with 339,062 oz. silver and 617 oz. gold osts of $5.42 for previous year. Total production to January 1, 1919, was $1,000,000. Reported producing 100 tons daily during 1919, to September, a water shortage forced closing down the mill and curtailing operations.

KARD EXTENSION MINES CO. **NEVADA**

ddress: Lovelocks, Nev.

)fficers: B. F. Shepher, Jr., pres.; H. E. Woods, v. p.; Ray Stoddard, reas.. Reno, with L. D. Richardson and L. A. Hilborn, directors, at last nts.

nc. January 6, 1916, in Nevada. **Cap.,** $1,250,000; $1 par; 750,000 issued.

roperty: 5 claims, unpatented, 90 acres, in Rochester mining dis- Pershing county, adjoining the Nevada Packard ground, shows a shear of rhyolite with fissure veins, said to be 3-15' wide, with N. E. strike and from 20-30°. Veins carry silver chloride and free gold. David H. Skea, lting engineer for the Packard Extension, reported that the claims owned e company cover the actual extension of the Packard ore-shoots on their ward rake in a course to the S. W., and that the great ore zone of the rd mine should be found in Extension ground at a depth of about 250-300' th the surface.

o recent information received.

KARD NORTH EXTENSION MINING CO. **NEVADA**

ddress: Lovelocks, Nev.

fficers: T. P. Ebert, pres.: Frank Margrave, v. p.; J. W. Kromer, sec. en. mgr.

ic. 1916, in Nevada. **Cap.,** $1,000,000; shares $1 par.

roperty: 4 claims, adjoins the Nevada Packard ground, at Rochester, ing county. Management reported in 1916: "Our property is so closely ated with that owned by the Nevada Packard Mines Co., that a descrip- f their vein system is practically a description of ours. Their veins run d S. and presumably all enter our ground, though but one outcrops. It is s vein we are working and upon which our lessee is working. It is our ion to drive a tunnel which will cut all veins at considerable depth." The as cut in tunnel B, about 250' from the portal and drifts run N. and S. for n March, 1916. In August, 1916, work on company account ceased and perintendent, J. W. Kromer, was reported as operating the mine under Property is still in the prospect class.

KARD SILVER MINES CO. **NEVADA**

ddress: H. E. Stewart, Reno, Nev.

ic. in 1919.

roperty: claims adjoining those of the Nevada Packard company at ster, Pershing county.

RGANIZED UNITED MINES CO. **NEVADA-ARIZONA**

ddress: 405 Hobart Bldg., San Francisco, Calif. **Mine office:** Castle , Ariz. Res. Agent, S. T. Jeffreys. Clay Peters Bldg., Reno, Nev.

fficers and directors: Fred Lindeman, pres.; W. W. Davis, v. p.; B. W. nan, treas.: K. Van Winkle, sec.; A. D. Cox, mgr.

ic. in Nevada as a reorganization of the Rochester United Mines Co., ted in Volumes XII and XIII. **Cap.,** $1,500,000; $1 par; assessable; 00 shares issued.

roperty: 21 claims, 240 acres, in Rochester district, Pershing county, a lease on 22 claims at Castle Dome, Yuma county, Arizona, pre- property of the defunct Castle Dome M. & M. Co. Work by this

company is reported to have developed 55,000 tons of ore in the Castle assaying 12½% lead, and 2½ oz. silver per ton.

A 75-ton concentrator was installed early in 1919, and the Arizona pr was producing 5 tons of concentrates daily in April. The Nevada Ex are not being operated.

ROCHESTER BUCK & CHARLEY MINES CO. NEV

Office: C. T. Stevenson agt., Nelson Bldg., Reno, Nev.

Officers: C. H. Moyer, pres.; Frank L. Reber, v. p., sec. and with John Fant, C. E. Bugg and Wm. Lane, directors; F. L. Reber, mgr.

Inc. in Nevada. **Cap.**, $1,000,000; outstanding, $750,000; shares $1 Annual meeting, first Wednesday in April.

Property: 8 claims, 150 acres, in Rochester mining district, Per county, shows contact deposits 6-16′ wide between rhyolite and limestone s carry gold, silver and some lead ore. Was discovered in 1913.

Development: 220′ tunnel, with 600′ of workings.

Equipment: includes electric hoist. Property worked by lessee shipments made to Kennett smelter, at last accounts.

ROCHESTER COMBINED MINES CO. NEV

Described in Vol. XIII. Was to be merged with Rochester Nevada Mines Co., which see.

ROCHESTER ELDA FINA MINING CO. NEV

Described in Vol. XIII. Merged into Rochester Nevada Silver Mine which see.

ROCHESTER HOME TRAIL MINES CO. NEV

Address: 716 Phelan Bldg., San Francisco, Calif.

Officers: G. S. Johnson, pres.; C. C. Higgins, v. p. and mgr.; Wright, sec.-treas.

Inc. 1916, in Nevada. **Cap.**, $1,000,000; shares $1 par; 575,000 issue

Property: in Rochester district, Pershing county, adjoining the & Charley, a small producer. Home Trail is said to have all the "earmarks geologic characteristics of the district. Ore opened assays from $15 to $ ton in silver and gold. Other rich ore is reported to have been devel Closed down on account of war conditions.

ROCHESTER LINCOLN HILL MINING CO. NEV

Address: W. H. Scott, sec., Rochester, Nev.

Property: the Abe Lincoln mine on Gold hill, Rochester district, shing county.

Development: by tunnel, which has followed 4 to 8′ of ore, ass high in silver and gold.

ROCHESTER MERGER MINES CO. NEV

Described in Vol. XIII. Merged into the Rochester Nevada Silver Co., which see.

ROCHESTER MINES CO. NEV

Fully described in Vol. XIII. Merged into the Rochester Nevada Mines Co., which see.

ROCHESTER NEVADA SILVER MINES CO. NEV

Offices: Reno and Rochester, Nev.

Officers: O. W. Jones, pres.; F. M. Manson, v. p.; Wm. Adams, with J. W. Snyder, J. W. Davey, E. M. Lyon and R. W. Street, direct Nenzel, sec.-treas.; C. D. Kaeding, cons. engr-mgr.; C. A. Bennett, A. Carpenter, cons. metallurgist. Management of the new company is in an executive committee composed of F. M. Manson, J. W. Davey, Clemmons.

Inc. 1919, in Nevada. Was planned as a consolidation of the Crown Point Mining, Rochester Mines, Rochester Combined Mines, Elda Fina Mines, and Rochester Merger Mines company, which are scribed in Vol. XIII.

This plan was modified ... 1920, owing to the unwillingness procrastination ... and Rochester Combined shar...

these companies were excluded from the merger. This necessitated a ge in capitalization.

The three companies received 3,750,000 shares in exchange for their stock, in ollowing ratio; Rochester Mines, 1,750,000; Elda Fina, and Merger, 1,000,000 s each. This consolidation settled serious litigation over apex rights, the important suit being that of the Rochester Elda Fina vs. the Rochester s for $1,056,000. The scheme of consolidation dealt directly with individual holders, all of whom had the privilege of exchanging their shares for in the new company. This exchange privilege was accepted by 65% of rs of Rochester Mines; 90% of Combined; 80% of Elda Fina, and 60% enzel Crown Point. The Rochester Mines has paid $90,000 in dividends, ast one in October, 1918.

Property: 41 claims in the Rochester district, Pershing county. Geol- in the Combined property—a fault-contact between rhyolite and rhyo- iff; in the Elda Fina—a contact deposit between rhyolite and felsite; in the er—quartz veins in rhyolite, carrying oxide and sulphide ore; in the Roches- lines—replacement veins along fissures and shear-zones in sheeted rhyolite; n the Nenzel Crown Point—ore occurs as a contact deposit and in fissures rsing rhyolite and felsite formation.

Development: the total amount of workings and surface exploration is nsive. In the Combined, tunnels have opened ore to a depth of 400′ but ves are said to be small; in the Elda Fina, by shaft, also by drifts; in the er, by two tunnels—the Friedman of the Rochester Mines and the Pitt— cut several veins; in the Rochester Mines, mostly by tunnels, total work- covering several miles and reserves said to be good for several years at nills: a shaft and drift-tunnels opened well-defined veins, reserves being ated in 1916 as $4,000,000. About 1,000′ of new work done monthly in the ger and Mines properties.

Equipment: all of the mines have hoists, compressors, and other ma- ry for underground operations, including an electric locomotive in the tunnel. The Rochester Mines has a 180-ton cyanide mill in regular ation, extracting silver and gold worth over $60,000 a month. Rochester s ore is carried to the mill by a 12,000′ aerial tram. Electric power is able for all operations in the district, which is connected with the main line e Southern Pacific by a narrow-gauge railway.

Production: no figures available for this group, three of which have uced ore, principally the Rochester Mines, which, during the year ended 30, 1918, yielded $606.541 from 63.541 tons of ore. The operating profit his period was $133.777, and costs $7.44 per ton. This mine has produced $3,000,000 since 1913.

Consolidation of this group is the best thing that could have been done, ng litigation, centralizing management, operations and treatment of ore, and company should eventually enter the list of dividend-payers. By 1920 a t should show what has been done and future possibilities.

HESTER OCTOPUS MINES CO. **NEVADA**

Address: Lovelocks, Nev.

Office: Sam O'Connell, pres.-mgr.; W. E. Wright, v. p.-supt., R. J. Pier- sec.-treas.

Inc. 1916 in Nevada. Cap., $1,000,000; $1 par.

Property: 65 acres at Lower Rochester, Pershing county, ¼ mile from a ad, developed by tunnels. Ore is reported to assay 20 to 25 oz. silver and $5 gold per ton. Reported making regular shipments in 1919.

HESTER RAVEN MINES CO. **NEVADA**

Probably idle. Address: Lower Rochester, Humboldt county, Nev.

Officers: J. J. Morely, pres.; Frank L. Reber, v. p.; T. J. D. Galter, reas. and res. agt., with E. S. Howard, Frank Towelly and C. F. Hardley, ors.

Cap., 1,000,000 shares, 25c par.

Property: 3 claims, in Lower Rochester district, operated at last ac- by lessees who are reported shipping ore with values of $34 per ton in

gold and silver. Said to
months of 1916. Geologi
See U. S. G. S. Bull. 580.

ROCHESTER TREAS

Officers at last acc
John Golden and Harry J

Inc. April 14, 1913.

Property: the Old
Rochester district, Pershi

Geology: a silver-b
and running S. E., dippir

Development: by t
total 1,000'.

A small mine, exami

ROCHESTER UNITE

Fully described in
Mines Co., which see.

The section in which
bors are located, is part
or Royal George mine
four years. The Simon
more for its lead carbon

In 1919, the opening
it did during the extraord
nence, and started active

The district covers t
of the Cedar mountains,
wide, that reaches an ele
of a granite or grano-di
and later age, cut by dike
the whole capped in part
Faulting has brought old
Press, Jan. 27, 1917).

In the area covered by
is the contact belt of lim
sions and more or less
phism. The lower foot
district are covered by fl

At the Simon Silver
porphyry is an irregular
tance east. The claims c
cross faults. In the und
is partly in limestone, p
being on the hanging wa
west, the surface displac
ore occurrence on the
August, 1919, over 25 cor
starting work in the dist

At the Olympic mine
ton across a width of 20
which has kept a mill o

COALITION DIVIDE

See same under Divi

CONSOLIDATED W

Address: Mina, Nev

Officers: F. J. Solin
treas.; Geo. F. Thompso

Inc. May, 1919, in
standing.

roperty: Thompson & Walsh group, S. W. of the Simon Silver-Lead ted to show an outcrop 70′ across and to carry extension of the Simon ct, and also the Harvey & Taylor gold vein.

TY MAP OF SIMON DISTRICT NEAR MINA, MINERAL COUNTY, NEVADA.

evelopment: a 200′ shaft cut ore at 100′ below surface, that assayed rd and 2 oz. silver per ton.

quipment: gasoline hoist, etc.

CONTACT SILVER MINING CO. NEVAD

Address: Mina, Nev.

Officers: Fred W. Fall, pres.; Robt. W. Faron, v. p.; R. R. Gamble, se treas.; Ernest Rackliff, mgr., with Frank M. Andrews, directors.

Inc. May 7, 1919, in Nevada. **Cap.**, $150,000; shares 10c par.

Property: 5 claims, 100 acres, in Simon (Bell) mining district, 6 mi k S. E. of the Simon Silver Lead mine is said to show gold-silver-lead ore in contact deposit in limestone and andesite. A prospect.

CORNUCOPIA MNG. CO. OF NEVADA NEVAD

Address: Luning, Nev.

Inc. May 23, 1919, in Nevada, by N. M. Wiley, Francis O'Boyle, and R. Pledge. **Cap.**, $150,000; 10c par.

Development: by September a new vertical shaft 100' deep was in and site. An old 75' incline shaft had revealed fair value. Equipped with 6 h hoist.

Property: a group of claims in the Simon district of Mineral coun A prospect.

FAGAN CONSOLIDATED SILVER MINES CO. NEVAD

Address: P. A. Simon, Mina, Nev.

Officers: P. A. Simon, pres.; E. S. Chafey, v. p.; B. W. Zachau, sec treas., with E. S. Mulford and F. M. Manson, directors. J. O. Greenan, sup

Inc. November 20, 1919, in Nevada. **Cap.**, 3,000,000 shares; 10c pe 1,500,000 in treasury.

Company is a merger of the Norman Silver Mining Co. and Simon Fag Mines Co.

Property: the Norman and Fagan groups, 12 claims, 2½ miles S. Simon silver-lead mine.

Geology: the Norman group has a contact deposit enclosed betwee limestone, rhyolite and andesite, containing gold-silver-lead ore, said to aver $50 per ton.

The Fagan group is on a lime-grano-diorite contact like that of the Sim silver-lead mine. The contact is exposed by open-cuts and pits for over 1,0 and shows commercial ore with gold and silver values at many places, form owners having shipped some ore of $50 gross value.

Development: the Norman has an 80' and 35' shaft, equipped wi hoist, etc. Work to be concentrated on the Fagan group, and a shaft is n being sunk below the 35' working level, down to the sulphide zone.

FAGAN EXTENSION MINING CO. NEVAD

Address: Mina, Nev.

Officers: H. B. Lind, pres.; I. L. Pierce, sec.

Inc. August 22, 1919, in Nevada. **Cap.**, $15,000; shares 1c par; 750,00 treasury; 750,000 to be used for promotion stock.

Property: about 22 acres, adjoins north end and east sideline of Fag and Fagan No. 2 claims in Simon (or Bell) district, Mineral county, n slightly developed.

FAGAN JUNIOR MINING CO. NEVAD

Address: Mina, Nev.

Officers: Dr. A. S. Abdun-Nur, pres.; J. E. Greenan, v. p.; B. W. Zach sec.-treas., with E. S. Mulford, Frank Dunn, F. J. Guirhovien and E. N. Ma directors.

Inc. December 6, 1919, in Nevada.

Property: 2 claims adjoining the Simon-Fagan on the southeast. T Fagan ore zone is expected to extend into the Fagan Junior.

MINA GOLD MINES CO. NEVAD

Address: Tonopah, Nev.

Officers: P. H. O'Neil, pres.; J. H. Miller, v. p.; J. E. Adams, sec.-tre Allen Rives, asst. sec.-treas., and Wm. Watters, directors.

Inc. May, 1919, as a reorganization of the Mineral County Gold M & Milling Co. **Cap.**, $150,000; 10c par.

: 1½ miles S. W. of the Simon mine said to show high-

milling gold ore in a vein 4 to 30′ wide. Some ore was mined and cyanided al years ago.
Development: by 200′ tunnel and 100′ incline shaft. A 500′ two-compartment shaft, with stations at 100′ intervals was being sunk in July, 1919.

IA GOLD MINING EXTENSION CO. **NEVADA**
Same office and directorate as Mina Gold Mines Co. whose property it adjoins.

IERAL BELL MINING CO. **NEVADA**
Office: 318 Clay Peters Bldg., Reno and Mina, Nev.
Officers: L. Little, pres.; with W. G. Adams, Albert A. Baroni and Sharpe, directors. A. N. Salisbury, sec.-treas.; F. B. House, mgr.
Inc. May 3, 1919, in Nevada. **Cap.,** $150,000; 10c par; 110,000 shares is- . Annual meeting, first Monday in May.
Property: 11 claims, 200 acres, in Simon (or Bell) mining district, near a, Mineral county. **Ore:** occurs as a contact deposit in lime and rhyo- said to average $16-$18 in lead, silver, gold. Sinking 100′ shaft.
In mid-September, the surface equipment was burned, but was to be ced at once and work continued.

VADA SIMON MINES CO. **NEVADA**
Office: 202 State Bank Bldg., Tonopah, Nev.
Officers: Lt.-Gov. Maurice J. Sullivan, pres.; Al. McCoy, v. p.; A. Shan- sec.-treas., with H. C. Heidtmann and W. J. Douglass, directors.
Inc. 1919, in Nevada. **Cap.,** $1,500,000, par $1.
Property: 7 claims, surveyed for patent, 2,000′ from the Simon mine and same kind of contact, according to report. Treasury stock offered at 15c. share in May.
One of many new prospects at Mina.

RMAN SILVER MINING CO. **NEVADA**
Absorbed in November, 1919, by Fagan Consolidated Silver Mines Co., h see.

YMPIC MINES CO. **NEVADA**
Address: Omco, Mineral county, Nev.
Officers: E. G. McConnell, pres.; A. E. Sharbaro, v. p.; G. J. Panario, 460 Montgomery St., San Francisco, Cal.; Italian-American Bank, S. F., , treas., with Jas. P. Nelson, directors. F. J. Siebert, gen. mgr.; R. J. Bon- ort, asst. gen. mgr.; R. G. McDonald, supt.
Inc. May, 1916, in Nevada. **Cap.,** $200,000; shares 10c par; 1,200,000 ed.
Property: the Royal George group, 9 claims, 160 acres, 25 miles N. E. Mina, and 5 miles from the Simon Silver Lead mine in the Simon (Bell) ing district. Examined by R. H. Searles.
Ore: gold-silver occurs in a fissure vein in rhyolite. Mine has a fine body, which is unfortunately cut off westward by a fault, displaced segment having yet been located.
Development: by incline shaft to depth of 400′.
Equipment: included 25-h. p. gas engine, compressor, etc. The 100-ton and cyanide plant, completed in 1917, was reported making a recovery of 90 to 98%, the ore averaging about $18 per ton. Mill was destroyed by on November 21, 1919, but will be rebuilt in spring of 1920.
Gross returns from shipments in 1918 amounted to $212,000, mainly in gold
Production: 35,000 tons of concentrating ore running $15 to $20 per

OT SIMON SILVER MNG. CO. **NEVADA**
Address: Tonopah, Nev.
Inc. June 17, 1919, in Nevada, by J. T. Blake, H. Hamlin, Jr., and Dennis itzgerald. **Cap.,** $150,000; 10c par.

ION ANCHOR MNG. CO. **NEVADA**
Address: Tonopah, Nev.
Inc. May 31, 1919, in Nevada, by J. C. Williamson, F. K. Pittman, and ed Boyle. **Cap.,** $300,000; 20c par.

SIMON ANNEX MINING CO. NEVADA

Address: Tonopah, Nev.

Inc. June 4, 1919, in Nevada, by T. J. Flynn and Ray French. **Cap.** $150,000; 10c. par.

SIMON CENTRAL MINING CO. NEVADA

Address: C. J. Miller, sec., Journal Bldg., Reno, Nev.

Officers: A. G. Miller, pres.; G. M. Smitten, v. p.; with A. J. Merger, Peter Demosthenes, and Marie Woodson, directors.

Inc. 1919, in Nevada. **Cap.,** $150,000; 10c par.

Property: 6 claims in the Simon district.

SIMON CONTACT EXTENSION MINING CO. NEVADA

Address: P. O. Box 501, Tonopah, Nev.

Officers: C. C. Boak, pres.; H. O. Hall, v. p.; Thos. H. Griffin, sec.-treas. with A. A. Clute and W. R. McFadden, directors.

One hundred thousand shares treasury stock offered at 15c., May, 1919.

Property: 5 claims adjoining the Simon Contact in the Simon district via Mina, Mineral county.

SIMON CONTACT MINES CO. NEVADA

Address: Mina, Nev.

Officers: P. A. Simon, pres. and mgr.; C. C. Boak, v. p.; B. W. Zachau, sec.-treas., with B. F. Baker, C. H. McIntosh, directors. E. W. King, supt.

Inc. April 29, 1919, in Nevada. **Cap.,** $1,500,000; shares $1 par: 500,000 shares and $40,000 cash in treasury, June, 1919. Annual meeting, first Monday in May.

Property: 6 claims, about 105 acres, adjoins the big Simon mine on N. E. in Simon district, Mineral county, said to show a body of $40 lead-silver copper ore.

Equipment: gasoline hoist.

Planned sinking shaft and further development in 1919; 2 shafts were down 50' showing fair value at last report.

SIMON DISTRICT MINES CO. NEVADA

Address: Luning, Nev.

Directors: W. G. Zulch, F. T. Dann and A. Shannon.

Inc. May 5, 1919. **Cap.,** $150,000; 10c par.

Property: in Simon mining district. A prospect.

SIMON DIVIDE MINING CO. NEVADA

Office: Mina, Nev.

Officers: W. J. Douglass, pres.; C. W. Taylor, v. p.; W. G. Hillier, v. p.-sec.; E. S. Chafey, gen. mgr.; A. H. Elftman, cons. engr., with C. C. Boak and E .S. Mulford, directors.

Inc. May, 1919, in Nev. **Cap.,** $150,000; shares 10c par.

Property: 4 claims in the Simon district, in the Cedar Range, at an altitude of 6,500', 23 miles N. E. of Mina, Mineral county, Nev.

Reported by A. H. Elftman to cover 3,000' of the apex of the S. E. contact about 3 miles S. E. of the Simon mine, with mineralized outcrop proved for 1,500'. The vein is 40' wide on the surface with streaks 4 to 5' wide, opened by several shallow shafts showing ore said to run 10 to 12 oz. silver, 6% copper, and 1.5% lead carbonate.

About 1,000 tons of ore shipped during past 2 years averaged $40 in silver and copper. Dr. Elftman reports showings on the claims rank second only to those of the Simon mine.

SIMON DOUGLASS MINING CO. NEVADA

Address: Tonopah, Nev. Sponsored by C. N. Miller & Co., of Tonopah.

Officers: C. A. Calhoun, pres.; M. E. Albert, v. p.; H. S. Deane, v. p.; H. B. Smith, sec.-treas., with C. R. Douglass, E. S. Mulford and C. N. Miller, directors. E. S. Chafey, gen. mgr.

Inc. May, 1919. **Cap.,** $150,000; 10c par; 25,000 outstanding.

Property: Cleopatra group, comprising 3 claims, 60 acres in Simon district north of the Simon Divide and south of the Fagan group. The mass-

rs of lead ore, supposedly from the south extension of the main Simon
t are said to assay $68 per ton in silver.

N EXTENSION MINES CO. **NEVADA**

ddress: Mina, Nev.

fficers: P. A. Simon, pres.-gen. mgr.; Geo. S. Green, v. p.; B. W.
, sec.-treas., with W. J. Douglass, B. F. Baker, directors.

c. April 21, 1919, in Nevada. **Cap.,** $750,000; shares 50c par

roperty: 4 claims adjoining the Simon Silver-Lead on the N., to
ensively developed.

evelopment: 2 shafts down 30 and 25' by August.

N FAGAN HONEYMOON CO. **NEVADA**

ffice: Mina, Nev.

fficers: Fred Balzar, pres.; F. W. Fall, v. p.; Ed. C. Eustace, sec.-
; R. G. McDonald, gen. mgr., with F. A. Nussberger, Henry Orlandi, Jr.,
Enquist, J. R. Eustace, directors.

c. August 26, 1919, in Nevada. **Cap.,** $150,000; par 10c; $0,000 in
y. Transfer office: Mina, Nev.

roperty: about ½ mile S. of the Simon Fagan, developed by 100' tun-
A prospect.

N FAGAN MINES CO. **NEVADA**

bsorbed in November, 1919, by Fagan Consolidated Silver Mines Co.,
see.

N GOLD MNG. CO. **NEVADA**

ddress: Tonopah, Nev.

fficers: Dave F. Murphy, pres. and gen. mgr.; Owen Murphy, v. p.;
Goldsmith, sec.-treas., with Wm. Davis and Ott Ziegler, directors.

c. 1919, in Nevada. **Cap.,** $150,000; shares 10c par, 750,000 shares in
y. June, 1919.

roperty: Golden Eagle group of 6 claims, 120 acres, 23 miles E. of
1,200' from the Olympic mine at Omco, Mineral county.

re: said to occur in a contact between andesite and rhyolite, with a
fined fissure vein traceable for 3,000' along a well-mineralized course, and
rage $8.70 per ton.

NS JACKPOT MNG. CO. **NEVADA**

ddress: 353 Bush St., San Francisco, Calif. **Mine office:** Mina, Nev.

fficers: Oscar A. Daube, pres.; P. J. Daube, sec.-treas.; Otto Hiffner,
with Joe de Forrest, directors.

c. June 7, 1919, in Nevada. Cap. $100,000; 10c par; all outstanding;
shares held by president as trustee. Transfer office: Company's office.

roperty: 6 claims, 60 acres in Simon district. An undeveloped pros-

N JUNIOR SILVER LEAD MINING CO. **NEVADA**

ddress: E. C. Watson, Luning, Nev.

fficers and directors: T. R. Pledge, pres.; E. C. Watson, sec.-treas.,
C. Bachman, N. D. Marakas, and W. D. Jones. R. G. McDonald, supt.

. May 7, 1919, in Nevada. **Cap.,** $150,000; 10c par; 750,000 outstand-
Transfer offices: Luning and Mina, Nev. Stock sold at 7½c. May, 1919.

roperty: a group of 9 claims, S. W. of the Simon mine, in Simon dis-
ose in and owned outright. Said to carry a big dike of silicified breccia
$3 per ton in gold; the material is used for ball-mill pebbles at the
Olympic gold mill.

velopment: by 200' crosscut tunnel. Plan 500' tunnel and shaft.
st the tunnel was in 100' in a limestone-rhyolite contact.

LEAD MINES CO. **NEVADA**

e changed May, 1919, to Simon Silver-Lead Mines Co., which see.

LEAD & SILVER MINES EXTENSION CO. **NEVADA**

ers: W. J. Douglass, pres.; T. J. Flynn, v. p.; W. O. Dougherty,
Carthy, Louis Cirac, directors. Ray French, sec.-treas.

erty: 5½ claims, 110 acres, adjoining the Simon mine on the east.

Treasury stock offered by Smith & Aman of San Francisco. at 15c. M 1919.

SIMON MINA MINING CO. NEVA

Office: 318 State Bank Bldg., Tonopah, Nev.

Officers: J. K. Turner, pres.; C. A. Calhoun, v. p.; L. L. Dellinger, m Branch H. Smith, sec.-treas., with R. E. Smith, directors.

Inc. May 14, 1919, in Nevada. **Cap.,** $150,000; 10c par: 950,000 shar outstanding. Stock sold at 15c., May, 1919.

Property: 5 claims covering 3,000' along a limestone rhyolite conta 1½ miles S. of the Simon mine.

Development: by 280' shaft, at bottom of which $12 silver-lead ore w encountered in an 80' crosscut.

Equipment: gasoline hoist and buildings.

Examined by F. M. Maloney, formerly of Cerro de Pasco. A prospect.

SIMON SILVER BELL MINING CO. NEVAD

Address: Mina and Tonapah, Nev.

Officers: P. A. Simon, pres.; W. J. Douglass, v. p.; C. C. Boak, se treas., with J. F. Wall and A. H. Elftman, directors.

Inc. May, 1919, in Nevada. **Cap.,** $150,000; 10c par; 800,000 outstan

Property: Bell group, 7 claims, about 80 acres, side lining the S on the south.

Development work started in 1919.

SIMON SILVER LEAD EAST EXT. MINES CO. NEVAD

Address: 221 Odd Fellows Bldg., Reno, Nev. **Operating office:** Mi Nevada.

Officers: C. B. Burkham, pres.; J. M. Andrews, v. p.; Geo. S. Gr sec.-treas., with Ernest Rackliff, directors.

Inc. April, 1919, in Nevada. **Cap.,** $250,000; increased later to $375,0 25c. par; 96,000 shares outstanding. Company reports $4,000 in treasury, Octo 1919. Transfer office: Reno, Nev.

Property: adjoins the Simon property on the east and south. D veloped by 2 shafts, 35' and 65' deep, and equipped with gasoline hoist.

SIMON SILVER LEAD EXTENSION M. CO. NEVAD

Address: Chris. McCarthy, mgr., Mina, Nev. **Office:** Tonopah, N Wood Elkus, supt.

Inc. April 21, 1919, in Nev. **Cap.,** $150,000; 10c par. T. J. Flynn, C McCarthy, and A. C. Kearns, incorporators.

Property: the Extension group in Simon district. Work said to d close ore at places along trend of vein.

SIMON SILVER LEAD MINES CO. NEVAD

Office: Mina, Nev.

Officers: P. A. Simon, pres., W. B. Zachau, sec. Burch Hershey White, cons. engrs.

Inc. November, 1919. **Cap.,** $1,500,000; par $1; 1,100,000 issued.

Property: 9 claims in Simon (officially known as Bell) district, Mine county, Nev., 22 miles east of Mina. Originally discovered 50 years ago, intermittently worked until real development began in 1919. Examined in by Walter Harvey Weed.

Geology: claims cover a limestone-porphyry contact with irregular trusions of older andesite and granite. Ore is found in veins which cros rocks, but in part follow fault contacts. The orebody is a replacement d mainly in limestone, and in part in porphyry; it runs E.-W. and dips 6 Two shoots of sulphide ore occur, separated by mineralized porphyry. Va fade in footwall limestone, but show high-grade ore against limestone fo Shipping ore carrying 15-30% lead, 12-32 oz. silver per ton, and 8% zinc, o for a width of 8' or so, in main orebody, and also beyond a cross fault in discovered orebody 300' or more to the east of the shaft; yet the value of mine rests upon the 400,000 tons of partly developed milling ore, which aver e per ton, 6.4% lead and 7.18% zinc. It is estimated this d at a net profit of $6.20 per ton.

Development: main working shaft is 430′ deep, being vertical for 230′, n inclined to follow footwall to 6th level. The South orebody is crosscut to hanging wall on each level, and the North orebody is crosscut and proven n the 4th (or 280′) level downward.

Surface cuts and pits show pay ore at numerous places along outcrop of ı, for total distance of 2,100′, of which only 400′ is explored underground. It is considered possible that the mine will develop into one of the largest er-lead properties of this country, big enough to warrant a large concen- ion plant and its own smelter.

ION TRIANGLE MINING CO. **NEVADA**

Address: Mina, Nev. and Tonopah, Nev.

Officers: E. S. Mulford, pres.; Geo. F. Thompson, v. p.; C. C. Boak, sec., ı A. H. Elftman, J. W. Dunphy, E. S. Chafey and W. J. Douglass, directors.

Inc. May, 1919. **Cap.,** $150,000; shaers 10c par.

Property: 4 claims in the Simon district, adjoining the Cons. West Ex- ion and said to be on the Simon contact.

TONOPAH DISTRICT, NYE COUNTY.

TER ALL MINES CO. **NEVADA**

Address: Tonopah, Nev.

Officers: Hugh H. Brown, pres.; Herman Zadig, v. p.; M. E. Albert, treas., with J. H. Evans and E. A. Keenan, directors.

Inc. March 27, 1917, in Nevada. **Cap.,** $1,000,000; shares $1 par; 700,000 es issued; assessable. Annual meeting, April 3rd.

Reported at the time of organization to have taken over part of the holdings he Umatilla Tonopah Mng. Co. and the Montana Tonopah M. Co. in Tonopah ing district.

CKEYE BELMONT MINES CO. Letter of Co. unclaimed **NEVADA**

Office: 1055 Spitzer Bldg., Toledo, Ohio, and Tonopah, Nev.

Officers: A. B. Tillinghast, pres.; W. B. Kober, v. p.; W. B. Voorhees, : also directors. E. F. Rowley, treas, at last accounts.

Inc. 1908, in Nevada. **Cap.,** $2,000,000; $1 par; outstanding 700,000 es. Annual meeting, first Thursday in Jan. Private corporation. Stock un- d. Is a holding company, operating property formerly owned by Belmont Ex- ion Mng. Co., now defunct, and holding interests in the Buckeye Eagle and keye Tonopah companies. Reported in Oct., 1915, to have taken an option ı a drift gravel property in Plumas county, Cal.

Property: 15 claims, 13 patented, 300 acres, at Tonopah, adjoining the opah Belmont on a portion of the east end line.

Ore: quartz with silver sulphides and gold occurring in fissures in hyte. Veins strike E. W. and dip 30°.

Development: 3 shafts, 125′, 900′, and 1,234′ deep, with 5,000′ workings.

Equipment: includes 2 electric hoists, of 52-h. p. and 120-h. p., one 40-h. asoline hoist and two 8-drill air compressors.

Property practically idle during the war, but plans for 1919-20 include deep- g shaft and development on the 900′ and 1,200′ levels. There are two large of low-grade ore with several rich stringers. No production to date.

CKEYE EAGLE MINING CO. **NEVADA**

Tonopah, Nev. Control held by Buckeye-Belmont Mines Co. Same officers directorate as that company.

CKEYE TONOPAH MINING CO. **NEVADA**

Tonopah, Nev. Control held by Buckeye-Belmont Mines Co.; same officers directorate as that company.

LIFORNIA & TONOPAH MINING CO. **NEVADA**

Reorganized as New California & Tonopah Mining Co., which see.

H BOY CONSOLIDATED MINING CO. **NEVADA**

Address: Tonopah, Nev.

Officers: J. H. Goldman, pres.; G. B. Thatcher, v. p.; E H. Mead, sec.- , with E. M. Hall, directors. F. H. Norcross, res. agent.

Inc. March 21, 1914, in Nevada. **Cap.,** $2,000,000; $1 par; all outstand-

ing; assessable; assessment No. 12, of 1c per share, levied August 1. Listed on San Francisco Exchange. Annual meeting, November 21.

Company is a reorganization of the Tonopah Cash Boy Cons. Mng. Co. which suspended operations in 1914 with debts of $3,476, and 76,870 shares in the treasury.

Financial statement of Cash Boy for period March 20, 1916, to March 1, 1918, showed: receipts, $134,162, which includes: assessments, 6, 7, 8, 9, 10, netting $99,878; ore shipments, $23,488; royalties, $925. Cash on hand, $8,340. Expenditures for same period were $125,822.

Property: several fractions, patented, 30 acres, at Tonopah, Nye county, adjoins the Tonopah Merger on the W., Tonopah Victor on the S., and Tonopah Extension on the N. Ore: gold-silver occurs in veins in rhyolite.

Development: by 1,646' vertical shaft, with most of the recent work on the 1,527' level, where crosscutting and drifts to the S. disclosed 4 distinct veins carrying ore of commercial grade reported to show higher value with depth. A total of 1,976' of underground work was done from March to November, 1918. Crosscutting is being done to the N. on the bottom level to cut the downward extension of the veins exposed on the 1,527' level.

In 1920, there were 5 faces in ore on the 1,537' and 1,646' levels. The 1,537' level showed 30 to 36" of $68 to $89 ore, and the 1,646' had 1½' of $33 ore.

Equipment: includes 75-h. p. electric hoist and 3-drill air-compressor.

Production: in 1915, 150 tons, assaying $15 per ton; from March, 1918, to November, 1918, 1,740 dry tons were shipped having a net assay value of $13.41 per ton. Shipping 150 tons weekly in 1920.

Property is a promising prospect.

GREAT WESTERN CONSOLIDATED MINING CO. NEVADA

In 1915, control of this company was acquired by the Greenwater Copper Mines & Smelter Co., which see.

Address: Emery W. Elliott, 542 Mills Bldg., San Francisco, Calif. John McGee, supt., Box X, Tonopah, Nev.

Annual statement to December 31, 1919, shows: cash on hand, January 1, 1919, $2,537; received from assessment, $20,399; expenditures $21,564; cash on hand, December 31, $1,372. Assessment No. 10 levied September, 1918, delinquent, February, 1919. No. 11 was payable in September. Listed on San Francisco Exchange.

Property: 11 unpatented claims, about 300 acres, at Tonopah, Nye county.

Development: by 2-compartment shaft, 1,150' deep, which enters one of the ore-bearing formations at about 1,000'. Considerable exploration work was done on the 860' level, but it is said to have been all in cap rock and commercial ore was not found. Water hindered exploration during the early part of 1917. Management intends to explore the ground thoroughly by crosscuts and drifts. In June, 1918, work was resumed on the 1,100' level and a 12' vein intersected about 130' north of the shaft. All further work on the veins was suspended in October owing to the necessity of enlarging the shaft. A new 4-compartment shaft was sunk and is reported down 600' in August, 1919.

GREENWATER COPPER MINING & SMELTER CO. NEVADA

Address: Lloyd E. Marsden, sec.-treas., Room 515-E, 30 Church St., New York.

Officers: Chas. R. Miller, pres.; M. R. Ward, v. p.; preceding, Max E. Bernheimer, Chas. Gold, W. G. Denham, Clyde Milne, Oscar A. Dreyfus, F. I. Mallory, B. H. Campbell and W. H. Drayton, 3rd, directors, at last accounts.

Inc. Dec. 12, 1906, in Delaware. **Cap.,** $25,000,000; shares $5 par. Was a securities holding company only, and owned stock in a number of Greenwater promotions, all dead, described Vol. VIII, Copper Handbook. Company, December 31, 1910, had $144,727 invested in choice bonds, after losing about $170,000 through the failure of Chas. Minzesheimer & Co., New York brokers, who failed October 15, 1910.

Reorganized October, 1914, and capitalization reduced to $500,000;

par; 3,000,000 issued. Stock listed on the N. Y. Curb. Annual report ember 31, 1916, showed cash assets of $52,630, less expenses and loss on 50, leaving $47,670 net. Corporation Trust Co., Jersey City, N. J., transfer its. Annual meeting, second Friday in February.

Property: in August, 1911, company took over the O. K. and Supply ips, gold mines at Dale, Calif. Considerable work was done on the Supply t. In 1915 a crosscut on the 700′ level cut the Armenian and Jeane veins, ying practically no metal. Two winzes were sunk and drifts extended on 800-1,100′ levels of the Supply vein with negative results. The value de- sed with depth, and on the 1,200′ level no pay-ore was found. All develop- t and prospect work gave unsatisfactory results and the property was aban- d in October, 1915.

In November, 1915, the company acquired stock control of the Tonopah anza Mining Co. and the Great Western Cons. Mining Co., at Tonopah, Nev. The cost of shares and assessments in first-named company to end of 1916 $31,867, and of latter company $14,910. For the Ruby claims, 125,000 sury shares at par, 10c. each, was paid.

Company now hopes to recoup losses sustained in Californian operations. lings described under their respective titles.

'SY QUEEN MINING CO. **NEVADA**

Offices: 265 Russ Bldg., San Francisco, Calif., and Tonopah, Nev.

Officers: C. F. Wittenberg, pres.; F. A. Burnham, treas.

Inc. in Nevada. **Cap.,** 1,250,000. Four assessments have been called. d on San Francisco Exchange.

Property: 53 acres in Tonopah mining district, Nye county, said to show r ore. Vein is from 1 to 5′ wide. Formation is rhyolite, quartz and trachyte.

Development: by 1,370′ shaft. On the 1,350′ level a crosscut was run . for several hundred feet. At 247′ from the shaft a 4′ vein was cut with from 8″ to 18″ in width, and a winze was being sunk on this vein at last nts.

.IFAX TONOPAH MINING CO. **NEVADA**

Offices: 1008 Kearns Bldg., Salt Lake City, and Tonopah, Nev.

Officers: F. M. Smith, pres.; Thos. Kearns, v. p.; F. J. Westcott, sec.; . Zabriskie, treas.; preceding, directors. B. F. Edwards, gen. mgr., Syndi- Bldg., Oakland, Cal. J. W. Sherwin, supt.

Inc. Sept. 27, 1902, in Utah. **Cap.,** $2,000,000; outstanding, $1,895,000; s $1 par. Stock transferred at company's office. Registrar & Transfer Co., assau St., New York, registrar. Annual meeting, second Tuesday in Oc- . Listed on New York Curb and San Francisco Exchange.

Property: 4 patented claims, 81 acres, adjoining the central portion of elmont property on the east. Company also operates property of the ll Extension Co. of Tonopah.

Ore: gold-silver, occurring in trachyte. For geology of Tonopah dis- see U. S. G. S. Prof. Paper, 42, or Jim Butler company herein.

Development: by vertical shaft, 1,734′ deep, with the deeper levels at 1,200′, 1,400′ and 1,700′. The 1,000′ crosscut picked up the easterly exten- of the Belmont vein and ore shipments were made. After considerable the vein was lost through faulting. Owing to an excessive flow of water was stopped until July, 1919, when the water was reported under control ork to be resumed.

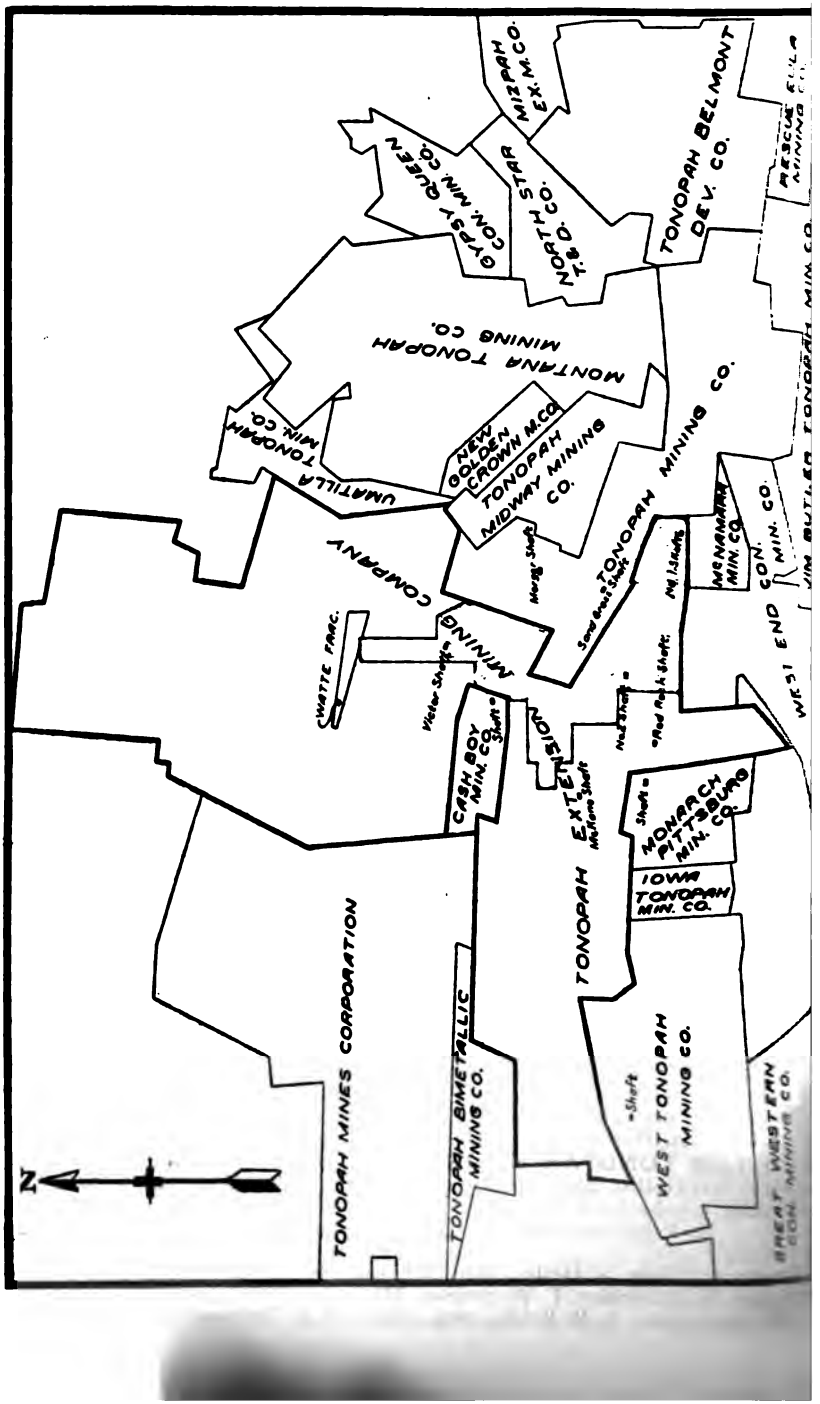
The West End Consolidated Co. is reported to be in charge of develop- work, taking treasury stock in payment.

BUTLER TONOPAH MINING CO. **NEVADA**

Office: 500 Bullitt Bldg., Philadelphia, Pa. Mine office: Tonopah, Nev.

Officers: Clyde A. Heller, pres.; Wm. M. Potts, v. p.; S. Deas Sinkler, p.; J. K. Kitto, sec.-treas.; R. G. Wilson, asst. sec.-treas.; C. B. Taylor, aniel.

Directors: Clyde A. Heller, Wm. M. Potts, R. G. Park, H. C. Brougher, Taylor, S. D. Sinkler, T. W. Synnott, M. B. Cutter and J. C. Fraley, Fred'k aw, gen. supt.; L. R. Robins, mng. engr.; Clyde Jackson, supt.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TONOPAH MINES CORPORATION
TONOPAH BIMETALLIC MINING CO.
TONOPAH EXTENSION
WEST TONOPAH MINING CO.
GREAT WESTERN COPPER MINING CO.
CASH BOY MIN. CO.
MONARCH PITTSBURG MIN. CO.
IOWA TONOPAH MIN. CO.
WEST END CON. MIN. CO.
MINING COMPANY
MONTANA TONOPAH MINING CO.
NEW GOLDEN CROWN M.CO.
TONOPAH MIDWAY MINING CO.
TONOPAH MINING CO.
UMATILLA
TONOPAH MIN. CO.
GYPSY QUEEN CON. MIN. CO.
NORTH STAR T.M.D. CO.
MIZPAH EX. M. CO.
TONOPAH BELMONT DEV. CO.
MINNAMAH MIN. CO.
JIM BUTLER TONOPAH MIN. CO.
Shaft
Main Shaft
Hoist Shaft
New Hoist Shaft
No. 1 Shaft
Main Shaft
Main Shaft
Main

Inc. Nov. 13, 1903, in Delaware. **Cap.**, $2,000,000; shares $1 par; all is- 1; 281,979 in hands of Trustee for company. Traded in on New York and ton Curb. Listed on San Francisco Exchange. Transfer agent: company's e; registrar: Fourth National Bank, Philadelphia. Annual meeting, second lnesday in January.

Dividends: initial of 10% was paid August 2, 1915. Total distributions ugust 1, 1918 were $1,151,074.

Treasurer's statement for 15 months ended December 31, 1918, shows: re- ts, $670,289, including $613,956 from ore shipments; disbursements for opera- s, $306,406; for Belmont Wagner Mng. Co., $235,853; for Belmont Shawmut g. Co., $107,435; dividends, $292,063; taxes, $42,937; cash on hand, $69,074; rty bonds, $102,500. Total net operating profit for the same period was ,053, as compared with $483,675 in 1917.

Property: 16 patented, 2 unpatented claims, 241 acres, at Tonopah, Nev.; the Ophir King group, 91 acres; also owns a one-quarter interest in an option he Eagle Shawmut mine, California, and Belmont Wagner property, both by the Tonopah Belmont Dev. Co. and separately described. The Jim er has $403,915 invested in these holdings.

Geology: of Tonopah is complex; a series of volcanic rocks, partly lava s, partly intrusive sheets and masses of quickly varying thickness overlie another irregularly. The productive veins are in the Mizpah "trachyte," laid by the Midway andesite and intruded by the West End rhyolite. The s are cut through by the Midway andesite and do not commonly outcrop, terminate against the Midway andesite at depths up to 1,200'. They are re veins which for some distance lie on or in planes of contact between tive rocks. Values are in gold and silver. See U. S. G. S. Prof. Paper, 42. The company holdings are identical in character to those of its neighbors, Tonopah Mining and Belmont companies.

Development: is through the Desert Queen and Wandering Boy shafts. elopment for fiscal year 1917 was 5,012', costing $8.59 per foot, and for 15 ths ending December 31, 1918, amounted to 4,649', costing $10.43 per foot. elopment work having failed to expose new orebodies of commercial value, her work on the 865' level of the Wandering Boy was planned for 1919.

Ore reserves: Sept. 30, 1917, consisted of 18,320 tons positive ore, 5,000 possible ore, a total of 23,320 tons, compared with 19,158 tons in preceding , practically all of which has been taken out. Geological development in ous parts of the mine are not encouraging, but results late in 1919 were rted as satisfactory.

Recent production and costs per ton:

	Ore, Tons	Value per Ton	(A)	Mng. Dev.	Trans.	Trmt. Chge.	Gen. Exp.	Total Oper.	Oper. Profits
....	27,688	$26.15	$2.14	$8.21	$0.53	$3.98	$0.89	$13.61	$10.40
....	40,297	26.12	1.79	5.17	0.71	5.33	0.73	11.94	12.39
....	46,489	19.78	1.56	4.80	0.83	4.79	0.38	10.80	7.73
....	48,533	19.25	1.74	4.29	1.08	5.02	0.28	10.40	7.11
....	34,722	21.45	2.14	5.36	1.07	5.58	0.32	12.18	7.13

(A) Deductions by ore purchasers.

n the 7½ months ending July 15, 1919, the profit from 4,226 tons was $20,568. is treated at the Tonopah Belmont mill.

The apex suit of the Jim Butler against the West End Co. for trespass and extracted was decided July, 1916, in favor of the West End Co. by the Supreme Court, and the judgment confirmed June, 1918, by the U. S. me Court. Pending the suit the West End continued to mine ore, but the ne was impounded, the total amount being $373,614, from 62,758 dry tons

The Jim Butler has been fairly profitable, but is now a mine of diminishing

NAMARA-CRESCENT MINING CO. **NEVADA**

Offices: 565 Mills Bldg., San Francisco, Calif., and Tonopah, Nev.

ORIENTAL MINING CO. NEVAI

Address: 565 Mills Bldg., San Francisco, Calif., and Tonopah, Nev.

Inc. 1919, by Geo. Wingfield, C. Brougher, and F. E. Ostwald. J. Joseph, pres. and mgr. **Cap.,** $300,000; 20c par; 600,000 shares in treasu

Property: New York-Tonopah group, 80 acres, adjoining the M. Namara-Crescent and under same management.

Development: by 850′ shaft, to be sunk to 1,400′. **Equipment:** elec: hoist and 100 h. p. motor installed in June, 1919.

OVERSIGHT MINING CO. NEVAI

Address: M. J. Scanlon, attorney, Reno; and Nick Schade, asst. s Tonopah, Nev.

Inc. February, 1920, in Nevada.

Property: 3 claims in Oversight section of Tonopah district, said to on direct strike of main E.-W. vein system. Shaft down 80′ and machi erected in March, 1920.

RALSTON MINING CO. NEVAI

Officers: Chas. E. Perry, pres.; Wm. Forman, v. p.; T. A. MacD sec.-treas.; J. H. Evans, R. J. Highland, directors.

Inc. July, 1916, in Nevada. **Cap.,** $1,000,000; $1 par.

Property: the K. C., or Gori McBride group, east of the Halifax adjoining the East End mine at Tonopah. The property was paid for 601,000 shares at 3c.

RESCUE-EULA MINING CO. NEVAI

Offices: 265 Russ Bldg., San Francisco, Cal., and Tonopah, Nev.

Officers: Chas. D. Laing, pres.; Herman Zadig, v. p.; with J. W. Do Oscar Daube and W. G. Morrow, directors. Chas D. Olney, sec.; J. J. McQu gen. mgr.; H. D. Moore, supt.

Inc. in Nevada. **Cap.,** $1,500,000; shares $1 par; assessable; outstan 1,400,000 shares. Assessment No. 11 was levied in December, 1918. S transferred at company's office. Registration Surety Co., San Francisco, re trar. Listed on San Francisco Stock Exchange and traded in on New Y Curb.

Profit for year ended June 30, 1917 was $56,133. A dividend of 2½c share was paid on June 8, equal to $35,539. The surplus was $33,245.

Property: the Rescue, Eula, Last Thought and Maggie May to 80 acres, at Tonopah, said to show silver-bearing ore in veins. Developed an 1,100′ shaft. Recent work confined to drifting on the 1,050′ level to ha the orebody found on the 950′ level.

Shipments are made to the West End mill and prospects are considered

TONOPAH BELMONT DEVELOPMENT CO. NEVAI

Office: 500 Bullitt Bldg., Philadelphia, Pa. **Mine office:** Tonopah, Ne

Officers: C. A. Heller, pres.; W. M. Potts, v. p.; S. D. Sinkler, C. B. Taylor, gen. counsel, with H. C. Brougher, M. B. Cutter, J. C. Fe R. G. Park, and T. W. Synnott, directors. J. K. Kitto, sec.-treas.; C. Doc comptroller. **Operating officials:** Frederick Bradshaw, gen. mgr.; G. Garrey, cons. geologist; Herman Dauth, mng. engr.; L. R. Robins, supt.; W. H. Royston, mill supt.; Temple Jackson, auditor.

Inc. 1902, in New Jersey. **Cap.,** $1,000,000; shares $1 par; increa 1906, to $2,000,000, but $500,000 was later cancelled, leaving $1,500,000 outst Stock transferred at company's main office. Fourth Street National Philadelphia, registrar. Annual meeting, last Tuesday in May, at Camden. Listed on Philadelphia, San Francisco and Salt Lake Exchanges and trad on New York and Boston curbs.

The company controls three subsidiaries, namely the Belmont Sur Mines, Ltd. of British Columbia, in which it invested $1,294,706; the Bel Shawmut Mining Co., California, $621,876; and the Belmont Wagner Co., Colorado, $605,479. The total sum is $2,522,061, and the first-name pany has repaid all loans advanced. Details of these companies will be under their respective titles.

Comparative general balance sheet: years ending on March 1, 1918, and ember 31 from then on:

Assets.

	Property	Invest's	Def. Chgs.	Supplies	Ore on Hand	Current	Total
..	$3,477.627	$2,368,379	$8,994	$172,141	$51,593	$642.097	$6,498,098
-18*	$1,055,770	$1,913,214	$6,377	$215,141	$51,546	$966,790	$3,942,111
..	1,360,717	20,125	1,078,525	212,800	89,159	1,255,044	4.016,370
..	1,563,189	27,500	360,888	188,813	108,499	1,473,522	3,722,411
..	2,141,473	29,453	100,040	157,735	139,796	1,425,441	3,993,938

* 10 months. The large deferred charges represent money advanced for lopment of subsidiaries; the large investments represent the interests in subsidiaries.

Liabilities.

r	Capital Stock	Current	Property Reserve	Tax Reserve	Net Surplus	Total
.....	$1.500,000	$170,165	$2,989,041	.....	$1,838,892	$6,498,098
-18....	1.500,000	186.611	.....	105,656	2,149,843	3,942,111
.....	1,500,000	136,820	.....	.....	2,379,550	4,016,370
.....	1,500,000	137,670	.....	.....	2,084,741	3,722,411

Comparative Operating Account, year ending March 1:

	Metal Receipts	Oper. Expense	Oper. Profit	Total Income	Deductions	Surplus	P. & L. Surplus
.....	.....	.....	$357,413	.....	.....	.....	.....
.....	$1,313,106	$739,031	591,489	$605,391	$384,912	$220,479	$1,838,892
18	2,048,504	1,097,802	1,026,702	1,142,449	874,342	268,107	2,149,843
.....	2,865,991	1,112,349	1,253,642	1,486,474	941,391	495,083	2,879,550
.....	2,100,522	1,184,865	975,657	1,047,768	796,756	251,012	2,084,741
.....	2,806,869	1,318,806	1,488,063	1,562,695	1,568,500	(a)5,805	1,903,286

Deductions include dividends and administration, taxes, etc. (a) Defiicit.

The net income for the first quarter of 1919 was $150,524, and available resources on March 31 totaled $557,140. The second quarter's net was 425, and available resources $501,646. For the September quarter the net ne was $139,403. Cash assets were $301,466. The last quarter gave $28,793 and cash assets were reduced to $293,402.

Dividends: 20c. in 1906; 20c in 1907; none in 1908-09; 15c. in 1910; 90c. 11; $1 in 1912; $1.10 in 1913; $1.10 in 1914; 50c in 1915; 50c in 1916; 50c 17; 22½c in 1918; and 30c in 1919 to Dec. 31, making a total of 40 distribu-, equal to $10,178,063.

Property: 11 claims, 161 acres, adjoining the Montana Tonopah and pah Mining properties on the east, at Tonopah; and control of the sub-ries mentioned. In October, 1919, 360 acres of land, said to contain coal, and ations of oil, near the Walker river, was purchased. To prospect for oil, evada Coal & Oil Co. was organized. The Bell copper mine in the Simon ct was reported acquired in August.

Geology: the Tonopah district is made up of a thick series of rhyolitic ndesitic rocks, which is faulted in a very intricate manner, together with the panying veins. The deposits are quartz veins, in part filled and in part cement, intersecting the earlier andesite and to some extent entering into nderlying rhyolite. Principal ore minerals are argentite and polybasite, with amounts of pyrite, chalcopyrite, galena, zinc blende and gold. Veins vary dth from 3' to 25'. The principal producer of the Tonopah Belmont has the Belmont vein, cut off near 1,500' depth by the Mizpah fault; the veins producing are not as productive as they were.

Development: by 3-compartment vertical shafts, 1,127' and 1,718' deep. ions during the years 1918, 1917-'18, and 1916-'17 were 9,263'; 14,437', and ', respectively. Total workings are about 40 miles. Results during 1918 fair, some small new veins being opened; in 1917-'18 reserves were not

increased, and in 1916-'17 work was satisfactory. A comparison of reser shows the following:

Year	Tons	Year	To
1915-'16.....	142,164	1917-'18.....	75
1916-'17.....	98,694	1918.....	82

Early in 1919, development of the South vein was under way at the 6 level, where a good shoot of ore was opened and in May the downward exte sion of this vein had been cut at a depth of 1,166'. Some time previous it w found at 800 and 900'. An electric locomotive is used on the 1,000' level, grea facilitating moving ore and waste.

Equipment: includes a 60-stamp cyanide mill, which started operatio in July, 1912. For a detailed description of this plant see Trans. A. I. M. August, 1915. To treat custom ore, this plant was enlarged in November, 19 The plant at Millers was closed during 1918, but reopened 1920.

Production:

	Tons Milled	Value p. ton	Oper. Costs Mine	Mill	Extr. %	Profit p. ton	Production—O Gold	Silve
1918.....	87,089	$16.40	$4.56	$2.95	92.13	$7.82	10,974	1,076
1917-'18.	130,991	16.57	4.44	3.21	94.13	8.10	19,953	1,946
1917.....	144,762	17.54	4.65	2.76	93.35	8.64	27,831	2,629
1916.....	165,157	13.88	3.92	2.68	92.97	6.59	31,112	2,968
1915.....	181,424	16.74	4.02	2.56	92.99	...	40,591	3,714
1914.....	172,398	21.08	4.35	3.05	94.45	8.83	44,465	4,251
1913.....	60,359	24.21	4.35	3.66	94.43	12.42	38,371	3,826
1912.....	87,349	20.84	4.85	3.36	....	14.31	45,069	4,535

To offset the decreasing production of the original claims at Tonopah, t company has been branching out, acquiring new properties, thus making t company a permanent organization independent of the life of the Tonopah min which is now visible. With silver at $1 per oz., the Belmont can make gr profits. Returns in 1919 were good, that for April being a profit of $44,306 fr 9,315 tons of ore. In July, 7,880 tons gave a profit of $36,554. The miner's str from August to October reduced the 1919 output considerably, but early 1920 the output was increased to 400 tons daily. In February, 1920, profit $9,175.

TONOPAH BONANZA MINING CO. NEVA

Address: 365 Bush St., San Francisco, Calif., and care John Mc Box X, Tonopah, Nev.

Assessment No. 5 of 1c levied May, 1918. Cash on hand, July 30, $3,201.

Control of this property was acquired, 1915, by the Greenwater Copper Mi and Smelter Co., which see.

Property: 15 unpatented claims, 380 acres, at Tonopah, Nev., increa 1916 by acquisition of the Desert King Mining Co.'s property, 40 acres, adjo on the S. E. The claims, which lie in the western section of the district, had compartment shaft, 1,100' deep, when new company took over the property some crosscutting had been done on the 600' level, but no commercial ore veloped.

During 1918 about 600' of crosscutting was done on the 1,637', but no found and all work was suspended in October. Plan repairing shaft and stalling pump, 1919-'20.

TONOPAH EAST END DEVELOPMENT CO. NEVA

Address: E. P. Cullinan, sec., Tonopah, Nev.

Inc. in South Dakota. **Cap.**, 1,500,000 shares.

Property: east of Mizpah Extension at Tonopah. Idle several yea

TONOPAH EXTENSION MINING CO. NEVA

Office: 30 Church St., New York. **Mine office:** Tonopah, Nev.

Officers: M. R. Ward, pres.; W. A. Mitchell, v. p.; with S. A. Ke

f. Schwab and W. R. Rose, directors. W. G. Benham, sec.-treas.; J. G. hen, gen. mgr.
Inc. 1902, in Arizona. Cap., 2,000,000 shares; $1 par; non-assessable; outling. 1,282,801. Original capital of 1,000,000 shares was increased June, to 2,000,000 and issue authorized of 156,294 shares for acquiring Tonopah ger and 173,074 shares for Tonopah Victor Co. U. S. Corporation Co., 34 au St., New York, transfer office and registrar Annual meeting in May. d on San Francisco and Nevada Stock Exchanges and on the New York

Comparative General Balance Sheet, year ending March 31:

Assets—

	Property & Equip.	Supplies	Invest's	Bullion & Cash	Other Current	Total
.....	$1,472,670	$132,297	$679,041	$211,698	$151,642	$2,647,349
.....	1,584,562	213,770	229,945	148,133	142,017	2,318,427
.....	1,692,766	134,965	179,945	319,586	12,238	2,339,500
.....	1,636,283	97,892	209,470	206,507	156,387	2,306,539
.....	1,217,246	79,048	130,462	190,606	128,208	1,745,570

Liabilities—

	Capital	Current	Surplus	Total
.....	$1,282,801	$254,928	$1,109,619	$2,647,349
.....	1,282,801	98,318	937,308	2,318,427
.....	1,282,802	246,184	810,514	2,339,500
.....	1,272,801	194,126	839,612	2,306,539
.....	943,433	134,450	667,687	1,745,570

urrent liabilities include dividends payable.

Comparative Profit and Loss Statement, year ending March 31:

	Metal Receipts	Total Income	Oper'g Expenses	Admin. & Gen.	Federal Taxes	Profit For Year
.....	$1,652,031	$1,630,280	$946,769	$63,635	$104,366	$515,509
.....	1,250,983	1,229,143	923,230	61,577	26,460	217,875
.....	1,707,174	1,663,918	963,020	43,863	.....	673,394
.....	1,532,900	1,555,639	859,089	66,017	.....	584,421
.....	1,289,817	1,341,620	662,269	50,140	.....	596,892

Dividends: (calendar year) 15% in 1905; 15% in 1906; 35% in 1917; g in 1917-'18; 9% in 1918-'19, and 25% in 1919, to October 1st, making a of $2,230,600.

Property: 628 acres in the Tonopah mining district, Nye county, Nev., s Tonopah Mining Co. on the W. and West End Cons. Mining Co. on

During the fiscal year 1910-11 the company acquired the properties of the lock Cons. Mining Co., McKane Mining Co. and Pittsburg Tonopah Exning Co. and in June, 1915, properties of the Tonopah Merger Mining d the Tonopah Victor Mining Co.
e Sully claims of 77 acres were bought for $10,000 in 1916.

Geology: ore carries silver and gold in quartz veins in rhyolite, trachyte oleanic breccia. The ore minerals are argentite, stephanite, polybasite, proustite and pyrargyrite. There are 5 main veins, from N. to S., the r, O. K., New Victor, Lower Contact, and Murray, of which the Murray most important, showing a stoping width of 14'. The veins strike N. 45° 70° W., and N. 70° W., with dip 20 to 70°, growing steeper with depth. rebodies occur in shoots ranging in width from 3-60', with a maximum of 600' for any single shoot.

Development: by 2 vertical main working shafts, namely, No. 2, 1,440' nd the Victor, 1,760' deep. Extensions during recent years were 13,967' -'16; 12,017' in 1916-'17; 10,993' in 1917-'18, and 10,322' in 1918-'19. Total

workings amount to 28 miles. During 1918-'19 the Lower Contact vein at 6 yielded a large quantity of fair-grade ore, but the stopes were exhausted.

At No. 2 shaft, the 1,440′ level produced most of the ore. A number good shoots were found, but chances for finding further large ore-bodies a remote. At 1,680′ in the Victor shaft the Merger vein yielded heavily, the M ray on this level, 600′ long, 3 to 30′ wide, of good grade. No definite calculati of reserves is possible. A 4-compartment shaft is being sunk below the 1,7 level, and early in 1920, it was decided to deepen the old McKane shaft to a de corresponding with the 1,540′ level of the Victor shaft. This will improve ve tilation and give access to ground on the west. A new head-frame, hoist, co pressor, skips, ore-bins and pumps were erected at the Victor shaft. Ore extracted by overhead stoping and subsequent waste filling.

Equipment: at the mine includes two 150 horse-power hoists, De duplex and Aldrich quintuplex pumps, 2 compressors of 1,700′ capacity, a tramway from mine to mill. The new hoist at the Victor shaft has a capacity hauling 4 tons at a speed of 1,000′ per min. from a depth of 3,000′. All m chinery is electrically driven. The 50-stamp cyanide mill has a daily capacity 400 tons.

In September, 1917, an auxiliary 500 k.w. power plant was tested. This to generate electricity when the Nevada-California Power Co.'s supply fails

Production (year ending March 31):

	Tons	Value	Extr.	Oper. Cost p. Ton			Metal Sold—O	
Year	Milled	Per Ton	%	Mine	Mill	Total	Silver	Gol
1919.	114,921	$15.449	93.05	$4.80	$3.68	$8.48	1,367,440	13,1
1918.	110,188	12.543	90.51	5.26	3.38	8.64	1,169,671	11,8
1917.	109,402	17.107	....	4.90	3.62	8.82	1,882,402	18,8
1916.	91,981	18.038	92.39	4.61	4.48	9.59	1,106,519	20,5
1915.	71,882	19.966	89.57	5.19	3.75	9.39	1,790,032	17,5

Yields in 1919 were maintained, that for July being 8,660 tons, 102,081 silver, 985 oz. gold, and a profit of $52,280. In February, 1920, profit was $27,4

The Tonopah Extension is in much better physical condition than it was 1917, and should pay regular dividends with silver at over $1 an ounce. Manag ment is capable and careful.

TONOPAH GOLD ZONE MINING CO. NEVAD

Reorganized as Gold Zone Divide Mining Co., of the Divide district, wh see.

TONOPAH MIDWAY MINING CO. NEVAD

Address: Tonopah, Nev.

Officers: H. C. Brougher, pres.-mgr.; R. P. Stenson, v. p.; E. P. Erick son, sec.-treas.; W. Brougher, R. B. Govan, W. J. Douglass, C. C. Boak, dire tors; W. J. Douglass, supt.

Inc. in Arizona; reorganized 1915, in Nevada. **Cap.**, 1,500,000 shar $1 par; assessable; outstanding, 1,132,096. On April 19, 1918, assessment No of 1c per share, was levied. Annual meeting, in February. Listed on San Fra cisco Exchange.

Property: 5 patented claims, 50.58 acres, in Tonopah district, said show silver and gold ore. The quartz vein in trachyte dips 45° and pay occurs in shoots. Five veins have been opened on the 600 and 800′ levels. D ing 1918 work was confined to the 600′ level. The S. crosscut from No. 2 was advanced 700′ and connection made with the Tonopah Mining Co.'s w ings on the Last Chance vein. This vein on the Midway is said to be 6-15′ in width and in places runs as high as $384 per ton.

In 1919, work is being done on the 800′ and additional compressors instal to continue work on the 1,200′ level, where a 20′ vein expected to be the d ward extension of the Brougher or Last Chance vein is to be developed.

Threatened litigation with the Tonopah M. Co. over the Last Chance has been amicably settled, the Midway receiving $34,527 in cash and a ver side-line [illegible] which will obviate future apex claims. Shipments are to We[illegible]

Development: by 2 shafts, 1,400′ and 835′ deep.
Operating expenses for year ending December 31, 1918, were $41,571 and re- s totaled $66,880, including ore sales, $17,456; assessments, $14,772.

NOPAH MINING CO. OF NEVADA **NEVADA**

Office: 572 Bullitt Bldg., Philadelphia, Pa. **Mine office:** Tonopah, Nev.
Officers: J. H. Whiteman, pres.; C. R. Miller, v. p.; C. A. Higbee, sec.- s., with Samuel Bell, Jr., Barton Hoopes, Jr. and H. D. Moore, directors. H. Blackburn, gen. supt.; H. W. Stotesbury, mine supt.; H. A. Johnson, supt.
Inc. July 12, 1901, in Delaware. **Cap.,** 1,000,000 shares; $1 par; all outding. Annual meeting, May. Transfer office: 572 Bullitt Bldg., Philadelphia, Listed on Philadelphia and San Francisco Stock Exchanges and on New k and Boston Curbs.
Comparative General Balance Sheet, year to March 1, and to Dec. 31, 1916 and thereafter; assets are as follows:

Assets.

	Prop. & Equip.	Invest's	Loans & Advances	Def'd Ch'g's	Other Current	Total
.....	$141,183	$2,363,230	$2,816,120	$189	$351,711	$5,672,434
.....	213,003	2,331,863	2,319,745	422	491,894	5,356,929
.....	127,234	3,085,876	1,480,667	226	661,222	5,355,224
-16...	113,530	3,147,832	911,432	1,603	512,364	4,686,861
-15...	162,970	3,104,511	566,265	1,370	929,178	4,764,294

The loans are to subsidiaries.

Liabilities.

	Capital Stock	Deprec. Reserve	Current	Net Surplus	Total
.....	$1,000,000	$316,740	$156,251	$4,199,444	$5,672,434
.....	1,000,000	316,740	177,306	3,862,884	5,356,929
.....	1,000,000	320,502	356,605	3,678,117	5,355,224
-16.....	1,000,000	250,000	53,941	3,382,920	4,686,861
-15.....	1,000,000	50,000	64,760	3,649,534	4,764,294

Comparative Income Account, year to March 1 and Dec. 31, for 1916 thereafter.

	Metal Receipts	Total Receipts	Oper. Expense	Net Income	Taxes	Divid's & Deprec'n	P. & L. Surplus
*.....	.....	.....	.....	$243,290	.....	.....	.....
.....	$1,555,692	$1,848,659	$722,812	782,062	$101,441	$375,000	$4,199,444
.....	1,068,401	2,818,134	959,078	825,259	52,198	600,000	3,862,884
.....	1,141,181	.....	823,093	918,065	.....	560,502	3,748,127
-'16...	1,831,589	.....	1,380,693	783,064	.....	1,089,678	3,704,259
-'16...	.....	.....	1,628,548	925,557	.....	1,165,234	3,860,244

*7 months.

Dividends: 1905, 75% of capital stock; 1906 and 1907, 120%; 1908, 50%; , 130%; 1910, 150%; 1911 and 1912, 160%; 1913, 145%; 1914, 100%; 1915, ; 1916, 60%; in 1917, 60%; in 1918, 37½%, and 30% in 1919 to October. total paid is now $14,875,000.

Property: 160 acres at Tonopah, Nye county, adjoins Tonopah Exten- on the east and north and Jim Butler Tonopah Mng. Co. on the north. Also s controlling interest in the Tonopah & Goldfield R. R. Co., 55% in the Mining Co. of Nicaragua, control of the Tonopah Nicaragua Co., and the Tonopah Placers Co. of Colorado. Also owns $19,875 capital [illegible] Esmeralda Power Co. and 92% of the Tonopah Canadian Mines Co. has acquired property in the Schist and Flin Flon lake district of is doing considerable work through its subsidiary, the Mandy min- descriptions see under respective titles.
[illegible] of the Tonopah district, see Tonopah-Belmont Mining Co. and

workings amount to 28 miles. During 1918-'19 the Lower C ... Mizpah. Dee... yielded a large quantity of fair-grade ore, but the stopes w... ...ume shaft ... At No. 2 shaft, the 1,440′ level produced most of ... .500′ deep and ... good shoots were found, but chances for finding fur... ...pah shaft is b... remote. At 1,680′ in the Victor shaft the Merger ve... ray on this level, 600′ long, 3 to 30′ wide, of good ... of reserves is possible. A 4-compartment shaft ...e any large bod... level, and early in 1920, it was decided to deeper ... pillars and the ... corresponding with the 1,540′ level of the Vi... ... good deal of ha... tilation and give access to ground on the v... ...ily were sent to ... pressor, skips, ore-bins and pumps were ... Mizpah and Silver ... extracted by overhead stoping and subs... ...s, as much as 15,000 ...

Equipment: at the mine inclu... ... in November, 1918, and ... duplex and Aldrich quintuplex pur... ...e upper levels, the Sand Gr... tramway from mine to mill. The r... ...onopah Belmont mill. In Janu... hauling 4 tons at a speed of 1,0... ...Mizpah vein on the 400′ level of ... chinery is electrically driven. T... ...p cyanide mill at Millers, 12 miles ... 400 tons.

In September, 1917, an ... ...nts. The mill has been closed down for s... to generate electricity whe... ...tion of work was contemplated, partly to ...

Production (year ...

Year	Tons Milled	Va... Pe... S...	Tons	Value	Extrac., %	C...
1919.	114,921		155,683	$9.75	91.4	$...
1918.	110,188		109,835	14.85	91.9	9...
1917.	109,402		81,782	15.65	90.1	8...
1916.	91,981		136,246	13.66	...	...
1915.	71,88...		143,432	16.25	...	...

... Mining and company's own mill charges.

Yields ... ...e weekly output of ore to the Belmont was 1,050 tons. ... silver, 985 ... ...g 4,395 tons, yielding 63,678 oz. silver, 690 oz. gold, a... The ... ...orresponding figures for July were 3,950; 64,800; 600 ... 1917, an... ...uary, 1920, profit was $5,800.

...ment is ... ...l, 1917, J. E. Spurr, in charge of the Exploration Depart... **TONC** ... ...e department was discontinued. From January, 1912, to ... R... ...ost was $261,108, and total value of results, $7,858,601.

see... ...ure life of the Tonopah property is fast nearing an end ... **TO**... ...and to make a permanent dividend-paying organization. ... ...been acquired. There is no doubt that the plan will succee... ...ent is thoroughly experienced and capable.

st... **NORTH STAR TUNNEL & DEV. CO.** NEVA...

t... ...5 Russ Bldg., San Francisco, Cal. **Mine office:** Tonopah ... ...s: H. Zadig, pres.; C. D. Olney, sec.; A. E. Lowe, supt. ...12, in Nevada. **Cap.,** $1,000,000; $1 par; assessable. Assessm... ...e levied October 15, 1917. Company's San Francisco office, tra... ...egistration Surety Co., San Francisco, registrar. Annual meetin... ...sted on San Francisco Exchange.

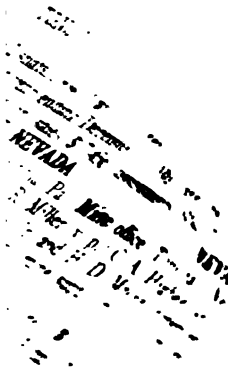
...perty: 5 claims, Ivanpah, Elaine, Pyramid Fraction, Crosscut ... ...f Extension, 46 acres in Tonopah, said to show gold and silver ore ... **...velopment:** by shaft, 1,250′ deep; lateral workings total about ... ...n after reorganization the company struck a shoot which yielded ... ...d of tons of shipping ore in 1913 and 1914, but the shoot proved of li... ... and shipments declined. Development is hampered by lack of ... 1916 company has made sundry shipments to West End mill, but not ... to meet expenses, until in 1920 rich ore was found between the 950 ... levels, and daily shipments made of $40 ore.

...NOPAH 76 CONSOLIDATED MINING CO. NEVA...

Address: L. S. Reese, Reno, Nev.

Officers: M. R. Averill, pres.; T. J. Lynch, v. p.; with W. S. Harr... ...lumenthal, directors.

1911, in Nevada. **Cap.,** 1,500,000 shares; $1 par; non-assessable



al meetings since July, 1913. Listed on San Fran-

and fractions, about 60 acres, ½ mile W.

00′ deep. The West End M. Co. is
ven from its 1,800′ level to the 76

hoist.

NEVADA

Tonopah Extension Mining Co.,

ING CO. **NEVADA**

ton, Mass.

; F. W. Paine, v. p.; Oscar Rohn, sec.;
ner, Wm. Everts, and Frank Price, directors.

ween the holdings of the Tonopah Bonanza
d the Great Western Cons. Mng. Co. on the south,
ed through the workings of these companies. No re-

OPAH MINING CO. **NEVADA**

ss Bldg., San Francisco, Calif. **Mine office:** Tonopah.
erman Zadig, pres.; A. S. Wollberg, v. p.; C. D. Olney, sec.,
ourn and S. D. Landecker, directors. A. S. Haskell, supt.
Nevada. **Cap.,** $1,500,000; $1 par; assessable. Assessment No.
per share, levied June 13, 1918. Company office, transfer office. Regis-
surety Co., San Francisco, registrar.

roperty: 8 claims, 80 acres, in Tonopah district, Nye county, developed
00′ shaft. Reported merger with Montana Tonopah Mng. Co. as After All
Co., in 1916, was presumably never carried out.

T END CONSOLIDATED MINING CO. **NEVADA**

ice: Syndicate Bldg., Oakland, Calif. **Mine office:** Tonopah, Nev.
icers: F. M. (Borax) Smith, pres.-treas.; J. F. Carlston, v. p.;
is, sec., with L. W. Bennett, R. P. Jennings, C. P. Murdock and R. L.
, directors. J. W. Sherwin, gen. mgr.; H. D. Budelman, mine supt.; W. D.
, mine foreman; F. C. Ninnis, mill supt.; J. R. Blair, auditor.
n. May 2, 1906, in Arizona. **Cap.,** $10,000,000; $5 par; 1,786,000 out-
g. Listed on San Francisco Exchange and New York Curb. Registrar
fer Co., New York, transfer agent and registrar. Annual meeting, first
day in March.

Financial Statement.

	Cash on hand	Revenue	Disburse-ments	Dividends	Balance
.....	$47,656	$2,030,897*	$1,466,949	$357,697	$253,907
.....	130,772	1,204,442	1,198,134	89,424	47,656

The apparent revenue is swollen by inclusion of bullion coming from cus-
e treated in mill as well as the sums received in settlement of the dispute
e Jim Butler company.

Assets and Liabilities.

Cash & Bullion	Invest.	Other Assets	Total Assets	Total Liabil.	Surplus
$530,743	$690,330	$390,363	$1,611,448	$201,580	$1,409,868
346,734	530,680	700,986	1,578,400	572,377	1,006,024

vidends: in 1915, 5c.; in 1914, 15c.; in 1915, 10c.; in 1916, 5c.; in 1917,
1918, 20c.; in 1919, 10c. The total is **$1,251,940.**

operty: 10 patented and 7 unpatented claims, 84 acres, in the Tono-
strict. (In the suit of the Jim Butler v. West End, concerning apex
the West End-McNamara vein, instituted in 1914, the West End was

given a final favorable verdict in June, 1918.) Other holdings include 2,2 acres at Searles lake, California, leased from the U. S. Government. This being developed for potash, and $74,592 was spent to the end of 1918. In Ho duras, Central America, a promising gold-silver mine is under exploitation, which, so far, $33,953 has been spent.

Development: by 3 shafts, deepest 1,212', with 13 miles of working In 1917, extension amounted to 7,625', also sinking the Ohio shaft to 1,212'. new vein was found on the Ohio 500' level. Of the lateral work on this vein 1,225'—1,010' was in pay ore, the remainder in second-class ore. From April December it yielded 11,837 tons valued at $250,000. Reserves were 10,333 to of positive ore, valued at $206,660: 35,905 tons of probable ore, worth $1,015,0 and 61,111 tons of possible ore. The new vein is in trachyte. During 1918 sults in the Ohio were good, reserves increasing to 82,000 tons worth $2,000,0 The West End section can be counted on to yield profitably for some time.

Equipment: includes hoists, buildings, compressors, etc., and a stamp mill and cyanide plant. The daily capacity of the mill was originally 100 to but has been increased to 225 tons. Total cost of plant is more than $170,0 About 1,400 tons a month are treated from other mines.

Production:

Year	Ore Treated	Extraction %	Gross Value	Silver oz.	Gold oz.	Co per T
1918.....	50,195	91.97	$990,185	826,577	8,676	$1
1917*.....	45,910	92.69	721,937	677,117	7,161	1
1916.....	61,535	91.22	1,319,651	1,351,658	14,752	
1915.....	56,976	90.92	958,657	1,210,038	13,219	

* From 1917 on, these figures refer to company ore only.

Recent shipments have been over 100,000 oz. of silver-gold bullion month

The company's position is greatly improved by late developments and high price of silver.

Under date of January 7th, 1920, Mr. F. M. Smith, president of the W End Consolidated Mining Company, advised the stockholders that the direct decided to allocate the equities now possessed by the company in Tonopah, N California and Honduras, Central America, by organizing a new company to called the West End Mining Company, with an authorized capital of $2,000,0 to take over the silver properties in Nevada. A second company, viz.: the W End Chemical Company, with an authorized capitalization of $3,000,000, will over the Searles Lake properties in California. A third company, the West Opoteca Company, with an authoriaation of $3,000,000, will take the properties in Honduras.

The West End Consolidated Mining Company will be dissolved and 1,7 shares of capital stock of each of the new companies will be distributed t present stockholders.

Mr. Smith states: "The properties at Tonopah continue to be oper with good returns. The recent increase in the price of silver materially ad our ore reserves by making tonnages of ore, heretofore called low-grade, a able for milling at a profit. Recent developments underground continue to pose continuations of ore shoots previously opened up, with good values. T factors, together with the well known condition of the mine, give assuran continued operation of our mill."

The latest shipment of bullion from the West End company's mill at T pah consisted of 24 bars weighing 44,700 oz., and calculated to be worth $6 This shipment is the result of two weeks run in December and reflects the eral good condition of operations at the mill. It is generally believed tha West End mine at Tonopah has ore reserves sufficient to operate the mill fo years and that in addition it has virgin territory yet to be explored.

WEST END EXTENSION MINING CO. NEVA

Idle.

Officers: Franz Sigel, pres.; Frank S. Harris, v. p.; Daniel O. H sec.-treas., with M. T. Rowland and Jas. M. Satterfield, directors, at la counts.

Inc. in Delaware. **Cap.**, $1,000,000; issued $600,000; shares $1 par. U. S. ...p., New York, transfer agent and registrar. Report for year ending Decem- 31, 1917, shows an indebtedness of $1,200.

Property: 4 claims, the Bank group, 70 acres, at Tonopah; adjoins West ...d Cons. on the north and Tonopah 76 on the west.

...ST TONOPAH MINING CO. **NEVADA**

Office: 301 Nat'l Bank Bldg., Tonopah, Nev.

Officers: M. R. Ward, pres.; R. E. Mulcahy, v. p.; J. A. Perry, sec.- ...s., with A. Hamilton, F. S. Glover, C. W. Buthmann and E. C. B. Adams, ...ctors; J. G. Kirchen, mgr.; H. L. Williams, supt

Inc. in Nevada. **Cap.**, $1,000,000; shares $1 par; all issued; assessable. ...ted on San Francisco Exchange. Annual meeting, first Tuesday after first ...nday in January.

Property: 7 patented claims, 123 acres, in Esmeralda county. **Geology:** ...rtz vein in trachyte and rhyolite, dipping 65 to 70°, with E. W. course. Ore ...tains gold and silver.

Development: 1,100′ shaft, to be deepened when water is overcome. On ... level an 800′ crosscut passed through the vein, which is to be developed at ...th.

Equipment: 75-h. p. hoist, compressor, 75-h. p. triplex pump, ventilating ... etc.

NEW JERSEY

Companies are arranged in alphabetical order.

...LBACH SMELTING & REFINING CO. **NEW JERSEY**

Office: 580 Market St., and works, 111 Passaic Ave., Newark, and on ...ark Bay, N. J.

Officers: Archibald R. Watson, pres.; Julian B. Beatty, v. p.; E. E. ...fenbach, supt., with W. I. Cooper and E. T. Villareal, directors; F. Schmut- ...sec.

Inc. 1891, in New Jersey. **Cap.**, $1,000,000; $100 par; in 500,000 pre- ...ed and $500,000 common stock; 3,900 preferred and 3,900 common shares ...ed and outstanding. American Metal Co. is the purchasing and selling agent, ...ing 1,300 pfd. and 1,302 common shares, representing ⅛ interest, having a ...k value of $225,600 to A. M. Co.

Works: at Newark comprises an electrolytic refinery, a lead desilvering ...t, and a small copper smelting plant. The refinery has 444 tanks, in parallel, ... two 360 k. w. generators. Plant has a capacity of 1,800 to 2,000 tons electro- ... copper per month, employing 150 men. The metallurgical practice of the ...ks ranks high. The lead refinery, with a capacity of 4,000 tons per month, ...ted at Newark bay, went into operation July, 1913. Company does a custom ...ess in ores, bullion, residues, blister copper, etc., containing gold, silver, ...mum, copper and lead.

Company also owns real estate in the city of Newark, and on Newark Bay, ...ed at $500,000.

...INGTON SMELTING & REFINING CO. **NEW JERSEY**

...dress: Charles Engelhard, treas., 30 Church St. New York. Works ...ington, N. J.

...icers: W. L. Glorieux, pres.; C. O. Bager, v. p.; C. W. Baker, v. p.; ... A. Knorre, sec.

...operty: is an electrolytic smelter and refinery for gold, silver, plati- ...d copper ores.

...JERSEY ZINC CO. **NEW JERSEY**

...full description in first part of United States section.

...any not only owns the Franklin Furnace, N. J., mines, but has hold- ...ious states and is, therefore, grouped with the Am. Smelting & Re- ... S. Smelting and other large companies with widely scattered holdings.

... NICKEL-COPPER REFINERY **NEW JERSEY**

... of International Nickel Co., 43 Exchange Place, New York. Plant

at Bayonne, N. J., treats nickel-copper matte from Sudbury smelter. A. J. Wa hams, supt. of plant; H. W. Walter, asst. supt.

PERTH AMBOY SMELTER **NEW JERSE**

Owned by American Smelting & Refining Co., which see. Has 600-ton c per-lead smelter, 200-ton lead refinery and a 300-ton electrolytic copper refin at Perth Amboy, employing about 2,000 men.

See A. S. & R. in U. S. section of this book.

RARITAN COPPER WORKS **NEW JERSE**

Owned by International Smelting & Refining Co. (q. v.), at Perth Amb N. J. A. C. Clark, supt.

THOMAS IRON CO. **NEW JERS**

Office: Hokendauqua, Pa. **Mine office:** Wharton, N. J.

Officers: W. A. Rarrows, Jr., pres.-mgr.; Fred R. Drake, v. p.; with Samuel Krause, Edwin Thomas, Andrew D. Chidsey, J. Mark Mauser, Thos Ritter, directors. Oliver T. Case, sec.-treas.; L. H. Stone, supt.

Inc. April 4, 1854, in Pennsylvania. **Cap.,** $2,500,000; $50 par. Auth ized bond issue, $1,000,000; $639,500 issued. Dividends total $150,000. St transferred at company office.

Property: Richard iron mine at Wharton, Morris county. Ore mag tite (Fe_3O_4) occurs in lenses in gneiss, and averages 58% iron. The mine worked by back stoping and shrinkage methods.

Development: by vertical shaft to depth of 1,400', with 10,000' of w ings.

Equipment: includes 200-h. p. electric double drum hoist, two el compressors of 800 and 2,800 cu. ft. capacity and 1,000-ton magnetic conc. m

Reserves: estimated by management to consist of 800,000 tons of blocked out with total reserves amounting to 2,000,000 tons.

Production: to 1918, 3,000,000 tons. Mine was not operated in 1 In June, 1919, company reports sinking a new electrically equipped shaft.

Company operates five blast furnaces at Alburtes, Helertown and He dauqua, Pa., producing 1,249,423 tons pig iron in 1918.

UNITED STATES METALS REFINING CO. **NEW JER**

Subsidiary of the American Metal Co., which see, under United States.

NEW MEXICO

According to the U. S. Geological Survey the output of the mines of Mexico for 11 months of 1919, with December estimated, amounted to $5 in gold, 709,000 ounces of silver, 2,800,000 pounds of lead, 52,200,000 pou copper, and 8,000,000 pounds of zinc, as compared with $682,791 in gold, 7 ounces of silver, 8,398,239 pounds of lead, 98,264,563 pounds of copper 24,050,324 pounds of zinc in 1918. These preliminary figures show decrea $115,000 in gold, 73,000 ounces of silver, 5,600,000 pounds of lead, 46,0 pounds of copper, and 16,000,000 pounds of zinc.

Mills of the Mogollon district, Socorro county, produced $129,000 in gol 310,000 ounces of silver as compared with $119,710 in gold and 302,902 oun silver in 1918. The Mogollon Mines Co.'s mill was operated steadily, Socorro Mining & Milling Co.'s mill was closed April 1, and operations we resumed. The shipments of gold-bearing siliceous copper ores from Lord increased heavily, but there was a decrease in the shipments of gold-bearing copper ores from Orogrande. Very little gold or silver ore was shipped Pinos Altos. The Whiteoaks district continued to produce gold from a mating mills.

The output of copper in 1919 was only a little more than half that in In 1919 the Chino Copper Co.'s output was 43,992,000 pounds, as compare 79,340,372 pounds in 1918. The Burro Mountain Branch of the Phelps Co., which in 1918 produced 53,146 tons of concentrate averaging 14.9 pe copper, was even more seriously affected by the drop in the price of copp suspended milling operations early in the year. The copper-matting San Pedro was dismantled. The 85 Mining Co., at Lordsburg, made a l

ıse in shipments in 1919, but shipped crude ore entirely as compared with centrates and crude ore in 1918. The copper ore shipments from Orogrande reased heavily.

The mining companies of this state are arranged alphabetically.

MIRAL GOLD AND COPPER MINING CO. **NEW MEXICO**

Idle. **Office:** Tusas, Rio Arriba county, N. M. G. F. Hall, mgr.

Inc. 1900, in New Mexico. **Cap.,** $500,000; shares $1 par.

Property: 8 claims, 160 acres, in the Bromide district, shows 3 fissure ıs carrying silver, copper and gold ores, opened by 3 shafts, deepest 150'. :tive owing to lack of funds.

HAMBRA MINING CO. **NEW MEXICO**

Defunct. Silver City, New Mexico.

ERICAN EXPLORATION & MG. CO. MEXICO & NEW MEXICO

Mine offices: Steeple Rock, Grant county, N. M.; Ahumuda Bravos, ıuahua, Mex., and Terrazas, Iturbide, Chihuahua, Mex.

Officers: Henry A. Haile, treas., with Jas. Duckworth, Geo. Empsall, sdale Smith, Arthur Smith, of Springfield, Mass., Jesse W. Morton and ry Hinckley, directors.

Inc. Sept. 28, 1907, in Maine. **Cap.,** $500,000; $1 par; issued 275,748.

Property: 600 acres, 16 claims, in New Mexico, and 12 properties in ico, also 3 mill sites.

Property includes the Burnham mine at Terrazas, the San Ignacio at Ahu- a, in Chihuahua, Mexico, and the Hinckley, at Steeple Rock. The New ican property has tunnels of 100' and 313' and shafts of 100', 100' and 150', 1,223' of workings, carrying mainly silver ore. The property at Ahumuda shafts of 25', 100', 160' and 474', giving ore assaying about 30% lead, 6% and 12 to 20 oz. silver per ton. The property at Terrazas shows contact sits between limestone and porphyry, giving assays of about 3% copper, lead, 8 to 20 oz. silver and $2.50 to $12 gold per ton. Development: by ts of 187' and 200'. Equipment included a 55-h. p. gasoline plant and neces- mine buildings.

ERICAN GOLD, COPPER M. & SM. CO. **NEW MEXICO**

Address: Santa Fe, New Mexico.

This company was forced into a receivership and the properties were pur- rd by George Heineman, of 1524 Poplar St., Kansas City, Mo., at receivers Awaiting final decision of court.

ERICAN SILVER CORPORATION **NEW MEXICO**

Inc. 1920 in West Virginia, to acquire property of Socorro M. & M. Co.

ACONDA SKOOKUM COPPER GROUP **NEW MEXICO**

Mail returned unclaimed from last address: E. H. Rodgers, 310 West Mis- i St., El Paso, Texas. Owned by E. H. Rodgers, L. H. Davis and J. F. ling.

Property: 4 claims, unpatented, located at north end of the San Andreas , Socorro county, 26 miles west of Oscuro, on the E. P. & S. W. R. R. to cover 6,000' of a quartz lode in granite, from 20' to 100' wide, and to disseminated copper sulphide ore, assaying 2½% copper, 1½ oz. silver and $5 gold per ton.

Development: opencuts and pits along the strike of the lode.

[illegible]SON-APACHE COPPER CO. **NEW MEXICO**

Mail returned unclaimed from last address:

[illegible]: Anderson, El Paso, Tex., chief owner. **Mine address:** Hachita, Co., N. M.

[illegible]rs: at last accounts, Hon. Geo. H. Neale, pres.; Harry Duey, v. H. Howe, sec.-treas.; Arthur Houle, cons. engr.

June 1, 1907, in Arizona. **Cap.,** $500,000; shares $5 par. Held [illegible] a $100,000 bond and lease, with $20,000 paid.

[illegible]ty: the Apache mine, 5 claims, 100 acres, 5 miles southeast of [illegible]Mine, opened 1883, was worked continuously until 1907 by leasers, pro- [illegible]ximately $200,000. Property said to show contact deposit 50-150'

wide between quartz-feldspar-hornblende-porphyry and carboniferous limestone, with ore, oxidized to present depth, and running 4 to 30% copper with one ounce silver to each unit of copper. Bornite ore occurs at the bottom of the shaft.

Development: by a 360′ shaft, for a length of 400′ and along the surface for 600′, said to show 200,000 tons of ore, with about 40,000 tons blocked out for stoping.

Shipments of low-grade copper and silver ore with lime gangue made intermittently to the El Paso smelter. Presumably idle.

ANIMAS PEAK GOLD MNG. CO. **NEW MEXICO**

Property: at Hillsboro, Sierra county, N. M., formerly owned by the defunct Hillsboro Cons. Mng. Co. of odious fame. Management planned refinancing company and development in accordance with available funds. Work on 200′ double compartment shaft started March, 1915. On the 200′ level an ore shoot, 3′ wide, was said to average $35 per ton in gold. No recent returns secured.

ATWOOD COPPER CO. **NEW MEXICO**

Name changed to Boston-Emerald Mining Co., which see.

AUSTIN-AMAZON COPPER CO. **NEW MEXICO**

Offices: 116 Texas Bldg., El Paso, Texas; Room 4 Porterfield Bldg., Silver City, N. M. **Mine address:** Tyrone, N. M.

Officers: Chas. E. Davis, Mayor of El Paso, pres.; M. W. Porterfield, v. p.; C. H. Leavell, sec.-treas., with John M. Wiley, managing director, and D. M. Jackson, director. J. H. Shockley, mgr.

Inc. Dec. 1, 1916, in New Mexico. **Cap.,** $1,500,000; $1 par: 1,060,000 outstanding. El Paso Bank & Trust Co., registrar and transfer agents. Annual meeting, second Tuesday in March.

Property: 15 claims, 500 acres, in Burro Mtns., Grant county, 6 miles W. of Tyrone.

Ore: chalcopyrite occurs in contact and quartz veins, running N.E.-S. W. through monzonite (quartz-diorite), and said to average 6% copper. A N.-S. mineralized shear zone, in places 150′ wide, is said to traverse seven claims.

Development: 3,000′ of shafts, drifting, etc. Over 30 shallow openings show ore. Management planned sinking to 700′ level, in 1917-18, but due to war conditions, high costs, etc., the property was closed down January 1, 1918.

Equipment: includes 18-h. p. gasoline hoist and compressor. Shipments to October 1st, 1917, 137 cars of 6.26% copper ore. J. H. Shockley reported that property could be made one of the important copper mines of the West.

AZTEC COPPER CO. **NEW MEXICO**

Office: 707 Colorado Bldg., Washington, D. C. **Mine office:** Organ, Dona Ana Co. N. M.

Officers: Gen. H. H. C. Dunwoody, pres. and mgr.; C. C. Clement, v. p.; B. K. Roberts, sec.-treas., with Col. M. C. Wyeth, C. F. Humphrey and Admiral C. H. Davis, directors.

Inc. in Arizona. **Cap.,** $1,000,000; $1 par; 600,000 shares issued.

Lands: 4 claims, 6 acres, in the Organ Mountain mining district, about 12 miles by good road southeast from Las Cruces. Claims cover the mineralized limestone porphyry contact worked by the Modoc mine. Developments are on the Orejon claim, opened by a 140′ 45° inclined shaft, sunk on a 12 to 18″ vein reported to carry copper, silver, lead and zinc ore, averaging $40 per ton. No recent reports available.

AZURE MINING CO. **NEW MEXICO**

Office: 170 Broadway, New York City. **Mine office:** Tyrone, Grant county, N. M. Louis Kahn, pres.; M. D. Rothschild, sec.-treas. Wm. Roger Wade, supt.

Inc. 1890, in New York. Is operated as a close corporation.

10 claims, 1,800 acres, near the Burro Chief group of the Co. Company sold 73½ acres, 1909, to Mangas Development

Burro Mountain property shows monzonite, quartz

rphyry and granite, with fissure veins in granite and disseminated ore in rphyry, there being 7 orebodies with 2 under development. The Santa Fé in is from 15 to 75′ wide, averaging 40′ and is traceable for 6,000′. This vein developed by a 417′ shaft, having 5 levels with 15,500′ of workings showing m turquoise as well as copper ore. The old turquoise mine has 2 tunnels and ge open-cast workings.

Besides the Santa Fé vein, the property has disseminated ore, one orebody the contact between granite-porphyry and monzonite-porphyry being 152′ ck, developed for 500′ in length and carrying 2½% copper present as dis-ninated particles of chalcocite. Property has been explored by churn drills d diamond drilling.

The mine was at one time the largest turquoise property in the world, sys-natic mining having begun in 1891. Gem production has practically ceased and property is considered valuable for its copper ore alone.

Company also owns the Tres Hermanos zinc mine in the Tres Hermanos trict, 23 miles S. of Deming, Luna county, N. M., said to show oxidized ores rying zinc-lead-silver values.

Ore: occurs as blanket and chamber deposits in limestone, 2-5′ wide, orted to assay from 30-35%zinc, 30-40% lead, and 6-8 oz. silver. Developed several vertical shafts, from 30-100′ deep.

Equipment: includes compressor and 20-h. p. gasoline hoist.

Production: in 1915, mainly from development work, was 720,000 lbs. c, 300,000 lbs. lead and 2,000 oz. silver.

Claims under option to Phelps Dodge Corporation (Burro Mountain anch), and systematic drilling of the property was started in 1917; results re not encouraging at last accounts.

ATTLESHIP MINING & MILLING CO. **NEW MEXICO**

Probably dead. See Vol. XII. Former office: 412 Mack Bldg., Denver, Colo. ne near Lordsburg, Hidalgo county, N. M.

Dr. O. L. Blachly, pres.; O. B. Crum, sec.-treas. Property reported under se to Andrew Bain, of El Paso, in 1915.

BEARUP GROUP **NEW MEXICO**

Owned by D. E. Bearup, Cooney, N. M. Located in Mogollon-Cooney dis-t, Socorro county, N. M.

Claims: 4 on Gold Hill and 9 in western part of district. The Gold ll claims show the Maud S. lode. Vein where opened has width of 2′ to 13′, is said to assay $12 per ton. There is also a narrow high-grade streak.

Development: by tunnels, longest 600′. Total amount underground kings, 1,500′. Small shipments made of ore extracted during development k said to have assayed $98 to $235 per ton and 50 tons shipped to concen-or assayed $21 per ton. There was a small 2-stamp mill and gasoline en-e on the property. No recent returns secured.

BENNETT-STEPHENSON M. & M. CO. **NEW MEXICO**

Officers: O. Jolliffe, pres.; Jas. C. White, v. p.; C. B. Gill, treas.; J. L. Cullough, sec. Annual meeting, April 7th, at Las Cruces. Controls, through ck ownership, the Organ Mountain Mining Co., which see. Fully described, I. X.

Mines under lease until 1921 to Phelps Dodge Corp.

BETHLEHEM COPPER CO. (INC.) **NEW MEXICO**

Mail returned unclaimed from former address: Steins, N. M.

Officers: J. A. Sund, pres.-mgr.; Wm. Charles, v. p.; F. P. Davy, sec.-

Inc. June 1, 1917, in New Mexico. Cap., $1,000,000; $1 par; 527,500 ld.

Property: 12 patented claims, 240 acres, in San Simon mining district, ia county, said to show a contact deposit between diorite and porphyry. ported to be 100′ wide and 3,500′ long. Values of ore given as $2.40 gold, ilver and 1.4% copper per ton. Developed by open cuts.

e a prospect. No recent information obtainable.

BIG THREE MINES NEW MEXICO

Situated 3 miles north of Organ, Dona Ana county, N. M. Owned and operated by Capt. C. B. Gill, Geo. Luchen and Dr. J. H. Johnson.

Property: 7 claims show copper, silver and lead deposits. Working 116' deep, and equipped with 14-h. p. gasoline hoist. No recent information.

BITTER CREEK MINING CO. NEW MEXICO

Address: Taos, New Mexico.

Officers: Fred S. Lewis, pres.; Wm. T. Hinde, v. p.; Condon C. Lowe sec.-treas.-mgr., with Wm. McKean and Alvin Burch, directors. L. O. Haberstich, supt., Red River, N. M.

Inc. July, 1916, in New Mexico. **Cap.,** $1,000,000; 425,070 shares outstanding, March, 1919. U. S. Corporation Co., New York, registrar and transfer agents. C. W. Galvin & Co., 50 Broad St., New York City, selling agents.

Property: 5 claims, 100 acres, known as the Hub mines, at Red River, Taos county, said to show telluride ore in fissure veins in andesite. Values are gold and silver.

Development: by prospect shaft and several shallow tunnels. Plan continuing the Dorothy tunnel. Company purchased an additional claim, 2 acres, in 1918, said to show a 150' body of quartz and quartz-porphyry ore, assaying from $1-$7 in gold, to be developed by crosscut tunnel.

BLACK COPPER CO. NEW MEXICO

Mine office: Elizabethtown, Colfax county, N. M. Developed by shaft and credited with past gold production of $200,000. No recent returns available.

BLACK HAWK CONS. MINES CO. NEW MEXICO

Formerly Black Hawk Mining & Milling Co.

Mine address: E. D. Lidstone, pres.-mgr., Box 456, Silver City, N. M. Fiscal agents, C. A. O'Leary, Pioneer Bldg., St. Paul, Minn. Business office 706 Security Bldg., Milwaukee, Wis.

Inc. May, 1919, in Delaware. **Cap.,** $1,500,000; $1 par.

Officers: E. D. Lidstone, pres.; J. A. Camm, v. p.; Geo. H. Cheyne treas.; J. L. Dietz, sec. John P. Fetsch, directors. Liberty Trust Co., Boston, Mass., transfer agent. Equitable Trust Co., Boston, Mass., registrar.

Property: two groups, a total of 700 acres of mineral land in the Hanover-Santa Rita district, Grant county, New Mexico. Also 8 claims, 160 acres in Bullards Peak district, N. W. of Burro mountains, comprising all holdings of Black Hawk M. & M. Co.

The Hanover property held under lease and bond, comprises two groups, one on each side of the A. T. & Sta. Fe R. R. line at Hanover junction. There are seven shafts, the Lucky Bill shaft on the South Group opening a 30' vein that yielded 320 tons of ore in September, 1919, from the 150' level with the 300' level reported ready for stoping. Shipping ore is also mined at the Walker and Lucky Bull shafts and milling ore at Patterson shaft. Examined in January, 1919, by I. L. Wright.

Equipment: all five shafts are equipped with hoists, air-compressors, pumps, buildings, etc.

Production: in 1919 was 406,000 lb. lead, 2,100 oz. silver. The Black Hawk group, southwest of Silver City, is idle. It has yielded bonanza silver ore in former years, but is not in shape for economic working at present.

The Hanover property is a young one, with proven orebodies and is a district that has been productive for a half century. Considered promising.

BLACK HAWK MINING & MILLING CO. NEW MEXICO

Fully described in Volume XIII. Holdings purchased in May, 1919, by the Black Hawk Consolidated Mines Co., which see.

BLACK RANGE TUNNEL & MINING CO. NEW MEXICO

Address: E. D. Randolph, sec.-gen. mgr., 219 Main St., Lafayette, Ind.

Officers: H. E. Black, pres.; A. O. Behrn, v. p.; W. C. Mitchell, treas., with T. F. Gaylord, B. L. Phillips and Martin Hardsocg, directors; C. Hullinger, supt., Chloride, Sierra county, N. M.

Company presumably a reorganization of the Black Range Copper ng Co. and Black Range Reduction Co. (see Vol. X), both now dead. **Property:** the Silver Monument mine, showing a vein of silver-copper

Development: 2,300′ tunnel and shaft. Main vein has apparently not found. Equipped with steam plant, compressor and a 25-ton concen- on mill. No recent reports obtainable.

INEY CONSOLIDATED COPPER CO. **NEW MEXICO**

Office: Lordsburg, Hidalgo county, N. M.

Officers: D. L. Hill, pres.; H. W. Peak, v. p.; R. S. Spann, ssec.; J. P. eus, supt.

Inc. 1919, in Texas. **Cap.**, $2,000,000; $1 par. Company reports that it unincorporated association, operating under declaration of trust, with- ersonal liability, in any event, of the trustees or of any stockholder.

Property: Bonney mine group, property of Tyndale Copper Mining El Dorado group, Manilla group, Misers Chest Extension group and s, in all about 750 acres, located in Virginia district, about 5 miles S. f Lordsburg. The Bonney Mining Co., on September 15, 1918, refused tend the lease on the property held by the Lawrence Mining Co., and dingly the mine was operated by the Bonney Mining Co. until January, when the copper market was demoralized. Property was purchased in 1919, by D. L. Hill, of Lordsburg, N. M., who consolidated it with ad- ig mineral ground, under the present title.

Geology: veins are strong, well-defined fissures, 4-20′ wide, which be- water level carry sulphides well disseminated through quartz gangue. try rock is andesite, with monzonite, diorite and rhyolite.

Ore: of the Bonney mine occurs as chalcopyrite, bornite, chalcocite ome covellite, carrying gold and silver values in five fissure veins in ite. Veins are located in isolated hills, 4 miles N. E. of Pyramid Peak, ntirely separated therefrom. Shipments in 1918 averaged 0.156 oz. 3.77 oz. silver and 3.39% copper.

Development: at Bonney mine, by 3 shafts, 500, 400 and 350′ deep; 500′ ses and 4,500′ of drifts and crosscuts. Company has opened 1,400′ on vein and 600′ on 500′ level. The reserves are estimated at 257,000 tons average value of $15.50 per ton.

Reserves: broken ore 21,000 tons, blocked out 16,000 tons. Estimated 0 tons (figured to 400′ below 500′ level).

Equipment: includes 100-ton flotation-concentraton mill, semi-Diesel r plant, hoist, dwellings, concrete office, etc.

Production: for 16 months prior to January, 1919, company shipped ore pper Queen smelter, Douglas, Ariz., containing 1,882 oz. gold, 50,732 lver and 898,421 lb. of copper all valued at $286,056.

NEY MINING CO. **NEW MEXICO**

roperty purchased by the Bonney Consolidated Copper Co., which sec. he Bonney mine was under option to the Lawrence Mining Co., until mber, 1918, then operated by the company until January, 1919, when o the demoralized copper market, the smelters refused to pay a definite for ore. This forced the company to shut down the mine. Property old July, 1919, to D. L. Hill of Lordsburg, N. M., who formed the Bon- Consolidated Copper Co., to take over this and adjoining property.

TON & BRICE COPPER CO. **NEW MEXICO**

reorganization of the Jarilla Consolidated Copper Co. Mine at Otero county, N. M.

Officers: at last accounts, E. E. Locklin, pres.; W. W. C. Spencer, -gen. mgr., with Clinton Gowdy, G. E. Moffett and John Colthrop, ors.

Inc. 1917, in New Mexico. **Cap.**, $2,000,000; $1 par; issued, 1,000,000. al meeting, first Monday in May.

Property: 40 claims, about 800 acres, in Jarilla (Silver Hill) district, county, carrying sulphide ore in contact deposits between limestone

and monzonite porphyry. Vein said to be 3 to 30′ wide, 300′ to a half mi long, and proven to 170′ depth, averaging 3 to 5% copper, 2 oz. silver a $1 gold per ton.

Development: by 5 shafts, deepest 172′, and the Harvey tunnel, 1 long.

Company is a merger of and holds the properties formerly owned b the Eureka Mines Cons. Co., Boston Jarilla Copper Co., Amarillo Mi Co. and Eureka Placer Mining Co., whose combined capitalizatio $8,000,000 was reduced to $2,000 000. No recent report obtainable.

BOSTON EMERALD MINING CO. NEW MEXIC

Formerly known as the Atwood Copper Co. **Address:** J. Tan supt., Lordsburg, New Mexico.

Property: the Atwood mine, near Lordsburg, Hidalgo county. Late 1918 it was reported that H. V. Snell, of Globe, Ariz., had purchased controlling interest from Morningstar & Augustine.

Development: shaft being unwatered, preparatory to sinking to 1,000′ level, in 1919.

BOSTON-HECLA MINING CO. NEW MEXIC

Office: 40 Court St., Boston, Mass. **Mine office:** Lordsburg, N. M.

Officers: R. E. Candruff, pres.-treas.; J. B. Piscope, v. p.; D. W Ta lor, sec., with R. S. Fisher and M. W. Lawlor, directors.

Inc. April 18, 1918, in Arizona. **Cap.,** $2,000,000; $1 par; 1,000,800 sha outstanding. Equitable Trust Co., Boston, Mass., transfer agent.

Property: 9 claims, 3 patented, 120 acres, about 3 miles S. W Lordsburg, Hidalgo county, between the 85 and Octo mines.

Ore: sulphide occurs in quartz-fissure veins in andesite and dior reported to assay 0.04 oz. gold, 2.17 oz. silver and 2.6% copper. Orebo is 20—125′ wide, with E.-W. course and dip of 70°.

Development: by 300′ shaft. Sinking a second shaft to same dep **Equipment:** includes 40-h. p. hoist and compressor.

Property has been examined by O. H. Reinholt, San Diego, Calif J. T. Bickle, Globe, Ariz.

BUFFALO-NEW MEXICO MINES CO. NEW MEXI

Office: 450 Brisbane Bldg., Buffalo, N. Y.

Officers: J. F. Rooney, pres.; H. F. Heinrich, v. p.; C. H. Reeser, s W. G. Germain, treas. R. P. Kelly, supt.

Inc. 1910, in Arizona. **Cap.,** $1,000,000; $1 par; 350,000 shares o standing.

Property: 15 unpatented claims, 200 acres, at Red River, Taos coun said to show a quartz vein in andesite and rhyolite with gold and si values.

Development: by 200′ shaft and 300′ of workings. A 2,300′ tunnel being driven to drain the mine. **Equipment:** includes 40-h. p. steam h and steam compressor.

BURRO MOUNTAIN COPPER CO. NEW MEXI

Out of existence. Property operated as Burro Mountain Branch of Phelps, Dodge Corporation, which see.

BURROS DEVELOPMENT CO. NEW MEXI

Address: J. M. Kiner, pres., Silver City, N. M. R. W. Jackson, v C. C. Royall, sec.-treas.

Inc. 1917, in New Mexico. **Cap.,** $600,000; shares $1 par; 100,000 sha offered the public October, 1917, at 10c to provide funds for patenting development. No later returns received.

Property: 21 claims, 420 acres, a short distance south of Leopold. to show a vein of 7.2% copper ore in a 75′ shaft.

B. V. N. MINING CO. NEW MEXI

Probably defunct. **Last address:** Pinos Altos, Grant county, N. M.

Officers: at last accounts, Dr. A. M. Torello, pres.; J. W. Bettes, Fischer, Robt. Noble, Jos. Vinot, H. Bettes and S. D. Bettes, Wm. Donovan, supt.

nc. Nov., 1914, in New Mexico. **Cap.**, $250,000.
Property: Silver Hill mine, in Pinos Altos district, shows gold-silver-ore in vein, 1' wide, believed to be continuation of rich orebody on ning Lankston and Pacific No. 2 claims.
Development: 3 tunnels, 289', 300' and 400' deep and 260' stope Some done in 1915, no reports received since.

UMET-NEW MEXICO MINING CO. **NEW MEXICO**
Office: 154 W. Randolph St., Chicago, Ill. **Mine office:** Silver City, Mexico.
Officers: Alex. McCallum, pres.; Alpheus McCallum, v. p.-treas.; J. A. nt, sec.; A. W. McCallum, asst. sec.; J. A. McCallum, supt., with Jacob nberg, directors.
nc. in New Mexico. **Cap.**, $1,000,000; $1 par; practically all outling.
Property: three groups in Magdalena district, 12 claims, 10 patented, cres, 2 miles from a railroad and 5 miles from Magdalena, reported to ore assaying 3 to 21% copper, 3 to 97 oz. silver, 0.06 to 0.96 oz. gold, d maximum of 24%, and a zinc maximum of 12%.
n Pinos Altos district company has 3 deeded claims, and 3 claims under n. 120 acres; 7 shipments from there assayed between 0.20-1.26 oz. gold, 19 oz. silver, 9 to 43% lead and 3 to 38% zinc. The company also holds ear working bond on the Langston mine, located near the Pinos Altos rty; Calumet receives ½ profits made after all expenses are paid, ding a profit for milling the ores.
Development: by tunnels with 3,000' of openings at Magdalena; by 2 s and 3,000'-4,000' of drifts and stopes at Pinos Altos; by 200' shaft and derable drifts at the Langston mine.
Equipment: includes hoisting plants, blacksmith and machine shops, ings and a concentration and a flotation mill near Pinos Altos with a ity of 1,500-3,000 tons per month.

IBEL MINING & MILLING CO. **NEW MEXICO**
Address: H. L. Pratt, mgr., Red River, N. M.
Company said to be operating a mine near Red River, Taos county.

LISLE MINING CO. **NEW MEXICO**
Office: 50 East 42nd St., New York City.
Directors: August Heckscher, of New Jersey Zinc Co.; G. M Heck-, Sumner Girard, H. K. Welch, and S. Makeever; M. K. Welch, mgr
n February, 1918, company filed petition of bankruptcy giving liabilities 16,473 and assets as $43,829. Although the petition is nominally a itary one, it is reported that the company's action was taken in response e demand of the Heckschers for protection of their interests. Of the liabilities $101,353 had been advanced by the Heckschers.
Cap., $3,000,000.
Property: the Carlisle group, at Steeplerock, N. M. After the bankcy proceedings, this mine was turned back to the owner G. H. Utter, and scribed under that name. It produced $6,000,000 in gold ores, when d by Marshall Field, L. Z. Leiter, and N. K. Fairbanks. With depth, res turned into complex sulphides which were not amenable to the lurgical processes of the early '80s. Mine had been idle 39 years, until arlisle company took it over.

E AND WEST **NEW MEXICO**
Address: Gage, N. M.
a private concern which does not furnish financial information.
Property: 3 claims, near Gage, Victoria Mining district, Luna county; ed to show a quartz vein, running N. E.-S. W., containing gold, silver pper, and developed by a 30' shaft. Only a small amount of develop-work has been accomplished.

MPION COPPER CO. **NEW MEXICO**
Offices: 7 Government St., Kittery, Me., and 1853 Commonwealth Ave., on, Mass. **Mine address:** Copper Hill Box, Dixon, Taos county, N. M.

Officers: R. J. Barton, pres.; Benj. B. Earl, v. p.; Arthur M. Cru sec.-treas.; preceding, with Ralph Thompson, E. J. Quiry, directors. Jas. Burton, gen. mgr., Dixon, N. M.

Inc. July 7, 1911, in Maine. **Cap.**, $400,000; increased March, 19 from $200,000; shares $1 par; changed in 1918 from 2,000,000 shares, 10c p Listed Boston Curb. Annual meeting first Tuesday in March. Comm wealth Trust Co., Boston, transfer agent.

Report issued March 1, 1918, shows assets of $20,336 cash, $274 accounts receivable, $26,913 as equipment and development, and $150,00 mining property.

Property: 468 acres, made up of 15 claims, on Copper Hill, in the Co per Mountain district of Taos county, 9 miles east of Embudo, the near railroad station, and 25 miles N. E. of Taos, 2 potash claims of about acres, a mile from the mine, and 85 acres in the Big Bug mining district Arizona. The potash claims, the Arizona property, and ten claims of abo 200 acres, were purchased in 1917. The remainder of the property was a quired at foreclosure sale 1914, for $15,499. Mine is said to have 8 pra tically parallel veins of 18" to 20' width, between a schist footwall and qua zite hanging wall, the ore carrying cuprite, malachite and chrysocolla, su ceeded at depth by chalcocite and gray copper; ore carries silver and go with chalcopyrite beginning to show in lower workings, all in a quar gangue.

Development: includes shallow shafts and surface cuts on seve claims, a 250' shaft on the Champion, a 180' shaft sunk on a 4' vein in t Oxide mine, and a 500' tunnel, which has stoping ore and cuts a 45° blan vein. Report for 1917 showed 200' of stoping and drifting, 930 tons hoist and a yield of 67 lb. per ton milled.

Equipment: includes 2 horizontal boilers 54"x14", two engines, 6 80-h. p. the other 40-h. p. gasoline hoist, 2 compressors and several drills. 1,000' ground tram leads from the mouth of the Champion tunnel to oreb A 15,300' gravity pipe line, of 7" spiral steel riveted pipe conveys water fr spring to reservoir at mill.

In May, 1918, company tried the Greenawalt process of leaching a electrolysis, thus saving, it was reported, 98% of all ore values. A pl capable of 60 tons per day was installed early in 1919. No record of la activity.

CHEMUNG COPPER CO. **NEW MEXI**

Dissolved, see Vol. XIII. Formerly at Tyrone, N. M.

CHICAGO COPPER MINING CO. **NEW MEXI**

Address: E. G. Rafferty, pres.-gen. mgr., Oscuro, Lincoln county, N. Company has not operated since 1910. Property described in Vol. X

CHINO COPPER CO. **NEW MEX**

Office: 25 Broad St., New York. **Mine office:** Hurley, Grant co N. M.

Officers: Charles M. MacNeill, pres.; Daniel C. Jackling, v. p. managing dir.; Charles Hayden, v. p.; R. Babbitt, sec.; with A. Ch Beatty, Sherwood Aldrich, W. Hinckle Smith, Mark L. Sperry, John Sully (gen. mgr.), directors; C. W. Peters, treas.; Chadbourne, Babbi Wallace, gen. counsel. H. G. S. Anderson, asst. gen mgr.; Horace M

CHINO COPPER COMPANY

Our Statistical Department will furnish complete information on application

HAYDEN, STONE & CO.

Members New York, Boston and Philadelphia Stock Exchange

25 Broad Street, NEW YORK 87 Milk Street, BOSTON

l supt.; G. L. Webster, cashier; D. D. Moffat, cons. eng. for mills; H. M. rry, metallurgical statistician. Guaranty Trust Co. of New York and Old ony Trust Co., Boston, registrars; Bankers Trust Co., New York, and erican Trust Co., Boston, transfer agents.

Inc. Aug., 1909, in Maine. **Cap.**, $3,500,000; shares $5 par; increased to 00,000, June 30, 1911; and again increased to $4,500,000, April 2, 1912, of ch 100,000 shares are reserved for conversion of bonds and 30,000 shares ıain unissued; 869,980 issued. Bond issue has been retired. Annual :ting, third Friday in April.

With the A. S. & R. Co. and Ray Consolidated, Chino Copper owns the lup American Coal Co., capitalized at $4,000,000, and operating at Gallup, v Mexico.

Financial Statement, years ending December 31:

Assets.

	1918	1917	1916	1915
perty	$2,134,817	$1,954,811	$1,931,580	$1,824,085
ended on equipment	7,874,936	7,011,797	5,880,353	4,991,609
ended on development	1,149,534	1,060,979	993,027	943,391
stments	579,840	475,640	192,040	192,040
erred charges to stripng	3,135,663	2,910,197	2,615,447	2,160,158
erials and supplies	1,989,990	1,782,130	980,398	491,387
ounts and notes receivle	508,621	339,144	54,764	22,927
per and ore	4,094,875	5,324,011	6,882,340	4,124,765
ketable securities	1,939,921	1,054,898	248,750	.....
and cash due for copper	2,155,012	2,428,794	3,022,091	2,113,091
Total	$25,563,210	$24,342,401	$22,800,790	$16,963,454

Liabilities.

	1918	1917	1916	1915
ital stock	$4,349,900	$4,349,900	$4,349,900	$4,349,900
ounts payable	723,825	324,176	469,369	344,821
rued taxes, insurance	1,794,212	1,232,403	372,127	151,606
itment, refining and dery—not due	842,782	576,742	650,267	508,573
lus from sale of serities	2,995,253	2,995,253	2,995,253	2,995,253
lus from operations	14,857,238	14,863,926	13,963,874	8,613,261
Total	$25,563,210	$24,342,401	$22,800,790	$16,963,454

Current Assets and Liabilities:

Assets.

	1918	1917	1916	1915
per	$3,886,176	$5,106,240	$6,664,155	$3,930,727
.....	208,708	217,771	218,185	194,036
ounts receivable, etc.	113,621	139,144	54,765	22,927
s receivable	395,000	200,000	.....	.....
erials and supplies	1,989,990	1,782,130	980,398	491,387
ketable securities	1,939,921	1,054,898	248,750	.....
.....	1,000,050	533,525	1,561,996	1,065,735
due for copper	1,154,962	1,895,269	1,460,095	1,047,357
Total	$10,688,420	$10,928,976	$11,188,344	$6,752,171

Liabilities.

	1918	1917	1916	1915
Current accounts.....	$723,825	$324,177	$841,496	$496
Accrued taxes, insurance, etc	1,794,211	1,232,403	.....	
Treatment, refining, and delivery charges—not due..	842,782	576,742	656,267	508
Total	$3,360,818	$2,133,322	$1,491,764	$1,005
Surplus of quick assets	$7,327,602	$8,795,656	$9,696,580	$5,747

Income Account:

Years	Metals sold, etc.	Operating expense	Other charges net	Profit	Dividends paid	Profit or loss
1919...	.....	.....	.....	$1,389,984	$2,609,940	*$1,219
1918...	$17,032,364	$13,079,040	$45,102	3,908,222	3,914,910	—6
1917...	19,571,741	9,434,690	624,198	9,512,854	8,612,802	+900
1916....	19,545,053	6,701,891	315,213	12,527,949	7,177,335	+5,350

* Deficit.

Dividends: initial in June, 1913, $2.25 being paid in that year; su when $2.50 per share in 1914; $3 in 1915; $8.25 in 1916; $9.90 in 1917; $ in 1918, and $3 in 1919. On March 31, 1920, 37½c was paid. The total $29,339,224.

Property: 206 mining claims (3,493 acres) at Santa Rita, of which claims (3055 acres) are patented. Also 120 acres of agricultural land jacent to the mining claims. The mill-site at Hurley, including water-s and residue-disposal area, totals 18,530 acres.

The property is the old Santa Rita del Cobre mine, which is the old copper mine in New Mexico, and the second oldest in the United Stat having been opened, 1804, by Spaniards. The property was worked by American named Pattie, in 1822 and to 1827. It was in possession a Frenchman from 1828 to 1834, when an American called McKnight, be operations which ceased in 1836. From 1840 to the late fifties, it was possession of a Spaniard. In 1851 Santa Rita was the headquarters of American Commissioners, of the Boundary Survey. Some time be 1860 four Americans attempted to operate the property. In 1862 C Sibley, of the Texas Confederate force, held the mine. In 1873 M Hayes, acting on behalf of Denver people, succeeded in purchasing claims, attempting to perfect the title by obtaining U. S. patents, alth patents had been refused by the Commissioner of the Land Office in Hayes' application was turned down in April, 1873. Between that and the final decision of the Secretary of the Interior in November, title was obtained by Hayes from the surviving heirs of the original Spa ish estate and final U. S. patent was obtained to the claims covering Santa Rita del Cobre Grant. Title was acquired by the Chino Copper from the Santa Rita Mining Co., since dissolved.

Geology: Santa Rita is situated in the Central mining district, Gr county, New Mexico on a branch of the Santa Fe system which connects Whitewater with the Deming-Rincon division of the same railroad. orebody and town of Santa Rita are located in a distinct basin and rocks exposed in the district may be roughly divided as follows: 1. sedimentary; 2. intrusive; 3. extrusive. The sedimentary formation, of w there is a large area in comparison with the intrusive exposures, con of limestones of more or less purity, and belonging to the sub-carbon and carboniferous series, there also being some isolated exposu Devonian rocks. These beds vary from nearly pure limestones, th cherty limes and shaly limes, to shales. A considerable area of Cre sandstones and shales is exposed through faulting, the former co

quartzite in the immediate neighborhood of the intrusives. The ıcipal intrusive rocks in the Santa Rita basin are grano-diorite, a rtz-monzonite porphyry, and another of distinct porphyritic texture ch may be classed as andesite. This latter rock intrudes the two gen- types as also the sedimentaries, in sills, lacoliths and dikes. The boun- forming the S. E. side of the Santa Rita basin is composed of two s, the principal one being rhyolite and rhyolite tufa overlaying an r flow which is of an andesite nature.

The grano-diorite is intrusive into and across the edges of the sedi- tary series, which form a syncline dipping to the south from the north- bordering ridges toward the lowest point of the basin. The area in the basin has been strongly faulted in wide zones and in two gen- directions. The intersections of the numerous faults have resulted in ughly circular shear zone that has a diameter of ¾ of a mile. This has been the depository of the valuable copper minerals, chalcocite, ite and native copper. Bornite, chalcopyrite and cupriferous pyrites also found, but to a much lesser extent than the previously named. re also occurs in small restricted areas, malachite and azurite with a limited amount of chrysocolla.

Development: the old workings, which were very extensive, have been tically eliminated by the steam-shovel operations.

Recent work:

	Churn-drilling feet	Overburden moved cu. yd.	Ore mined tons	Ore reserves tons	Copper content per cent	Cost of mining cents p. t. per ton
.....	15,020	3,264,556	3,749,238	96,552,026	1.630	69.55
.....	22,425	3,712,414	3.607,825	.....	.....	50.88
.....	13,161	3,564,623	3,216,065	95,555,843	1.656	37.97

Equipment: consists of 10 steam-shovels, 21 locomotives, 140 dump , of 6 to 20 cu. yd. capacity. Company operates about 24 miles of track, ıg access to the pits. There is also a primary crushing plant, equipped 48"x60" jaw crusher, together with bins for handling and breaking up se material loaded by shovels.

Mill: the concentrating plant at Hurley, 9 miles from the mine on the a Rita branch of the Santa Fe railway, with original capacity of 5,000 per day, was started in October, 1911, but is now equal to 11,000 tons , due to improved metallurgical methods, and addition of 2 units, mak-

The mine has a coarse-crushing plant, consisting of gyratory crushers, 20" Garfield rolls, producing a maximum size of ¼". The mill is ɔped with 16"x42" rolls for preliminary grinding and Garfield Chilean for final grinding. Roughing treatment consists of Garfield tables, wed by Wilfleys and Richards-Janney classifiers and Isbell vanners. of the enlarged mill was set aside for treating 500 tons of partly oxi- l ore daily. A 5,000-ton tailing retreatment plant will start as soon as minary tests are satisfactory. There are several million tons of mate- ıwaiting treatment.

Graphic metallurgical control at the works is described by H. M. Merry all, 153, September, 1919, of A. I. M. & M. E. By means of large wall- s, a daily record of essential data is kept, such as weight of ore milled, rs of headings, tailings, and concentrates, screen analyses, costs, and of copper. Such presentation is necessary at any plant, or mine, so re- may be seen at a glance.

Power plant includes twelve 445-h. p. Heine boilers, three 1,250 k. w. rators, direct-driven by Nordberg Corliss engines, and one 2,000 k. w. Chalmers turbo-generator set. Primary water is secured from the [illegible] Spring, 3½ miles south of Hurley, from underflow of White- [illegible] Cameron Creek draw and Whiskey Creek draw. There is also [illegible] reservoir below the mill, the dam forming this reservoir

having been built out of mill tailings and having storage area of nea 3,000 acre feet. Coal is now obtained from a mine in the Gallup field of N Mexico, owned by Chino and two other companies.

Settlement at Hurley includes in addition to mill and accessory bui ings, office building, store, school, shops and dwellings, town having po lation of about 3,500 people. Town of Santa Rita, on company gro has population of over 4,000.

Production:

Year.	Tons Treated.	Cost per ton in cents Ore.	Waste.	Mill.	% Cu.	% Rec.	Ratio conc.	% Cu. in cnts.	Lb. Cu. Rec. per ton ore.	Lb. Cu. net prod.	Net Cost per lb. cts.
1912	1,120,375	.....	.....	.....	2.077	61.63	16.6:1	21.20	24.79	27,776,088	7.69
1913	1,942,700	23.13	16.	61.08	2.033	67.31	19.6:1	14.52	27.37	50,511,991	8.78
1914	1,907,300	22.13	16.12	55.01	2.115	67.86	12.9:1	18.50	28.70	53,999,928	7.80
1915	2,379,800	19.47	16.51	54.19	2.155	66.59	15.0:1	21.55	28.76	64,887,788	7.12
1916	3,094,400	19.88	18.09	64.00	1.833	66.59	12.6:1	14.82	24.42	75,701,978*	8.7
1917	3,008,100	50.88		103.00	1.640	69.32	13.6:1	15.50	22.76	83,339,782	11.9
1918	3,836,400	69.55		137.09	1.630	63.27	13.4:1	14.25	20.67	79,340,372	17.18
1919†	1,765,200	.....		.....	1.826	.....	.....	.....	24.04	42,325,449	14.98

* From all sources. † 9 months. For 12 months, 42,345,449 lb. The average price was 18.2c. and costs were 15.9c.

Both property and management are regarded as exceptionally s and the stock as a very high-grade investment.

CHINO DEL NORTE COPPER CO. NEW MEXI

Address: C. W. Hoyt & Co., 79 Milk St., Boston, Mass. **Mine** addr Geo. E. Coxe, gen. mgr., Hanover, N. M.

Officers: Wm. A. Ulman, pres., 233 Broadway, New York City; v Elmer E. Fox, Mesheck Frost, H. O. Bursum, Geo. E. Coxe, Clarence Hoyt, F. Greer Dodd, directors. John H. Leddy, sec.-treas. Wm. H. ney, cons. engr.

Inc. in Delaware. **Cap.**, $3,000,000; $1 par. Stock offered at 50c

Owns its properties through ownership of capital stock of El N Copper Co., of New Mexico, the operating company. Properties were for partly by 110,000 shares, $1 par, of preferred stock of the El Norte per Co.

El Norte Copper Co.

All the common stock and all but 11,000 shares of preferred stock this company, held by Chino Del Norte Copper. The El Norte owns New Mexican holdings.

Property: 4 separate tracts, 29 claims, 600 acres, and 17 more cl under option near Fierro and Hanover in the Central mining district, G county. Tracts cover contact deposits, in part covered by gossan, ex sively mined for iron ore.

Development: by 130' Mockley shaft, showing 12' vein with 8 to copper ore; also the Rattler tunnel and workings and several shallow s mostly sunk by former owners to get out very high grade oxidized ore, not carried below water level Examined by D. C. Sutton.

Regarded as a promising development proposition if properly fina and managed.

CLEAVELAND & WEATHERHEAD CO. NEW MEX

See under Deadwood Mining & Milling Co. Described in Vol. XII

C. O. D. LEASING CO. NEW MEX

Idle for many years. Probably out of business.

Mine: at Lordsburg, Hidalgo county, N. M. Described in Vol 1916.

C. & O. MINING & MILLING CO. NEW MEX

Address: Pinos Altos, Grant county, N. M.

Officers: J. L. Caddel, pres.; A. Caddel, v. p.; Jackson Agee, se above, with John James and A. L. McCarty, directors; A. L. McCar

Inc. April, 1914, in New Mexico **Cap.** $100,000 shares $1 pa standing, at last accounts, 90,000 shares.

Property: 2 claims, patented, in the Pinos Altos mining district, 7 s N. W. of Silver City.
Ore: lead-zinc-copper in fissure vein in diorite. Vein has a N. S. se, dips 65° and is said to have an orebody 6" to 4' wide. Ore rals are galena, sphalerite, chalcopyrite and pyrite and average assay ud to be 2% lead, 2% copper, 8% zinc, $4 to $10 gold, and 10 oz. r per ton.
Development: by 200' incline shaft with 4,000' of workings.
Equipment: included 20-h. p. gasoline hoist, a 50-ton concentrator which run jointly with P. A. M. & M. Co. In 1917, unwatering of shaft was work done. No later returns available.

OPERATIVE MINING CO. **NEW MEXICO**
Office: Lordsburg, N. M.
Officers: E. H. Taber, pres.-gen. mgr.; C. A. Ball, sec.-treas.; D. W. or, asst. sec.; E. H. Gould, eng.; H. C. Walter, mill supt.
Inc. 1919, in New Mexico. **Cap.,** $250,000; $1 par; 170,000 outstanding.
Property: a lease and option on 8 claims, 160 acres, in Gold Hill dis- Grant county, said to show argentiferous lead sulphide in 4' fissure in monzonite. In Jan., 1920, a body of native silver ore was found from the surface, which was said to assay $1,000 per ton. The Yankee claim, purchased 1919, has 3 feet of 15 oz. ore which will be developed 20.
Developed: by 200' incline shaft and 250' of workings, blocking out tons. Company estimates reserves at 5,000 tons.
Equipment: 10-h p. hoist and an 80-ton mill with flotation unit is in e of construction.

PER BELT SILVER & COPPER MNG. CO. **NEW MEXICO**
Office: 512 Exchange Bldg., Denver, Colo. F. E. Wire, sec.
nc. in Colorado. **Cap.,** $175,000; 5c par.
Property: 13 claims, unpatented, 252 acres, 3 miles N. W. of Magdalena, rro county, said to show silver-copper ore with some gold.
Development: mainly assessment work consists of open-cuts with sev- shafts 15 to 50' deep. Company is sinking a double-compartment shaft, 100' in November, 1919. It is equipped with a hoist.

BACK MINING CO. **NEW MEXICO**
Mail returned March, 1919, from former address, Bland, N. M. Com- probably dead.
Property: Lone Star group, formerly owned by Navajo Gold Mining mpany, and said to show gold-silver, in veins, running nearly N.-S. and 12 to 40' wide.
Development: about 5,000' of workings, including crosscut tunnels.
Equipment: 100-ton cyanide plant and concentrating mill.

HILLA COMPANY **NEW MEXICO**
ole. **Address:** care Stephen B. Davis, Jr., East Las Vegas, New co.
roperty: 1,500 acres of mineral land between the towns of Lucero and alpita, Mora county, N. M., slightly developed by tunnels and shafts. mpany has been inactive since 1916.

DWOOD MINING & MILLING CO. **NEW MEXICO**
ddress: Mogollon, Socorro county, N. M. Earl C. Cleaveland, gen.
roperty: the Deadwood and Sunburst mines and mill, near Mogollon, ng the Queen, Deadwood and Confidence-Last Chance veins which e 8-10' in width, extend for 2,500' through the claims and carry gold- ore.
velopment: by 500' shaft and about 5,000' of workings.
uipment: includes 60-ton mill with concentration and cyanide equip- ll engine, electric hoist, etc.
oduction: 44,000 tons of ore since 1905, yielding $325,000.
operty is under option to the Mogollon Mines Co.

having been built out of mill tailings and having storag
3,000 acre feet. Coal is now obtained from a mine in the C
Mexico, owned by Chino and two other companies.

Settlement at Hurley includes in addition to mill
ings, office building, store, school, shops and dwellin
lation of about 3,500 people. Town of Santa Rita
has population of over 4,000.

Production:

Year.	Tons Treated.	Cost per ton in cents Ore.	Waste.	Mill.	% Cu.	% Rec.	Ratio conc.
1912	1,120,375	.....	.....	.....	2.077	61.63	16.6:1
1913	1,942,700	23.13	16.	61.06	2.033	67.31	10.6:1
1914	1,907,300	22.13	16.12	55.01	2.115	67.86	12.9
1915	2,379,800	19.47	16.51	54.19	2.165	68.59	15.
1916	3,094,400	19.88	18.09	64.00	1.833	66.59	12
1917	3,608,100	50.88		103.00	1.640	69.82	1
1918	3,836,400	60.55		137.00	1.680	68.27	
1919†	1,765,200	.....		.....	1.826	.....	

* From all sources. † 9 months. For 12 m
was 18.2c. and costs were 15.9c.

Both property and manageme
and the stock as a very high-grad

CHINO DEL NORTE COPPE

Address: C. W. Hoyt & Co
Geo. E. Coxe, gen. mgr., Hano

Officers: Wm. A. Ulman
Elmer E. Fox, Mesheck Fr
Hoyt, F. Greer Dodd, direc
ney, cons. engr.

Inc. in Delaware. Ca

Owns its properties
Copper Co., of New M
for partly by 110,000 sh
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All the comm
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New Mexican hol

Property: 4
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NEW MEXIC

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Lee, Morgan M. W

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NEW MEXIC

described in Vol XI

NEW MEXI

March, 1919, from

NEW MEXI

M
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K. Davis, directors
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ares offered the public

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ft. shaft and the Har
The management (for perio
43,460 tons of ore in sto
alization of $6,284,517.

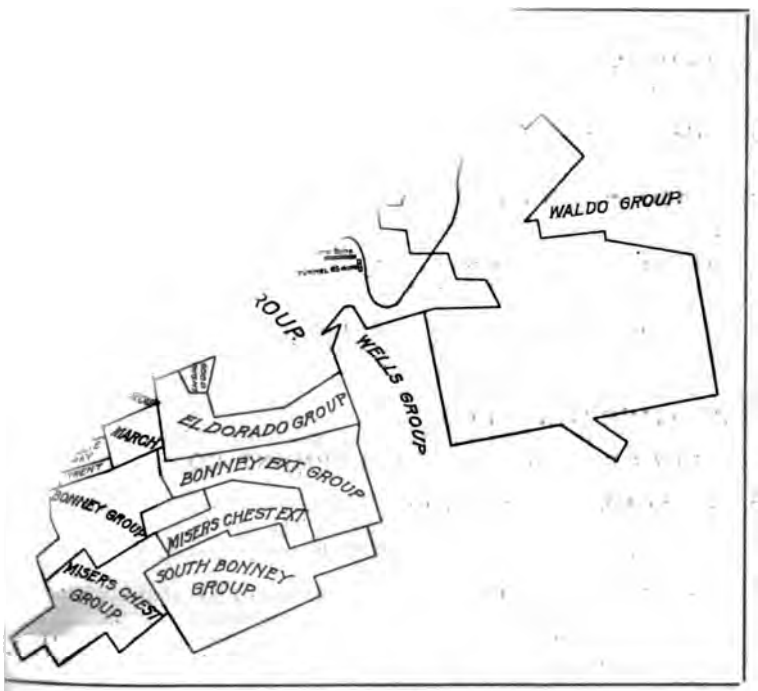
mpared in former years fro

rit, but the statements above are in our opinion

NEW MEXICO

nty, N. M.
H. Warner, sec.; P. B. Yates, treas.;
pt.; M. Merry, mill supt.
Cap., $1,000,000; shares $1 par.
cember.
of the Superior Mining Co., in

about 4 miles from Lords-
in rhyolite, developed by
ir shaft to surface, and



MAP OF MINING CLAIMS OF LORDSBURG DISTRICT.

of drifting on each level. Vein is estimated by company to average 10' idth and to carry 3.5% copper, 6 oz. silver and 0.1 oz. gold per ton. quipment: includes 100-h. p. electric motor, hoist, four 500-h. p. en- electric pump, and a 300-ton mill equipped with tables, 6 vanners and on unit. In 1919, company installed a 1,000-h. p. steam turbine using r boilers and driving a 750 k. w. generator. Mill recovery is 91%. 250 men are employed.
eserves: 263,460 tons of $13.56 ore, with normal metal prices, besides tween 210 and 310 levels.
roduction: latest figures received were for 1916; gross $1,456,586, as ed with $762,921 in 1915. In February, 1920, the mill was treating s daily, an equal amount going to smelters.
roperty considered good, and management competent.

DIVIDEND MINING & MILLING CO. **NEW MEXICO**

Defunct and stock valueless. Mine near Estey, Socorro county, N. M. See Vol. XIII.

DONNA DORA MINING CO. **NEW MEXICO**

Organ, Dona Ana county, N. Mex. Reorganized as Mineral Hill Mining Co., which see.

DUNCAN MINING & MILLING CO. **NEW MEXICO**

Address: Duncan, Ariz. **Mine address:** Steeplerock, N. M.

Officers: H. C. E. Spence, pres.; H. W. Evans, sec.-mgr.; F. N. Hall, treas.

Inc. in New Mexico. **Cap.,** $150,000; 50c par.

Property: 8 claims, 9 miles N. E. of Duncan, Ariz., in the Steeplerock district, Grant county, is said to show 2 veins running through the entire property, the Mt. Royal 40′ wide, on which most of the development work has been done, and 40′ east of it the Jim Crow vein, 80′ wide. The vein filling is a reddish brown monzonite and quartz carrying gold and silver and the high values occur where the hematite is massive.

Development: mainly on Golden Fleece claim by a 410′ incline shaft and about 2,000′ of workings. Company estimates reserves at 40,000 tons of $25 ore and 60,000 tons of lower grade ore.

Equipment: includes a 6-drill compressor driven by a 60-h. p. engine, 24-h. p. hoist, power house, machine and blacksmith shops, etc. Company has erected the first unit of a 125-ton mill, with power supplied by oil engines; mill said to contain crushers, ball mills, Dorr classifier and steel cyanide tanks.

ECLIPSE MINING & MILLING CO. **NEW MEXICO**

Address: Duncan, Ariz., and Steeplerock, N. M.

Officers: Geo. W. Trimble, pres.; Ben. F. Barbour, sec-treas. and mgr. with W. C. Downey, Wm. O. Olsen, Chas. H. Lee, Morgan M. Wilson and C. R. Meyer, directors.

Inc. in Arizona. **Cap.,** $1,000,000; shares $5 par; 106.000 shares issued. Annual meeting, first Wednesday in January. Is the successor to the Shamrock Mining & Milling Co., described in Vol. XII.

Property: 24 claims, 480 acres in Steeplerock mining district, Grant county, said to show a fissure vein in andesite, from 6-8′ wide with S. E. N. W. course. Ore is silicious and reported to assay 1.16 oz. gold, 15.1 oz. silver and 6.84% copper.

Development: by several tunnels and shafts.

ECONOMIC MINING & MILLING CO. **NEW MEXICO**

Probably dead. No returns since 1916. Fully described in Vol. XII.

EDISON MINING & MILLING CO. **NEW MEXICO**

Probably dead. Mail returned unclaimed March, 1919, from former address, Red River, Taos county, N. Mex.

EIGHTY-FIVE EXTENSION COPPER CO. **NEW MEXICO**

Office: Miami, Ariz. Mines at Lordsburg, N. M.

Officers: Lester B. Doane, pres.; L. D. McClure, v. p. and gen. mgr.; De Witt Murray, sec.; C. C. Faires, treas., with E. K. Davis, directors.

Inc. in Arizona. **Cap.,** $5,000,000: $1 par; 2,000,000 shares paid; property are being held in escrow; 400,000 shares offered the public at $ each, April, 1917.

Property: 600 acres adjoining the 85 Mining Co.'s ground at Lordsburg, shows several veins along a dike reported to be 75′ wide and traced for 600′. Ore is silicious and carries gold, silver and copper values.

Development: by 310′ vertical shaft, 265′ air shaft and the Hart shaft 125′ deep, with about 1,700′ of openings. The management (or perhaps we should say the promoters) claimed to have 463,460 tons of ore in sight averaging $13.50 per ton, giving the property a valuation of $6.284,517. This estimate is based on a report by J. L. Wells.

Production: to date 149 cars of ore shipped in former years from the Atwood mine, which netted leasers $40,965.

Property may have merit, but the statements above are in our opinion warranted by facts.

IHTY-FIVE MINING CO. **NEW MEXICO**

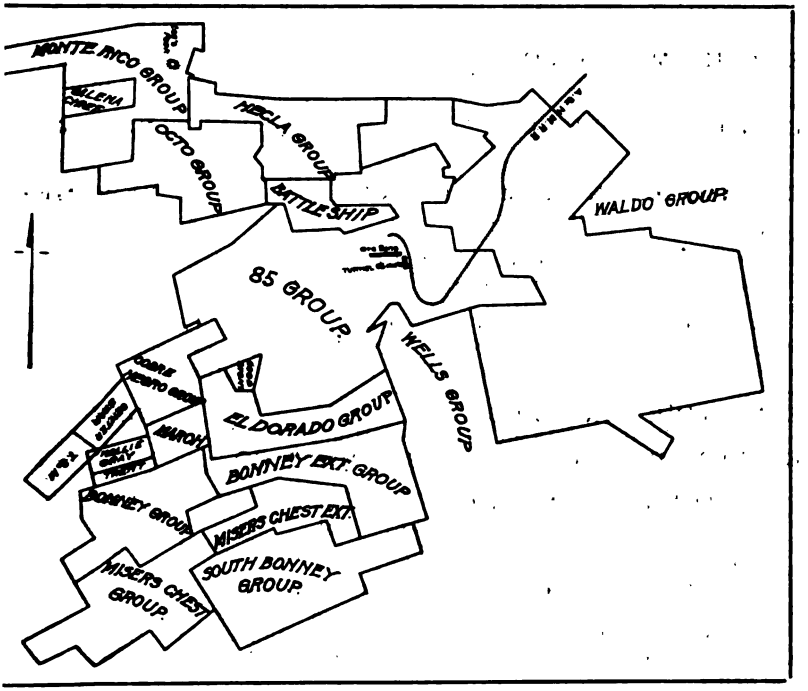
Office: Valedon, Hidalgo county, N. M.

Officers: A. P. Warner, pres.; C. H. Warner, sec.; P. B. Yates, treas.; I. Interrieden, mgr.; J. Jackson, supt.; M. Merry, mill supt.

Inc. Sept. 23, 1909, in New Mexico. **Cap.**, $1,000,000; shares $1 par. ual meeting, second Wednesday in December.

Company purchased the Superior mine of the Superior Mining Co., in

Property: 6 claims, in Shakespeare camp, about 4 miles from Lords-, in the Virginia district, includes a vein in rhyolite, developed by tunnel and a 1,700′ blind shaft, with a 300′ air shaft to surface, and



MAP OF MINING CLAIMS OF LORDSBURG DISTRICT.

′ of drifting on each level. Vein is estimated by company to average 10′ idth and to carry 3.5% copper, 6 oz. silver and 0.1 oz. gold per ton.

Equipment: includes 100-h. p. electric motor, hoist, four 500-h. p. en-, electric pump, and a 300-ton mill equipped with tables, 6 vanners and ion unit. In 1919, company installed a 1,000-h. p. steam turbine using or boilers and driving a 750 k. w. generator. Mill recovery is 91%. it 250 men are employed.

Reserves: 263,460 tons of $13.56 ore, with normal metal prices, besides etween 210 and 310 levels.

Production: latest figures received were for 1916; gross $1,456,586, as ared with $762,921 in 1915. In February, 1920, the mill was treating ons daily, an equal amount going to smelters.

Property considered good, and management competent.

EL CENTRO MINING & MILLING CO. NEW MEXICO

Address: Lordsburg, Hidalgo county, N. M.

Officers: E. S. Eno, pres.; Geo. M. Peck, v. p.; R. F. Fitz, sec.-treas. P. O. Box 275, Los Angeles, Cal., with Henry Muntz, Alfred Cole, D. D. Culver and J. A. Rovelstad, directors.

Inc. Nov., 1914, in Arizona. **Cap.,** $200,000; $1 par; outstanding 100,00[illegible] Company, in 1915, bought the Last Chance mine, owned by the Sutton Con[illegible] solidated Mining Co., and claimed to have produced $135,000 in the past.

Property: 4 claims, 2 patented, 68 acres, in the Pyramid mining dis[illegible] trict, 8 miles south of Lordsburg, said to show shoots 9-30′ wide of silver[illegible] copper ore in a fissure vein in andesite.

Ore reserves: claimed to be 10,000 tons of ore, assaying $4 to $12 pe[illegible] ton.

Development: 275′ vertical shaft with 2,000′ of workings. Mine id[illegible] in 1915-1916, but present management resumed operations, 1917. No late[illegible] returns received.

EL CLIFF MINING CO. NEW MEXICO

Probably dead. Mine at Hermosa, N. M. See Vol. XI, Copper Han[illegible] book.

EL NORTE COPPER CO. NEW MEXICO

George E. Coxe, mgr., Hanover, N. M.

Is operating company for Chino del Norte Copper Co., which see.

EL PASO MINING & MILLING CO. NEW MEXICO

Mail returned unclaimed, March, 1919, from former address, Pinos Alto[illegible] N. Mex.

Officers: at last accounts, A. F. Kerr, pres.; El Paso, Tex.; J. E. Spen[illegible] cer, mgr.; J. W. Crowdus, cons. engr.; with Louis Addoo and Mrs. J. W[illegible] Crowdus, directors.

Operated the Savannah Copper Co. group of 19 claims which includ[illegible] Pacific No. 2, at Pinos Altos, N. M., under lease. Shows gold bearing quart[illegible] in Skilacorn vein. Equipped with 75-ton concentration mill and flotatio[illegible] unit.

ERNESTINE MINING CO. NEW MEXICO

Absorbed, June, 1915, by Mogollon Mines Co., which see.

EXCELSIOR MINING & DEVELOPMENT CO. NEW MEXICO

Probably dead. See Vol. X.

FLAG TUNNEL MINING CO. NEW MEXICO

Address: C. C. Lowe, mgr., Taos, N. M.

Officers: Jose Montanar, pres.; R. F. Oakley, sec.; W. T. Hinde, treas[illegible] L. C. Haberstich, supt.

Inc. March, 1919. **Cap.,** $1,000,000; $5 par; 7,000 shares outstanding. U[illegible] S. Corporation Co., New York, registrar and transfer agent.

Property: 4 claims, about 80 acres and a tunnel site, 200 acres in th[illegible] Keystone mining district, Taos county, said to show gold tellurides in se[illegible] eral veins.

Company plans to push a tunnel, which will unwater and develop the[illegible] claims.

GARNET COPPER CO. NEW MEXICO

Address: Ohaysi, N. M.

Officers: James H. Parker, pres., and C. Jungk, sec.

Inc. in New Mexico, in 1916. **Cap.,** $60,000; shares $1 par.

Company operates the Garnet, Mae Belle, James Fisk and Shoo Fl[illegible] mines at Ohaysi, Otero county, N. M.

Development: deepest shaft is down 450′. The deposit occurs in gar[illegible] net-lime zone of altered sedimentaries at porphyry contact, and ore con[illegible] tains copper and gold. Ore was sent to the El Paso smelter. No recent re[illegible] turns received.

rell, sec.-treas.; F. P. Jones, T. L. Lowe, J. Agee, T. W. Carter, D. C. rell and D. T. White, directors.
nc. 1917, in New Mexico. **Cap.**, $3,500,000; $1 par; 620,000 issued.
Property: 61 claims in the Burro Mountain district, N. M., including of National Copper Co. Considerable development done.

D BELL MINING CO. **NEW MEXICO**
Probably dead; mail returned unclaimed, March, 1919, from former ss, Deming, N. M.
nc. 1916, to develop a silver property N. E. of Hillsboro, Sierra county,

D BUTTES MINING & MILLING CO. **NEW MEXICO**
Office: Duncan, Ariz.
Officers: G. F. Fraser, pres.; Daniel Fraser, v. p.; John Evans, sec.-; A. Fraser, mgr., with W. Hutchins and M. C. Tilletson, directors.
Cap., 750,000 shares; par $1.
Property: 920 acres, divided into 3 groups in the vicinity of Twin s, Steeplerrock district, Grant county, N. M., about 20 miles N. E. of an, Ariz. The properties are (1) the Rival Extension group of 9 claims, ed on the Rival lode, showing a low grade gold ore; (2) the Twin Peaks of 26 claims, said to contain gold sulphides; (3) the Dark Thunder of 120 acres reported to have shipped 30% copper with some silver old. Company also owns 50,000 shares of the Rival Mining Co.
Development: at the Rival Extension and Twin Peaks, by a 265′ shaft 1,000′ of workings; the Dark Thunder has been prospected in several s.

D & COPPER DEEP TUNNEL M. & M. CO. **NEW MEXICO**
Office: Beaver Falls, Beaver county, Pa. **Mine office:** Elizabethtown, x county, N. M.
Officers: A. T. McIntyre, pres.; G. E. Dachtler, v. p.; W. H. Martin, reas.; W. P. McIntyre, gen. mgr. and supt., with J. M. Richards, tors.
nc. Oct. 10, 1900, in New Mexico. **Cap.**, $500,000; increased 1912 from 00; shares $1 par; 282,948 issued. Annual meeting third Tuesday in

Property: in the heart of Cimarron range, on the west slope of Baldy tain, 12,500′ high, comprises 12 claims, 260 acres, in the Moreno dis- 18 miles from the St. L. R. M. & P. R. R. at Ute Park. Orebody, a ct between slate and monzonite, is developed by 2 shallow shafts and 0′ crosscut tunnel, planned to penetrate the mountain with a final h of 3,500′, cutting 2 bodies of low-grade copper ore. Also said to a deposit of molybdenite. Total underground work, 4,400′.
Equipment: includes a 12-h. p. gasoline air compressor and 10 buildings; 1 stamp-mill. See U. S. Geol. Survey Prof. Paper, 68, p. 95, for geology s district.

DEN LINK CO. **NEW MEXICO**
Probably dead. See Vols. XII and XIII.

NT COUNTY COPPER CO. **NEW MEXICO**
Address: H. B. Link, mgr., Santa Rita, N. M.
ompany said to be developing a body of zinc ore, 1½ miles north of Rita. Mining is by tunnels. A mill was constructed in 1919, and was cing a good grade of zinc concentrate early in 1920. About 25 men yed.

AT EAGLE MINING CO. **NEW MEXICO**
Address: Red Rock, N. M.
fficers: J. H. Cauthen, pres.; J. S. McCelvey, v. p.; R. S Spann, sec.-; F. A. Kroll, mgr.
nc. Jan., 1919, in New Mexico. **Cap.**, $750,000; $10 par.
roperty: 16 claims, 300 acres, in the Anderson mining district, Grant y, showing a vein with gold, silver, copper in fluorspar; vein is 15′ wide

and 2,000′ long, surrounded by granite, course, N. 30° W. Company rep that ore carries 91.7% fluorspar.

Development: 800′ of open-cuts. Reserves are said to be estimat 300,000 tons with 10,000 tons blocked out.

Equipment: includes a compressor and tramway. Production to M 1919, about 3,000 tons. Company plans to sink a 3-compartment shaft and erect another compressor.

HANOVER BESSEMER IRON & COPPER CO. NEW MEXI

Address: Fierro, Grant county, N. M.

Officers: B. D. Coleman, pres.; C. F. Hess, sec., and J. W. Brock, tre D. M. Barringer, B. D. Coleman, J. W. Brock, R. A. F. Penrose, Jr., J Brock, C. C. Tegethoff and John Brockman, directors. C. K. Barnes, s L. M. Kniffen, supt.

Inc. Nov., 1914, in Delaware. **Cap.**, $1,000,000; $1 par; 625,000 outsta ing. Notes authorized and issued, $100,000. Transfer office, 511 Bell Bldg., Philadelphia, Pa. Annual meeting, first Monday in May.

Property: at Fierro, Grant county, shows ore averaging about 3 iron and 5% copper. Company had a 10-year contract which required shipment of 20,000 tons of iron ore per month to the Pueblo plant of Colorado Fuel & Iron Co., which was closed temporarily in September. work was being done late in 1919, but in December, the U. S. S. R. & M. was reported to have purchased the mine.

HANOVER COPPER CO. NEW MEXI

Address: Hanover, Grant county, N. M. Geo. A. St. Clair, pres., luth, Minn.; F. T. Walker, mgr.

Inc. 1909. **Cap.**, $50,000; shares $10 par.

Property: 18 claims, north of the Chino Copper property and o the holdings of the Philadelphia Copper Co. Mine has shafts 70′, and 150′ deep and tunnels 40′ and 60′ long, showing copper and zinc o Equipped with hoist and compressor.

HARDSCRABBLE MINING CO: NEW MEXI

Company is out of existence, as holdings have been taken over are being operated by the U. S. Copper Co., which see. See Vol. XIII

HECLA MINING CO., THE NEW MEXI

Office: 652 South Spring St., Los Angeles, Calif. **Mine** addr Lordsburg, N. M.

Officers: R. E. Vandruff, pres.; John W. Wilson, v. p.; W. G. W sec.-treas.; O. H. Reinholt, cons. engr.; Franklin Smith, geologist; F. Davis, gen. mgr.

Inc. Oct. 17, 1916, in Nevada. **Cap.**, $850,000; shares $1 par; treas reserve, $200,000; balance used, partly to pay for property and equipment partly for development. No indebtedness.

Property: 9 claims fully paid for, and another, the Bonnie Jean, o option, about 140 acres lying between the 85 and the Octo mines, 3 m S. W. of Lordsburg, in Hidalgo county, and 2 miles from the S. P. R. R.

Geology: similar to that of the 85 and Octo mines. Country rock diorite-porphyry. General geology fully described by Lindgren in Paper 68, U. S. Geological Survey. Outcrops conspicuous and form la marks, such as Lee's Peak 500′ from the Hecla, frequently mentio by Lindgren. Gangue very silicious and ore is therefore in demand fluxing the basic ores from Bisbee. Sulphides found near the sur Many mineral varieties occur, but main values lie in copper, gold and s contents, said to average over $30 a ton before the rise in metal p

Development: includes two 300′ and several shallow shafts. the deeper shafts was to be enlarged, retimbered and deepened. The graphy does not lend itself to successful tunnelling.

Equipment: includes 250-h. p. boiler plant, 40-h. p. hoist, 700 c compressor, pumps, etc. No 1919 returns received.

IBRILLO COPPER MINING CO. **NEW MEXICO**
Mine in Socorro county, N. Mex. No returns received in many years. **ably** dead. See Vol. XIII, for full description.

MOSA COPPER CO. **NEW MEXICO**
Office: 30 Church St., New York. **Mine office:** Hanover, Grant county,

Owned by the General Electric Co. Property has been closed down **n the** hands of a caretaker for the past 7 years.

CANYON MINING & SMELTING CO. **NEW MEXICO**
Office: 154 West Randolph St., Chicago, Ill. **Mine address:** Magdalena, rro county, N. M. **Registered office:** Oscuro, N. M.
Officers: Alpheus McCallum, pres.; A. Pement, v. p.; E. G. Raffety, .; A. W. McCallum, sec., with Alexander McCallum and A. B. Wilson, tors. J. A. McCallum, supt.
Inc. April, 1906, in New Mexico. **Cap.,** $1,000.000; shares $100 par; shares outstanding.
Property: 11 claims, 220 acres, 3 miles from Santa Fe R. R., in the **dalena** mining district, shows a shear zone in rhyolite running N. 25° with steep dip N. E. Surface shows thin seams of oxidized ore, de- ped by 1,550′ crosscut tunnel together with shafts and open pits of about '. Company has expended almost $71,000 on development work. Ore ys, 2.5% to 24.64% copper, 1.2 oz. to 5.42 oz. silver, and 0.02 oz. to 1.15 oz. per ton.
No production figures received.

INOIS & SARATOGA MINES **NEW MEXICO**
Address: C. T. Brown, Socorro, N. M. Mine at Kingston, Sierra ıty, N. M.
Nothing has been done at these mines for several years, but manage- t expected to resume operations in 1919.

K MINING & MILLING CO. **NEW MEXICO**
Mine probably closed down as mail was returned unclaimed in March, . The property was known as the Roosevelt group, a former gold mine old gulch, Santa Rita mountains, near Bayard, a few miles S. W. of Santa The ore deposit was said to show both silver-lead and molybdenum.

KS PEAK TRAMWAY & MNG. CO. **NEW MEXICO**
Office: Dalhart, Tex. **Mine address:** Carrizozo, N. M. N. M. Vinyard, -gen. mgr.
Company has iron ore properties about 25 miles east of Carrizozo. In 1919, an 8-mile tramway, to connect with the Chicago, R. I. & Pacific was in course of construction.

LLA CONSOLIDATED COPPER CO. **NEW MEXICO**
as been reorganized under name of Boston & Brice Copper Co. see.

LLA COPPER SYNDICATE, INC. **NEW**
ddress: Brice, via Oro Grande, Otero county, N. M.
roduced a small tonnage in 1913 and early 1914. Operati late 1915. No recent information received. Fully desc

NNY BULL MINE **NE**
. H. Henry, owner, Boston Road, New York, N. Y.; I purch. agt., Steins, Hidalgo county, N. M.
roperty: 3 patented claims, south of Steins Pass, betw & S. W. R. R., on western slope of Peloncillo ra t deposit between limestone and a N.-S. monzonite to average 5% copper and to run high in lime and iron
evelopment: includes 2 old shafts, 100′ and 150′ deep, exposing 2 parallel veins, each 20′ wide. Property by the Johnny Bull Copper Mining Co., whose charter 2.

Production: about 225 tons of 5% ore has been mined to date, yield gold and silver also.

Owner reports that the lode is to be diamond drilled in 1920 to pr the orebodies in sight.

JUMBO MINING CO. **NEW MEXI**

Office: Deming, N. M. C. W. Lininger, supt.

Officers: J. J. Hyatt, pres.; C. J. Kelly, v. p.; E. L. Foulks, sec.-tre

Inc. 1917. **Cap.,** $250,000; shares $1 par; 50,000 treasury shares offer October, 1917.

Property: in Cook mining district, 25 miles north of Deming an at the Graphic and the Cook Peak mines. Claims show four strong para fissure veins in andesite porphyry.

Development: by 250 shaft with levels at 200′ and 250′. On latter le vein No. 1 is 2′ wide and carries high-grade silver lead ore.

Equipment: 50-h. p. boiler, compressor, 50-h. p. oil engine and steam hoist.

KING COPPER CO. **NEW MEXI**

See same title under Arizona.

KING & QUEEN COPPER CO. **NEW MEXI**

Office: 111 S. Second St., Albuquerque, N. M.; also Trust Bldg Paso, Texas.

Officers: J. O. Hamilton, pres.; J. R. Fisk, v. p.; W. K. Ramsey, treas.; H. F. Perry, supt.

Inc. 1907, in New Mexico. **Cap.,** $1,000,000; shares $1 par. El Title Co., El Paso, Texas, registrar.

Property: 14 claims, about 260 acres, 8 miles S. W. of Steins near the King Kendall and Johnny Bull mines, shows limestone cut large N.-S dike of monzonite porphyry with ore occurring in contact morphic deposit of altered garnetiferous limestone. Ore carries a bornite, chalcopyrite, pyrite, and on the Queen claim, some chry It is low-grade, carries zinc and lead, and is hard to concentrate.

Development: by shallow workings showing ore said to average copper. Company expected to explore with core drills in 1919. Pro has been worked by lessees for 5 or 6 years.

LA LUZ COPPER CO. **NEW MEXI**

Property probably closed down as letters were returned in 1917. See XII.

LAS ANIMAS PEAK GOLD MINES CO. **NEW MEXI**

Office: 1516 No. American Bldg., Chicago, Ill. **Mine office:** Hill N. M.

Officers: Hon. E. W. Kirkpatrick, pres.; R. Liebman, v. p.; C. B. Deman, sec.-mgr.; W. A. Nason, treas., with L. E. Marvin, W. McCarty and J. H. Palmer, directors. E. B. Van Deman, supt.

Inc. 1914, in Arizona. **Cap.,** $1,000,000; shares $1 par; 450,000 Annual meeting, third Wednesday in January.

Property: 12 claims, unpatented, 240 acres, 4 miles N. of Hill Sierra county, shows gold-silver ore in a fissure vein, said to be 3-12 striking N. and dipping 70°. Developed by several shafts to depth of 435. agement estimated 100,000 tons of ore blocked out in 1917.

Equipment: includes 50-h. p. steam hoist, pump, compressor and

Property was a good producer under former owners, the Philadelphia M. Co., which went into bankruptcy in 1907. Litigation followed and mained idle until acquired by present company in 1914.

No returns for 1918 available.

LAWRENCE MINING CO. **NEW MEXI**

Office: Oliver Bldg., Pittsburgh, Pa. Probably dead.

Had a lease on the Bonney mine of the Bonney M. Co., in the Virgin ing district, Lordsburg, N. M., which was taken over September 15, 1916 owners, and sold, July, 1919, to the Bonney Consolidated Copper Co.

.E HATCHET MINING CO. **NEW MEXICO**
dress: A. E. Bader, Santa Rita, N. M.
ficers: F. W. Lincoln, pres.; H. L. Linx, v. p.; E. H. Williamson, . E. Bader, sec.
operty: about 160 acres, 30 miles south of Santa Rita, Grant county, ing copper and silver. A rich and large vein was reported cut in Novem- 9. Sinking is in progress, showing good ore. This is "a 1,000-to-1 shot," ng to an advertisement of the company's treasurer.

MOUNTAIN SILVER MINES CO. **NEW MEXICO**
dress: H. W. Loomis, Deming, N. M.
. 1919, in New Mexico. **Cap.,** $150,000; shares 10c par.
icers: C. A. Overlock, pres.; D. A. Richardson, sec.; H. W. Loomis, gr.
operty: 8 claims, in an old silver district between Chino and Tyrone, from the Hurley concentrator of Chino Copper Co., Grant county. A y intrusion in limestone is to be explored.

Y GROUP **NEW MEXICO**
dress: M. D. Gaylord, mgr., Brice, via Oro Grande, Otero county, exico.
sumably idle for past 4 years. Property fully described in Vol. XIII.

IOTH MINING & MILLING CO. **NEW MEXICO**
dress: Pinos Altos, Grant county, N. M.
ring 1918 it was reported that A. C. Dundas, J. H. Tilley, W. J. Clayzer L. Williams, had secured a lease on the Mammoth mill. The operators treat the Mammoth mine dump and to handle custom ore.

AS DEVELOPMENT CO. **NEW MEXICO**
sumably dead, and property owned and operated by Phelps Dodge **Former office:** Silver City, N. M. **Mine office:** Tyrone, Grant N. M.
icers: J. E. Saint, pres.; G. A. Kaseman, v. p.; M. W. Porterfield, s., with W. C. Porterfield and R. P. Barnes, directors, at last report.
ly described in Vol. XIII.

HIS MINING CO. **NEW MEXICO**
ice: 204 Mills Bldg., El Paso, Texas. **Mine office:** Organ, Dona nty, N. M.
cers: J. I. McCullough, pres.; W. N. Small, v. p.; Jas. C. White, s., with T. S. Semple and Chas. E. Head, directors.
. 1911, in Arizona. **Cap.,** $1,000,000; shares $1 par; 650,000 shares ing.
perty: 5 claims, 100 acres, consisting of the Old Memphis mine, on and Copper Bow group.
elopment: by 4 shafts with about 2,000' of workings. Past ship- id to have averaged 10% copper, 6 oz. silver, and $3 gold per ton. No urns received.
perty under lease to Phelps Dodge Corp. for 5 years, from April 1, 1916.

RED RIVER MINING CO. **NEW MEXICO**
: Box 487, Raton, N. M.
: H. B. Pooler, pres.; W. D. Kershner, v. p.; W. G. Hughes, . J. M. Clarke, F. B. Evans, F. T. Divers, Chas. Frazer, Thos. Gable ara, directors.
e, 1914, in New Mexico. **Cap.,** $300,000; $1 par.
: 4 claims, patented, 70 acres, in Red River mining district, showing a quartz vein 3-6' wide containing gold and silver sulphides porphyry.
t: by tunnels 300', 225' and 175' long. Underground work- . Reserves estimated at 5,200 tons of $12 ore.
includes 25-ton mill, with a flotation unit, 6 miles from expects to erect mill at mine early in 1920, and to resume

Production: 300 tons of $17 ore up to 1917, when operations were s
pended

MEXARKO MINING CO. NEW MEXI

Office: Merchants' Bank Bldg., Ft. Smith, Ark. **Mine office:** Si
City, N. M.

Officers: Geo. Sengel, pres.; R. C. Bollinger, treas.; W. D. Logue, s
John W. Bettes, gen. mgr. E. P. Seeley, engr.-supt.

Cap., $1,000,000.

Property: at Silver City, Grant county.

MINERAL HILL MINING CO. NEW MEXI

No returns received since 1916. See Vol. XIII.

MOGOLLON MINES CO. NEW MEXI

Address: Sidney J. Kidder, gen. mgr.; C. A. Botsford, supt., Mog
Socorro county, N. M.

Officers: Frank H. Hitchcock, pres.; Alfred Levinger, sec.; J. H.
ban, treas., all of New York City, with J. U. Sebinius, O. F. Weber, R. J.
Kay and F. W. Vellacott, directors.

Inc. Dec. 6, 1912, in Maine. **Cap.,** $1,778,410; $5 par; all outstan
New York Trust Co., New York, registrar. Annual meeting, second Mon
October. Gross earnings, 1917, $408,765; operating expenses, $366,781
ing to $7.626 per ton. During 1918 plant operated at only part capacity
water shortage and influenza epidemic; during 1919 normal operation
maintained.

Property: 16 claims, 12 patented, 216 acres, at Mogollon. In 1915
agement absorbed the Ernestine Mining Co., which was organized Nov
1902. During 1918, company acquired options on both the Confidence and
wood mine, adjoining properties in Mogollon, also has under option the
King and the Forest Queen groups at Irwin, Gunnison county, Col.

Ore: gold and silver sulphide, in quartz veins in andesite and rh
said to average $12 to $15 per ton. Main vein, known as the Last Chance
S. E.-N. W.; dips 60 to 70° and is 10 to 26' wide.

Development: incline shaft 900' below main tunnel, which is 1,972
greatest depth of workings, 1,780'; workings total 27,131'. Shrinkage sto
used. Main workings are on Last Chance and Top claims.

Equipment: includes electric hoist, compressor, oil engines, el
power, 40 stamp mill and cyanide plant, capacity 160 tons daily.

Production:

	Ore treated, tons	Yield Gold, oz.	Silv
1918	38,566	4,312	
1917	52,222	6,460	
1916	44,904	7,171	

Total output in 25 years is $7,500,000. Property is fully described by
Scott, in Bull. 158 of, A. I. M. & M. E. February, 1920.

In December, 1919, property was operating at full capacity, 150 tons
making good profits.

MONITOR SILVER, LEAD & ZINC M. & M. CO. NEW MEX

Offices: 115 Broadway, New York, and McLaughlin Bldg., Santa
New Mexico.

Officers: Chas. E. Berner, pres.; Chas. W. Berner, v. p.; Gott
Ettensperger, sec.-treas., with Sidney H. Hirsch and Francis C. Wilson
tors. Ricketts & Co., 280 Madison Ave., New York, mgrs.

Inc. Feb. 5, 1916, in New Mexico. **Cap.,** $1,000,000; issued $6
shares $1 par. Security Registrar & Transfer Co., New York, transfer
and registrar.

Property: 500 acres in Hermosa, Palomas mining district, Sierra
New Mexico.

Equipment: includes a concentrating plant, hoist, compress
mi[illegible]ower and houses. No recent returns received.

TE RICO MINING & MILLING CO. **NEW MEXICO**
ffice: 428 Washington Trust Bldg., Washington, Pa. **Mine office:** burg, Hidalgo county, N. M
fficers: Lawrence R. Boyd, pres.; F. B. Theakson, v. p.; James V. sec.-treas.
roperty has been closed down since 1916, due to litigation, which was set- n May, 1919. Fully described in Vol. XIII. Work was resumed in 1920, ain tunnel being extended to cut the ore shoot opened above.

IONAL COPPER CO. **NEW MEXICO**
lle and probably dead. Chas. P. Laughlin, sec., Tyrone, Grant county, N. M. ully described in Vol. XIII.

IONAL GOLD & SILVER MINING CO. **NEW MEXICO**
ffice: Unity Bldg., Chicago, Ill.
fficers: M. R. Sherman, pres.; S. W. Winn, sec. Is a close corpora- Cap., $3,000,000.
roperty: 10 claims, including the Beck mine, 2 miles from Steins, go county, developed by 2 miles of workings with a 300′ shaft, showing a vein of gold-silver ore. Vein strikes N 70° E. and dips steeply north-

quipment: includes 5-drill compressor, hoist, 50-ton mill, blacksmith offices and dwellings.
line has been worked steadily since 1915 and shipments are made at vari- mes to the El Paso smelter.

ADA HILLS MINING CO. **NEW MEXICO**
resumably idle, as mail is returned from former address: Gage, Luna r, N. M.
roperty: 8 claims, purchased in 1916 for $15,000, in Victoria mining t, near Gage, said to show a vein 20′ wide of tungsten ore in lime forma- ith quartz gangue, opened on the 40′ level. Developed by 2 shafts, 130′ and ep. The property was formerly worked for silver values.

MEXICO ZINC & COPPER CO. **NEW MEXICO**
ddress: J. L. Terry, mgr., Hanover, N. M.
fficers: Judge W. H. Winter,, pres.; H. O. Bursum, v. p.; J. A. onald, sec.-treas.
roperty: 1,200 acres, includes the Mountain Home zinc mines, 11 ed claims, 211 acres, and the Copper Flat group, 52 unpatented claims, cov- the extension of the first named group. Holdings adjoin Phelps Dodge, e Zinc, and are near Hanover Bessemer C. & I., El Norte Copper and producers.
eology: contact deposits, shear zones and fissure veins in contact orphic areas of altered limestone near monzonite dikes and granitic in- t masses.
mpany planned to sink a 500′ shaft and also to drive a 500′ tunnel. No returns received.

YEAR'S GIFT GROUP **NEW MEXICO**
ldress: Jos. Hardy, Duncan, Ariz.
operty: 3 claims, patented, 48 acres, on south side of Vanderbilt in, Steeple Rock district, Grant county, N. M., 10 miles northeast of , Ariz., bought from G. H. Utter in July, 1919. Ground carries 2 quartz porphyritic andesite, the 20″ paystreak assaying 0.16 oz. gold, and 13 oz. er ton.
velopment: by 125′ shaft and 200′ of workings. Exploration under shipments of ore being made to Douglas.

MBER MINING CO. **NEW MEXICO**
operty located 12 miles south of Steins Pass. Company presumably idle, was returned, unclaimed from former address, Steins Pass, N. M. Fully in Vol. XIII.

CO., THE **NEW MEXICO**
dress: Alma, Socorro county, N. M. W. J. Weatherby, pres.; H. A. ne. Earl C. Cleaveland, gen. mgr.

Dividends: four 1% dividends were paid on pfd. stock, Dec. 1, 1[9]
Jan. 1, Feb. 1, March 1, 1917. On April 1, 1917, a 1¼% dividend was decla
payable quarterly on prefered stock.

Property: the Pacific, Hub and a portion of the Johnson groups,
acres, in the Cooney, or Mogollon district, about 80 miles from Silver City,
nearest railway point. Also has a bond on 300 acres additional, including
Eberle, Deep Down, Maud S., Deadwood and McKinley groups. Company
stalled a compressor at the Deep Down mine in 1918.

The Maud S. has produced silver-gold ore worth $800,000. The Pa
mine has yielded silver-gold ore to value of $200,000, mostly from above the
level.

The company was driving the Oaks tunnel, which starts at Mineral creek
will crosscut the Gray Hawk, Socorro, Pacific and other veins in its 9,800' le
It will be used as a main drainage and haulage tunnel for the district. S
ments made to the Socorro mill.

OCTO MINING CO. **NEW MEXI**

Office: 112 East State St., Redlands, Calif. Mine at Lordsburg, Hid
county, N. M.

Officers: E. W. Smith, pres.; G. S. Turrill, v. p.; F. E. Sanford,
J. M. Wilson, treas.; O. H. Reinholt, cons. engr., directors; E. K. Davis,
mgr.; E. J. Ernest, supt.

Inc. Nov. 15, 1912, in Calif. **Cap.,** $500,000; $1 par; issued 30
Annual meeting, third Thursday in December.

Property: 8 claims, 125 acres, 3½ miles S. W. of Lordsburg, N.
and 2 miles from the S. P. Ry. Geology is similar to that of the Eighty-Five
Hecla mines adjoining and is fully described in U. S. Geo. Survey, Prof. P

Ore: contains copper, silver, and lead. Shipments were said to
netted $28 per ton.

Development: by several old and a 145' 3-compartment shaft, which
sunk in 1919 to 600'.

Equipment: includes 40-h. p. hoist, 6-drill compressor, 200-h. p.
plant, etc.

ORGAN MOUNTAIN MINING CO. **NEW MEX**

Office: 204 Mills Bldg., El Paso, Tex. **Mine office:** Organ, N. M

The property, consisting of 340 acres, is located 12 miles N. E. of Las Cr
N. M., and was owned by the Bennett Stephenson M. & M. Co. The m
credited with a production of about $1,000,000 mainly in lead, zinc, silver
copper. The American S. & R. Co. had a lease, which was given up. The P
Dodge Corp. took a 5 year lease, which will expire in April, 1921. The co
is fully described in Vol. XIII.

ORGAN ORE CO. **NEW MEX**

Address: Organ, N. M.

Officers: W. W. Cox, pres.; J. D. Isaacks, v. p., L. B. Bentley, sec.
V. B. May, treas., with C. T. Seale, directors.

Inc. April, 1919, in New Mexico. **Cap.,** $50,000; $10 par; $19,6
standing.

Property: about 20 acres, near Organ, Grant county, N. M.
pany reports ore reserves at 600,000 tons, averaging 4% copper and 5 o
per ton.

ORO IRON CO. **NEW MEX**

Address: Ohaysi, Otero county, N. M.

Officers: Winchester Cooley, pres.; T. M. Wingo, sec.; J. H. P
gen. mgr.; Edward Salveson, supt.

Cap., $20,000; shares $1 par.

Property: the Cinco de Mayo, Iron Duke, Iron King, Iron
Iron Mask, and Laura claims at Ohaysi developed by surface workings
hematite and magnetite iron ores.

Equipment: compressor and 5 drills. No recent returns receive

'ERO COPPER CO. **NEW MEXICO**

Presumably idle, as mail is returned unclaimed from former address, Brice, Oro Grande, Otero county, N. M. See Vol. XIII.

ARK SMELTING & MINING CO. **NEW MEXICO**

Office: 601 Canal Road, Cleveland, Ohio. **Mine office:** Magdalena, orro county, N. M. Philip Argall & Sons, of Denver, Colo., cons. engrs. elter: Coffeyville, Montgomery county, Kans.

Officers: Geo. A. Martin, pres. and gen. mgr.; Oliver Box, asst. gen. r.; L. P. Pressler, supt.; W. S. Stevens, mill supt.; W. E. Corts, smelter supt. : company is a subsidiary of the Sherwin-Williams Paint Co.

Property: includes the Graphic mine, 30 claims, 227 acres, with total dings of 800 acres in the Magdalena district, showing limestone, shale and rtz, carrying contact ore deposits between limestone and schist, of about 50′ ven width, 500′ length, and known depth of 500′. The upper workings show ge quantities of lead and zinc carbonates, ores being mainly smithsonite and alerite, with some cerrusite and argentiferous galena, and occasional cuprite native copper. Ores are mainly low in grade, with principal values in zinc. : ore-shoot, of about 500′ length on the 7th, 8th and 9th levels, is about 100′ e on the 9th level.

Development: is by a 300′ shaft, and two 1,500′ cross-cut tunnels, with ut 8 miles of workings, the lower levels showing a slightly argentiferous sul- le complex of zinc, lead and copper. Property regarded as one of the largest deposits of America.

Equipment: 125-ton mill was erected, 1912, to treat the large tonnage of -grade complex zinc-lead-iron sulphide ore already developed, by the froth ation process, using it as an adjunct to older methods of concentration. A 50- mill does dry concentration on ores above 20-mesh, and wet concentration ores below that size. Electric power is used.

Production: mainly zinc ore, is shipped to the works at Coffeyville, the manufacture of lead and zinc oxides, as the base for pigments, of which Sherwin-Williams Co., in control of this corporation, is one of the largest erican manufacturers.

Lessees paid $4,000-$5,000 royalties monthly, 1917. No later returns re- ed.

COS COPPER CO. **NEW MEXICO**

Office: 581 the Arcade, Cleveland, Ohio. **Mine office:** Cowles, San uel county, N. M.

Officers: Alfred H. Cowles, pres., Sewaren, N. J.; I. C. Gifford, v. p.; derick W. Swan, sec.

Inc. 1904, in Michigan. **Cap.,** $100,000; $25 par. A close corporation. company had a floating debt of $65,000, all owed to stockholders, of m there are only 5. Mine holdings under lease, since 1915, to Pecos es Co.

Property: 15 claims, 573 acres, all patented and 238 acres including able coal veins and placer ground, in the Hamilton district, 12 miles a Santa Fe. Holdings include water rights to the Pecos river for 2½ s, with 2,000 h. p. available for development.

Lands show lower Carboniferous limestone. The property carries a act "vein," vertical, 200′ wide, outcropping for 750′ and lying alongside fered schistose diorite. The band of shipping ore is 9′ wide with er width of concentrating material. The ore, being complex, is diffi- of treatment.

Development: includes 370′ Evangeline shaft. Report by W. E. Bur- , in 1907, claims 168,304 tons blocked out on four levels. Lessees have ished much new development and in 1917, the ore reserves were to be more than double those of 1907, the pay streak having 50′ in width.

ment: includes a 165-h. p. steam plant, with 2 hoists, 1 good for and a 3-drill compressor.

Property: 14 claims, 225 acres, in Lake Valley mining district, Sierra county, about 7 miles from Lake Valley, said to contain silver and lead ore in a vein 2½-7′ wide in andesite and extending 6,000′ on surface. The district is located between two old producers, the Bridal Chamber and the Graphic mines, which are 25 miles apart.

Development: 2 shafts, 175′ apart, one 525′ and the other 200′ deep, with some lateral workings. Diamond-drilling has been done on the Good Luck claim. It is said that the vein widens and carries more silver with depth, such as 2½′ and 12 oz. at 200′ and 5′ and 50 oz. at 500′. Is a much advertised and probably somewhat over-rated company.

Equipment: includes 2 boilers, one 40 h. p., the other 100-h. p, a hoist with 800′ of cable, compressors, 5 pumps and necessary buildings. Over $400,000 is said to have been spent on the mine.

R. & S. MOLYBDENUM MINES CO. **NEW MEXICO**

Address: C. W. Savery Securities Co., 604 Denham Bldg., Denver, Colo. M. B. Rapp, mgr.

Cap. $3,000,000; shares $1 par. Pre-organization offer at 75 cents each.

Property: 350 acres on the Red river, 8 miles N. E. of Questa, at an elevation of 8,500′, in Taos county. Ore is found as veinlets in altered limestone and monzonite-porphyry. After spending $50,000 in driving a 500′ tunnel, in ore all the way, averaging 1½% molybdenite, it was advertised that "a conservative mining engineer places a value on the ore of two hundred and fifty million dollars. An expert who recently visited the property stated that he had examined 72 different molybdenum mines and this property contained more ore than all of the other 72 put together." which is a stupid assertion for any reputable engineer to make. The property is described in the Eng. & Min. Journal, December 13, 1919.

A small mill, 5 miles from the mine, was rented and October, 1919, 35 tons of ore were treated that yielded 25 tons of 85% concentrate. It is proposed to erect a hydro-electric plant and 200-ton flotation mill.

Calculating on basis of 1 ton of concentrate from 74 tons of ore, a recovery of 85%, and a market price of 50 cents per pound of molybdenite it is contended that the revenue would be $850, operating cost $403, and profit $447 on 1 ton of concentrate. This multiplied by 2½ tons daily output from the new mill for 300 days per year, gives a total profit of $335,286.

SACRAMENTO COPPER CO. **NEW MEXICO**

Address: 310 Two Republics Bldg., El Paso, Texas. **Mine office:** L. C. Sutton, mgr., Tularosa, N. M.

Officers: Ed. Mechem, pres.; Eli Knight, v. p.; R. B. Rawlings, sec.-treas., with W. P. Stiles, T. J. Stafford and J. M. Gale, directors.

Inc. March 28, 1916, in New Mexico. **Cap.,** $750,000; 50c par; 250,000 issued.

Property: 54 claims, 1,080 acres, 6 miles N. E. of Tularosa, N. M., covering Copper Basin, at head of Coyote creek, at base of White Mtns.

Development: by 200′ incline shaft and various test pits and cuts. The whole area is to be explored by drilling before mine equipment is ordered. It is said that at a depth of 100′ copper ore was cut and 34′ of ore passed three assaying 1 to 7%; at 400′ there was 10′ of 2 to 9% ore.

SAN LAZARUS MINES CO. **NEW MEXICO**

Office: 2837 Hennepin Ave., Minneapolis, Minn. Mine near San Pedro, Santa Fe county, N. M. Company has been idle for many years. Property is fully described in Vol. XIII.

SANTA FE GOLD & COPPER MINING CO. **NEW MEXICO**

Office: 11 Broadway, New York City. **Mine office:** San Pedro, N. M.

Property: 279 acres of patented mining claims in Santa Fe county and 31,594 acres of miscellaneous grazing lands comprising the San Pedro grant in Santa Fe, Sandoval, and Bernalillo counties and in addition 300 acres of grazing lands comprising the Canon del Agua grant in Santa Fe county.

Early in 1918 the mine was closed due to lack of ore. Is a Lewisohn company, operated while high metal prices prevailed, but whose dimin-

erves, probably do not warrant working under present excessive prices supplies and labor. Fully described in Vol. XIII.

VANNA COPPER CO. **NEW MEXICO**

Address: Henry Hovland, Lonsdale Bldg., Duluth, Minn. Mine near ios Altos, N. M. I. J. Stauber and I. L. Wright, lessees.

Inc. September 16, 1908, in Arizona. **Cap.**, $2,000,000; $10 par. The npany was a merger of the Copper Gulf Mining Co. and Comanche ning & Smelting Co., and also absorbed the Casa Grande Development , owning in fee simple all property formerly owned by the Comanche ning & Smelting Co. and holding all but 320 shares, or 99.36% of the ck issue of the Copper Gulf Mining Co. In January, 1919, the company l 149,000 shares of full-paid stock outstanding. Cash balance, February 919, was about $10,000.

Property: 17 claims, 16 patented, in the Pinos Altos district, 4 patented ims in the Anderson district, and 1 patented claim in the White Signal trict. The claims in the Burro Mountain group sold January, 1916, to elps, Dodge & Co., for $700,000, constituted the principal and most val- le holdings. The Comanche group comprised 43 claims. The Copper lf group consisted of 1.440 acres. The Jennie group of 4 claims, patented 0, on the Gila river, 35 miles N. W. of Silver City, is not worked owing its inaccessibility, and development on the Chloride Flat property has n confined to assessment work.

NORITO COPPER CORPORATION **NEW MEXICO**

Office: 34 Pine St., New York. **Mine office:** Senorito, Sandoval county, w Mexico.

Officers: H. B. Walmsley, pres.; W. E. Greenawalt, v. p.; J. A. Kern, ; H. W. Webb, treas. J. T. McLaughlin, supt.; W. L. Bain and Oswald :ker, cons. eng.

Inc. November, 1916, in New Mexico. **Cap.**, $1,250.000, in $1,000,000 nmon shares at $1 par, and $250,000 cumulative 8% pfd. shares at $10 par, ivertible on call at par to common. All common shares are outstand- and 4,100 shares of pfd. are outstanding. Common listed on New York b. Empire Trust Co., New York, transfer agent.

Property: 22 claims, 400 acres, in the Naciemento district, Jemez moun- is, 2½ miles from Senorito, N. M. The most important mines are the eka mine, consisting of Conglomerate No. 1 and Conglomerate No. 2 s, and the Copper Glance mine. Some of the property was worked by Juratrias Copper Co., now dead.

Development: considerable tunnelling, etc., exposing a large deposit of -grade ore. A U. S. Geological Survey report in 1910 said that the ore the Copper Glance claims consisted of sulphides, carbonates and sili- of copper in white, to reddish sandstone or grit. The ore beds aggre- about 100′ thick. The average ore will probably be low grade, which applies to the Conglomerate claims. Management reports about 800,- tons of ore in place and several thousand tons on dump running up to copper in the carbonate ore, also, high grade sulphide ore.

Equipment: includes, a sintering plant, a 50-ton smelter, sawmill, power- nt and necessary buildings.

Leaching trials were made on the ore in 1915 by W. E. Greenawalt of ver, producing copper at under 5c per lb., including mining and milling. mpany does not claim to be able, under existing costs, to attain this re- . The property was sampled in Oct., 1916, by R. S. Ransford for J. G. & Co. Late in 1917, a group of strong interests agreed to drill and the entire ore beds in consideration of their being granted an on 501,000 shares, representing control of the company. Exploration ced in April, 1918, and later it was announced that property con- approximately 3,300,000 tons of ore. Property apparently has con- merit.

FF MINING CO. **NEW MEXICO**

ress: F. G. Kaermer, mgr., El Paso, Texas.

Inc. in Arizona. **Cap.**, $30,000.

Property: 2 claims, 40 acres, on Caballo mts., near Rincon, contains a blanket deposit and a fissure vein 4 to 6′ wide in limestone. Ten tons of ore daily, containing 22% manganese and 27% lime, are treated in a lime kiln turning the lime carbonate into quicklime. Washing out the lime as white emulsion leaves the manganese in concentrated state with but little loss in tailings. No crushing is necessary.

Development: by 35′ vertical and 15′ incline shaft, and about 100′ of prospect holes.

SIERRA CONSOLIDATED MINING CO. **NEW MEXICO**

Out of business. Property taken over by Statehood Mines Co., both of which companies were reported forced into bankruptcy through incompetent management and spectacular get-rich-quick financing. Mine now operated by the Snake and Opportunity Mines Co., which see.

SILVER GLANCE GROUP. **NEW MEXICO**

Address: Joseph Oliver, owner, Box 112, Fairview, N. M.

Property: 200 acres, at Mineral Creek, Apache mining district, Sierra county, said to show veins containing 10% copper, and 20 oz. silver per ton. Property is developed by 150′ shaft and about 400′ of tunnelling.

SNAKE AND OPPORTUNITY MINES CO. **NEW MEXICO**

Address: 50 Broad St., New York City, N. Y. **Mine office:** Hillsboro, N. Mex.

Officers: H. L. Carr, pres.; E. F. Carlson, v. p.; E. L. Kerstetter, sec.-treas.; N. C. Sheridan, mgr.

Inc. June, 1919, in Delaware. **Cap.**, $1,000,000; $1 par; 800,000 shares outstanding. Company is controlled by the Mines Holding and Operating Corporation of New York, through ownership of 450,000 shares of stock together with an option on 200,000 additional shares.

Property: 28 claims, 5 patented, about 400 acres, near Hillsboro, Sierra county, formerly owned by the Sierra Consolidated Mining Co. and later by Statehood Mines Co., both of which companies were reported forced into bankruptcy through incompetent management. Property contains gold bearing fissure veins in andesite.

Development: by 3 shafts, 570′, 458′ and 240′ deep. Company reports 170,000 tons of low grade ore, assaying $5-$10 per ton, broken in the stopes having been left by former operators as filling.

Equipment: 50-h. p. gasoline hoist, compressor, 100-gal. pump and 1 engines.

Reported that property produced over $2,000,000 gross, previous to 19 Present company expects to ship in 1920.

SOCORRO MINING & MILLING CO. **NEW MEXICO**

Office: J. D. Fackenthal, 165 Broadway, New York. **Mine office:** Mogollon, N. Mex. D. B. Scott, gen. mgr. in 1920.

Officers: Wm. Childs, Jr., pres.; Harry Balfe, v. p.; Robt. T. Neeley, v. p.; J. Diehl Fackenthal, sec.; Adam K. Luke, treas.; with Wm. A. Barber, Henry D. Hotchkiss, A. L. Williams, David Luke, directors, in 1917.

Cap., $2,000,000; par, $5. Company is in hands of a receiver, and reorganization is planned. On November 10, 1919, 42,177 shares were sold at public auction in New York at $1,085 for the 5 lots.

Bought entire holdings of Mogollon Gold & Copper Co. for $100,000 at public sale in Socorro, N. Mex., August, 1915. Sale ordered to satisfy judgment of $416,626, obtained by Equitable Trust Co., New York, holders of bonds to that amount.

Property: 66 claims, partly patented, over 1,200 acres, including the Cooney, Peacock, Little Charlie, Independence, and Fluoride groups, sometimes known as the Silver Bar mine, in the Cooney district of the Mogollon mountains, 85 miles N. E. of Silver City, the nearest rail point. The Fair is the principal mine, it having yielded $4,869,000 in gold and silver; followed by the Cooney with $1,700,000 in copper and silver. See account by D. B. Scott in Bull. A. I. M. & M. E., February, 1920.

Geology: the property shows porphyry and andesite, carrying the Fanny ire vein of 5 to 10′ average width, with a paystreak of about 3′ average 30′ maximum width, having numerous narrow feeders, some of which y high value gold. Ores include slightly auriferous and strongly argen- ous chalcopyrite, bornite and chalcocite, claimed to carry increasing r values at depth, and the east vein has been said to show native cop- at depth of 600′.

Development: 3 mines—the Fanny, Johnson and Cooney. The Fanny a 1,200′ shaft, and the Johnson, a mile west, has 400 and 450′ incline ts. The Fanny is the largest mine of the district and the chief pro- r. There are also various tunnels on the several groups with an ap- timate total of 30,000′ of workings.

Equipment: includes hoists, compressor, aerial tram and 250-ton mill, ball-mills and cyanide plant. The power plant has four crude oil nes developing 960 h. p.

The old mill was destroyed by fire in October, 1917; late in 1918, the plant was put in operation, but was closed and all work ceased April 1, . In March, 1920, property was acquired by American Silver Corp. of it Virginia.

ATEHOOD MINES CO. **NEW MEXICO**

Preceded by the Sierra Consolidated Mining Co.

Property taken over by the Snake and Opportunity Mines Co., which see.

EPLE ROCK DEVELOPMENT CO. **NEW MEXICO**

Out of business. Formerly at Steeple Rock, N. M.

Property: the Carlisle and Jim Crow groups, 33 claims, sold to George tter, in 1914, who sold it 1915 to H. K. Welch and S. McKeever, of York, who organized the Carlisle Dev. Co. See Utter, Geo. H.

NSET COPPER CO. **NEW MEXICO**

Probably dead. See Vol. XIII. Former address, care L. M. Stiles, ., Box 393, El Paso, Texas.

SQUEHANNA MINING CO. **NEW MEXICO**

Address: C. J. Plankenhorn, sec., Williamsport, Pa. Company suc- ed North American Copper Co., described in Copper Handbook, Vol.

Property: 9 claims, patented, in the Pryamid and Virginia districts, near dsburg, containing copper, silver and iron. Part of property was ked by lessees in 1915 and 1916, but no recent reports received. Fully ribed in Vol. XIII.

OS MINING CO. **NEW MEXICO**

Mine office: Twining, N. Mex.

Probably idle as no recent returns have been received.

Officers: A. Clarence Probert, pres.-mgr., P. O. Box 56 Taos, N. Mex.; B. Bidwell, v. p.; J. Wright Giddings, sec.; H. F. Probert, treas., with ry W. Davis, directors.

Inc. November 11, 1914, in Delaware. **Cap.**, $2,000,000; shares $10 par; 3,090 outstanding. Annual meeting, last Monday in January.

Property: 15 claims, 4 patented, 333 acres in Rio Hondo mining dis- near Twining, said to carry copper-gold-silver ore in schist and ss, averaging 2½% copper, $4.17 gold and 5 oz. silver per ton. De- ed by 1,800′ vertical tunnel and several shorter tunnels.

Equipment: includes air compressor and concentrator.

AS CANYON MINING & MILLING CO. **NEW MEXICO**

Office: C. S. Cleaver, 5427 University Ave., Chicago, Ill. **Mine office:** Dodd, supt., Organ, N. M.

Officers: E. H. Bickford, pres.; C. S. Cleaver, sec.; H. R. Gottman, .; also directors.

Inc. January, 1917, in New Mexico. **Cap.**, $100,000; $100 par.

Property: 8 claims in Texas canyon, Organ mountains, 7 miles E. of an, Don Ana county, N. M. Examined by C. M. Becker.

Development: by short tunnels. Ore averages 0.43 oz. gold, 14.05 oz silver, and 2.3% copper. Faulting is evident through the property. Not enough work done to place any value on mine. No recent returns securable.

TORPEDO MINE. **NEW MEXICO**

Address: Robert McCart, El Paso, Texas, who with P. D. Thompson and Roland Cox, of New York, are the owners.

Property: in Organ mountain district, near Las Cruces, N. M. Formerly under lease to Phelps, Dodge & Co., who withdrew from their lease early in 1918.

Development: several thousand feet of underground work done in search of lead-zinc ore.

TRI-BULLION SM. & DEV. CO. **NEW MEXICO**

Office: 10 Wall St., New York. **Mine office:** Kelly, Socorro county, N. Mex.

Officers: J. O. Wall, pres.; S. W. Traylor, v. p.; with G. C. Van Tuyl, Jr., W. B. Nash, H. V. M. Dennis, Jr., J. M. Henderson, A. S. Somers, S. F. Dominick, Gustavus Taylor and Frank Coenen, directors; D. O. Dever, sec.-treas.

Inc. 1903, in Arizona. **Cap.,** $5,250,000; shares $5 par; in 50,000 participating cumulative 4% stock with 1,000,000 common; issued 6,700 shares preferred and 999,900 shares common. Listed on New York Curb. Empire Trust Co., New York, transfer office.

Property: about 115 acres, at Kelly, N. M., including the Nit and Silver Bell groups asquired in 1912. The Nit mine, adjoining the Graphic, has an underground connection with the Waldo mine of the Ozark Smelting & Milling Co. The workings of this mine disclose a 50′ vein of 4.7 to 6% copper ore, 454′ E. of the 215′ shaft, in a crosscut from the bottom of a 45° winze sunk from the bottom level. Company owns also 2 copper and lead claims about 150 acres, known as the Starlight group, in the Stanley Butte district, Ariz.

The Tri-Bullion Co., suffered a loss of over $32,000 from embezzlement by its former treasurer in 1913-15. Property now in good hands, and with an able consulting engineer has a promising future.

TULAROSA COPPER CO. **NEW MEXICO**

Office: Tularosa, N. M. **Mine office:** Bent, Otero county, N. M.

Officers: E. P. Kern, pres.; H. E. Forrester, v. p.; G. B. Kent, sec. and gen. mgr.; W. F. Drake, treas., with J. A. Thatcher, A. J. Merrill and P. M. Lynch, directors.

Inc. March 5, 1905, in New Mexico, as successor of Tularosa Mining & Milling Co. **Cap.,** $5,000,000; shares $5 par; issued, $3,500,000. Stock listed on New York Curb. Registrar & Transfer Co., New York, transfer office.

Property: 807 acres, 307 acres, patented, at Bent, on the Tularosa river. Mine is 12 miles N. E. of Tularosa on the E. P. & S. W. R. R., about 100 miles N. E. of El Paso, Texas.

Geology: the property is underlain by a flat sheet of diorite resting on quartzite and covered in general by the basal sandstone of the Red Beds of the region. This diorite outcrops at the Virginia mine, as the company's workings are called, and dips gently in every direction away from this point. The ore is found in the uppermost part of the diorite, which is much altered to a depth of 35 to 55′ below its surface. This ore body shows lenses of glance, 2 to 18″ wide, running in all directions, which together with stringers and veinlets of ore, make a stockwerk proved to be ore-bearing over an area 200′ wide and about 1,200′ long. The altered rock between the lenses also carries disseminated copper glance and the ore as a whole averages 2½% copper; 30 to 55′ below the diorite surface the rock is fresh except along fractures; stringers of ore occur, however, at depths of several hundred feet.

Development: at the Virginia mine there is an open pit 60 by 120′ across and 35′ deep which is opened on the richest part of the deposit. The

evel corresponds to the bottom of the pit; the 2nd level is 25′ deeper. : workings are said to block out 85,398 tons of ore in an area of 105x n extent. Twelve diamond-drill holes from 88 to 400′ deep prospect round, and the results form the basis for an estimate of 800,000 tons licated ore of an average value of 2½% copper.
'roperty was to be drilled in 100′ squares and the limits of the orebody determined. One drill-hole encountered 136′ of ore at a depth of

:quipment: includes a 12,000′ ditch, hydro-electric plant, and concen- r of 300 tons capacity.
n a circular published by New York brokers it is stated that Tularosa ll the potent essentials to make just as great and valuable a property ıino, Ray, Inspiration and Miami; and is today practically the one big, veloped porphyry copper area that shows the existence of a wonderful ›dy that needs only development, which is being aggressively pushed. :ompared with other deposits of similar character, this one is, in our on, small and the ore bed thin, averaging perhaps 35′, while the ore ves are not large enough to compare with those of any of the copper hyries. The property does not warrant a large mill.
The orebody may, however, extend over a greater area, and a drilling ›aign should be made. The new parties in control have had wide rience in mining and possess ample means to test the property thor- ly.
No information available for two years, so presumably dormant.

.LOCH GOLD & COPPER CO. **NEW MEXICO**

Address: D. H. Tulloch, pres., Silver City, Grant county, N. M.
Idle. Property fully described Vol. XIII.

A PEAK GOLD & COPPER MINING CO. **NEW MEXICO**

Office: Portage, Wis. Mine and mill at Tusa, Rio Arriba county, N. M. I. Owen, pres.; R. J. Rosenfeld, sec.-treas.
Mine has been closed down since 1910. See Vol. XIII for full de- tion.

IDALE COPPER MINING CO. **NEW MEXICO**

Inactive or dead. Described in Volume XIII.
Property being operated by the Bonney Consolidated Copper Co., h see.

ONE—EL PASO COPPER CO. **NEW MEXICO**

Address: 1115 N. Kansas St., El Paso, Texas. **Mine office:** Tyrone, f.
Officers: R. M. Dudley, pres.; T. Lia, v. p.; N. F. Work, sec.-treas.; J. F. Ross, J. H. Maxey, R. K. Bell, H. L. Watson, J. B. DuBase and Mortinez, directors.
Inc. Nov. 31, 1917, in New Mexico. **Cap.**, $1,500,000; $1 par.
Property: 23 claims, 400 acres, 2 miles S. of Tyrone, N. M., said to v disseminated copper-silver-sulphide ore in porphyry, assaying 3.4% er and 2 to 6 oz. silver per ton.
Development: by 260′ shaft sunk during 1917. No later returns re- d.

TED STATES COPPER CO. **NEW MEXICO**

Office: 1639 Broadway, New York. **Mine offices:** Hanover, and Pinos , N. M.
Officers: J. W. McAlpine, pres.-treas.; C. B. Manville, 1st v. p.; A. E. n, 2nd v. p.; J. T. Janes, supt.-sec. Hardscrabble group, Pinos Altos, l; W. P. Fletcher, supt., Philadelphia mine, Hanover, N. M.
Inc. April, 1911, in New Mexico, as a reorganization of the Philadelphia per Mines Co. **Cap.**, $1,500,000; $1 par; all outstanding. Registrar & nsfer Co., New York, registrar; Security Transfer & Registrar Co., New k, transfer agents.
Property: totals about 297 acres divided into 2 groups, the first at Han- in the Central mining district, consisting of about 80 acres, 8 claims, 2

of which are the townsite of Hanover, the remainder known as the Ph delphia mine; the second group, 9 miles distant, 14 claims, 212 acres at Pi Altos, known as the Hardscrabble mine. Company also owns the Ra Davidson sawmill near the Pinos Altos property.

Development: at Hanover, by 2 main shafts, north, No. 1, and so No. 2, 200′ and 712′ deep, respectively, together with some minor shafts, about 4,000′ of workings. Early in 1919, company was stoping from 700′ level where heavy mineralization and stringers of chalcopyrite bornite, dipping east, indicate large orebodies nearby. No work was be accomplished at the Pinos Altos property in 1919, but management beli this to be a very valuable mine, following a heavy mineralized grano-dio dyke and traversed by several veins, dipping west, running N. E.-S. The country formation is monzonite porphyry, grano-diorite and gran Previous operators sunk 29 shafts from 20 to 150′, mostly inclines on veins.

Equipment: includes 2 hoists, each capable of reaching 2,500′ de steam plant, compressor, pump and sawmill.

Production: from both mines about $180,000 from development from upper levels by previous operations. In 1917, shipments of 12 c carried from 3.40 to 18.00% copper, with $3 for silver and gold, and 40 to 60% iron. It returned over $1,000 net per car. This was from Hanover mine. Ore from the Pinos Altos mine returned from 4 to 2 copper and 16 to 39 oz. silver per ton. In November, 1917, P. A. New who was selling the company's stock under a contract, which he failed carry out, brought suit against J. W. McAlpine for non-performance of co tract, but the trial resulted in a verdict against Newman. Management eliminated undesirable associations and has made progress in mine devel ment, so that the future seems to promise success.

UTTER, GEO. H. **NEW MEXI**

Office: 329 Cedar Ave., Long Beach, Calif. **Mine office:** Steeple Ro N. M.

Property: the Carlisle, East Camp, Jim Crow, and Summit group mines in Steeple Rock district, N. M., acquired from the Steeple R Development Co., which is out of existence.

The Carlisle Group.

Consists of 3 patented claims and millsite, in the Steeple Rock Mi district, Grant county, N. M., 15 miles N. E. of Duncan, Ariz. The ore free-milling gold and silver down to 300′, where it changes to base carrying galena, sphalerite, and chalcopyrite with small amounts of g and silver.

Development: by 500′ shaft with winze to 600′ level, showing in pla a width of 40′ feet′ of mineralized lode matter.

Equipment: includes a 100-ton concentrator and flotation mill.

Production: in 1918 totaled 2,500 tons yielding 50% lead, 10% zinc, 4 copper, 80c. to $2 gold, and 13 oz. silver per ton. Also produced 175 tons complex zinc-copper ores. Not operated in 1919, but kept unwatered. part leased to Eastland and others, who have opened some good ore

East Camp Group.

Consists of 8 claims, patented, 118 acres, Grant county, 18 miles N of Duncan, Ariz. On one of the claims two quartz veins join. The N get mine, of this group was operated in 1918.

Development: by shafts, 200 and 300′ deep and some tunnels Ve about 3′ wide contain gold and silver. Property was worked in the 70s. most of the old workings are now caved.

Jim Crow-Imperial Mines.

Consists of 8 claims, patented, 123 acres, 11 miles N. E. of Dun Ariz., but in the Steeple Rock mining district, Grant county, N. M. T mine contains a fissure vein with many branches, in eruptive rock. T

about 4' wide carries ore said to assay 0.65 oz. gold and 10 oz. silver on.

levelopment: by four shafts, two of which are 100' deep, the third 200' and the last 300' deep. **Equipment:** includes 25 h. p. hoist, compressor, engines of about 50 h. p., etc.

roduction: mine was idle from 1896 to 1914; previous production es- d at $50,000 in gold and silver. Ore shipped in 1915, averaged 0.7 oz. and 40 oz. silver per ton.

Summit Group.

onsists of 10 claims, patented, 180 acres, 16 miles N. E. of Duncan, in Steeple Rock mining district, Grant Co., N. M. Mine shows 2 fis- eins running through the property N. E.-S. W.

evelopment: by 2 tunnels, 120' and 470' long, a 264' shaft and 3 open Owner reports 2 oreshoots 12' wide by 50' long, assaying $7 to $8 nd silver per ton, and the outcrop assaying from $10 to $50 per ton. [r. Utter also owns the Apex and Ballali gold-silver mines, the former miles N. W. of the Carlisle, and the Ballali adjoining the Norman mine, leased to Christy, and others of Clifton, Arizona, and in which ore was opened in 1919. Two cars sent to El Paso netted $13,500. ly, 1919, the New York's Gift group was sold to Jos. Hardy and as- es of Duncan, Ariz., the consideration being $15,000, cash.

'ORIA MINING AND SMELTING CO. **NEW MEXICO**

ankrupt. Holdings bought by C. J. Boyd of Los Angeles at sheriff's December, 1915.

roperty: 2 groups, 1,000 acres, 20 miles apart, the Southern group en Organ and San Andres Mts.; the other in Plomo district, San s range, 35 miles N. E. of Las Cruces. Claims said to show silver- ores.

'OR SMELTING & MINING CO. **NEW MEXICO**

ddress: Gage, N. M. Company is a close corporation.

fficers: J. T. Duryea, 437 E. 162nd St., New York, pres. N. J. Welsh, Benito Colonna, supt.

roperty: 9 claims, 8 patented, 136 acres in Victorio mining district, county, 3½ miles south of Gage. Mine was operated by the Hearst- in interests in 1880-1890, and purchased by present company in 1907; d intermittently since by leasers. Management describes property ving two vein systems, the primary system being fissures in limestone, eling and dipping toward a N. E.-S. W. fault fracture; these are con- d with the fault fracture and with one another, irregularly, by a dary system of veins which strikes N.-S. and dips east. Ore assays % silica, 20-25% iron and 7-10% line.

evelopment: by 300' vertical shaft, 100' incline shaft, and about 4,000' rkings. Company plans to sink a new vertical shaft 500' or 400' below nt deepest workings. **Equipment:** includes 2 hoists and compressor. **roduction:** $1,500,000 in the past. Present management reports 100- ns monthly production.

TERN MINING & DEVELOPMENT CO. **NEW MEXICO**

robably out of business. See Vol. XIII.

TE OAKS MINES CONSOLIDATED, INC. **NEW MEXICO**

line office: White Oaks, N. M.

eported, 1916, that "internal dissension arose in the White Oaks Co.'s gement, and rather elaborate plans for reopening the mines have ap- tly been abandoned." No recent returns have been received. Fully bed Vol. XIII.

O GOLD & COPPER CO. **NEW MEXICO**

ddress: G. E. Moffett, supt., Alamogordo, N. M.; E. M. McClintock, El Paso, Texas.

ac. 1916, in New Mexico. **Cap.,** $250,000; shares $1 par; non-assess- 140,000 issued.

roperty: 3 claims, 55 acres, in Silver Hill district, Jarilla mountains,

Otero county, N. M., said to show a contact deposit in limestone. Ore ries 2.5% copper, 0.1 oz. gold and 1 oz. silver.

Development: about 1,200′ of tunnels.

Production: lessees in 1916 mined ore which contained 120,000 lb c per. No later returns available.

NEW YORK

CANOPUS IRON CORPORATION — NEW YO

Offices: Garrison, N. Y., and Phillipstown, Putnam county, N. Y. J. Pearse, supt.; E. Maltby Shipp, cons. eng.

Inc. in New York. **Cap.,** 100,000 shares; $10 par. Listed on New Y Curb, but stricken from list on October 21, 1919. U. S. Corporation transfer agents.

Property: corporation owns in fee the minerals under 140 acres, the surface in fee of 40 acres, at Phillipstown, Putnam county, N. Y. miles from the Hudson river and from rail, and 49 miles from New Y Examined by G. O. Angell, who endorsed reports of the above nam officials.

The ore is magnetite, and deposit outcrops for 2,200′, varying in 40 to 180′ in width. A 2,000-ton shipment averaged 64% iron, 3.27% 0.27% sulphur, and 0.11% phosphorus. Concentrates from low-grade contain from 66.01 to 68.95% iron, 2.12 to 4.75% silica, 0.138 to 0.165 phur, and 0.025 to 0.037% phosphorus.

Development: in shaft at depth of 165′ the orebody is 25′ wide, a thickness of at least 75 or 100′, is expected, as magnetic needle readi indicate 180 to 190′ in width. Company assumes an average width of 5 400′ depth, with reserves estimated at 6,000,000 tons. The Forest of D mine, due west, has been mined to 1,100′ in depth and has shipped ore over 100 years. Equipment and houses are being erected.

With iron ore at 12c per unit, 60% shipping ore is said to be wo $7.20 per ton. Freight to eastern Pennsylvania furnaces is given as $2 per ton, while mining and placing ore on cars or boat is $1.70, mak total cost of $3.95. On this basis a profit of $292,500 per annum (300 d is calculated, or a return of 29.25% on capital. The company's shares extensively traded in on the New York Curb, and the property well vertised, but thus far the share market seems to have received more tention than the mine.

CHATEAUGAY ORE & IRON CO. — NEW YO

Address: Lyon Mountain, Clinton county, N. Y. Jos. R. Linney, m Chas. W. Carpenter, purch. agent.

Property: at Lyon Mountain, Clinton county, in the Adirondack M Ore is a standard low phosphorus, assaying 28% iron, .007% phosph .09% manganese. Open pit and underground methods used.

Equipment: includes magnetic concentration mill.

Production: in 1918 amounted to 44,359 tons. Total output, 5 tons.

DOUGLAS, LACEY & CO. — NEW YO

Company was notorius promoter of numerous mining and oil pro sitions and was in hands of a liquidating organization, known as the Am gamated Properties, Inc., at last accounts. Mr. Stevens' opinion of t firm and their clever scheme for obtaining money from small investo fully described in Vol. X, under the title given above and that of the Am gamated Gold & Copper Co. of Arizona.

GRANT MINE — NEW YO

Mine near Carmel, Putnam county, N. Y. The orebody consists complex of arsenical sulphides, carrying copper, quicksilver, gold and The crude ore is estimated to have a gross value of about $25 per but, on account of its refractory nature, has no present commercial

ıd cannot be utilized without special metallurgical treatment. Closed own for several years.

IATHESON LEAD CO. **NEW YORK**

A subsidiary of National Lead Co., New York, and described there- ıder.

IINES HOLDING & OPERATING CO. **NEW YORK**

Address: 50 Broad St., New York City.

Officers: Wm. R. Jones, pres.; Jackson B. Sells, 1st v. p.; Homer L. arr, 2nd v. p.; E. L. Kerstetter, sec.-treas., with B. Brown Barker, Wm. . Hoffman and Frank H. Rogers, directors.

Inc. July 3, 1919, in Delaware. **Cap.**, $3,000,000; $1 par; 1,600,000 issued.

Company controls through stock ownership the following companies: lidnight Mining Co., Idaho (1,310,595 shares), Onondago Mines Corpora- on, Nevada (277,560 shares), Snake & Opportunity Mines Co., New lexico (450,000 shares). Also has option on 200,000 shares additional of ıake & Opportunity Mines Co. The companies are all in the development age and are described under their respective titles.

EW YORK PYRITES CO. **NEW YORK**

Address: 25 Broad St., New York City.

Property: near Gouveneur, St. Lawrence county.

ICHOLS COPPER CO. **NEW YORK**

Office: 25 Broad St., New York. **Works office:** Laurel Hill, Queens ›unty, N. Y. Employs about 1,500 men.

Officers: C. W. Nichols, pres.; J. B. F. Herreshoff, v. p.; J. A. Church, ., sec.; Edw. R. Nichols, treas.; M. E. Harris, auditor.

Inc. May, 1905, in New York. **Cap.**, $10,000,000; reduced 1912 to $7,000.- 00; $1,000,000 preferred stock issued 1914; shares $100 par; bonds $3,000,- 00. Is the successor of Nichols Chemical Co. The American Metal Co., td., owns 1,400 pfd. and 9,805 com. shares and 450 bonds, its share interest ıualing 14% of capital, and total investment $1,570,500.

Dividends: to Oct., 1914, at rate of 6% per annum, paid quarterly on ›mmon stock; then a break of 2 years, with a disbursement of 4% in ecember, 1916.

Works: the Laurel Hill plant includes a smelter and electrolytic re- ıery, with steam and electric power.

The smelter has a Herresshoff water-jacket blast furnace of 600 tons ted daily capacity.

The electrolytic plant is operated on the series system, and has 550 nks. Anodes are cast. The final product is cast mainly into wire bars. his company enjoys a deservedly high reputation for the purity of its oduct and the efficiency of its metallurgical practice. Is the largest ectrolytic refining plant in the world; capacity about 45,000,000 lb. of ›pper per month.

The works do a very extensive custom refining business, treating ainly ore and matte from outside producers in the smelter, and Western ister copper in the electrolytic plant. The works handle all the bessemer ›pper from the Phelps-Dodge properties, and from the Old Dominion, alumet & Arizona, East Butte, Granby and Ducktown companies, and hers. The mining properties at Capelton, Quebec, were taken over by the lbert Copper Co.

ORTHERN ORE CO. **NEW YORK**

Address: Edwards, St. Lawrence county, N. Y.

Officers: T. I. Crane, pres.; W. D. Blackmer, mgr.

Inc. in New York and operated as a close corporation.

Property: 650 acres of mineral-bearing territory located along a belt limestone at the contact with gneiss. The formation is cut by various ins and lenses of zinc-pyrite ore. Four of these orebodies are being de- ed and worked.

Development: by 900′ vertical shaft and 700′ incline (dip 50°). connected the 400′ level.

Equipment: includes hydro-elec. power with auxiliary steam-elec. generating plant of 500 h. p. Each shaft is equipped with hoisting plant and ore bins. Surface tramming to the concentrator is done with a gasoline locomotive. A central electrically driven compressor supplies air for both mines. The concentrating mill consists of standard crushing and tabling machinery. The mixed zinc-pyrite concentrate made on the tables is separated into a high-grade zinc blende concentrate and pyrite, both of which products are shipped.

Production: 125 to 200 tons of crude ore per day. Shipments amount to 1,000-1,200 tons zinc concentrate and 500-600 tons pyrites per month.

ST. LAWRENCE PYRITES CO. **NEW YORK**

Offices: 41 Broad St., New York, and DeKalb Junction, St. Lawrence county, N. Y.

Officers: Rudolf Metz, pres.; F. T. Rubidge, v. p. and gen. mgr.; W. J. Kingsbury, sec.; R. M. Atwater, Jr., treas.; O. F. Pattberg, supt.

Property: located in DeKalb Twp., St. Lawrence county, includes the Stella mines, and is one of the four largest pyrite mines in the U. S.

Ore: pyrite, occurring in lenses or veins in gneiss and schist. The oerbodies strike and dip in the same general direction as the gneisses, strike N. E., and dip 20° to 30° N. W. The walls are not sharply defined: the average assay is about 21% sulphur.

Development: by 2 shafts 1,600′ apart on parallel deposits. The north shaft, the Stella, is idle; here the orebody extends 400′ along the strike, averages 10′ in thickness and has been worked to a depth of 900′ on the dip. The operating shaft, the Anna, opened by levels 50′ apart vertically, has an orebody opened for 1,500′ on the strike, and average thickness of 20′. The ore is put through a crusher at the shaft before sending to the mill.

Equipment: includes a 700-ton mill with gyratory crushers, trommels, rolls, jigs, and tables. In cold weather the concentrates, to prevent freezing, are dried in a Ruggles-Coles cylindrical dryer. Concentrate assaying 44% sulphur, is sold to sulphuric-acid manufacturers and to paper mills. Power is electrical, obtained from a hydro-electric company for about $3 per h. p. per year. The property was thoroughly described in E. & M. Journal, April, 1913, p. 689.

Production: approximately 150,000 tons ore per year, yielding about 60,000 tons concentrates.

ST. NICHOLAS ZINC CO. **NEW YORK**

Practically dead. **Former office:** 37 Wall St., New York City.

Inc. in Delaware. **Cap., $1,000,000; $1 par.** Stockholders authorized the issuance of $70,000 five year 1st. mortgage 6% bonds, June, 1918. The company came to grief in 1918 and the president W. J. Pierce leased the holdings to the Summitville Ore Concentrating Co., Inc., presumably without consulting the wishes or interests of the stockholders. The Summitville company of which Pierce was an officer, filed an execution for $44,6 against the Nicholas property with the sheriff of Sullivan county on Mar 14, 1918, and despite the efforts of a Stockholders Protective Committee with offices at 2711 Grand Central Terminal Bldg., New York City, the Leasing company seems to have retained ownership of the mine.

Property: owned 1,050 acres between Summitville and Mamakating, Sullivan county, 90 miles N. W. of New York City.

Geology: fissure vein in sandstone or "grit" beds, which have been tilted to form the Shawangunk range. Fissure dips with slope of hill and bedding of the grits to N. W. about 45°. Ore is chiefly lead and zinc sulphides, with a little copper.

Development: upper workings opened vein 300′ below its outcrop and lower tunnel 800′ lower, a total of 1,100′. Vein is from 1 to 8′ thick and ore 8″ to several feet, averaging 2′ in upper workings.

Kirby Thomas, who reported on the mine in 1916, estimated 8,000 tons

developed ore, 10,000 tons of probable ore and 58,000 tons of prospective

Equipment: 100-ton concentrating mill erected April, 1917.

MMITVILLE ORE CONCENTRATING CO., LTD. NEW YORK

Address: Samuel Droshnicop, pres., 530 McDonough St., Brooklyn, Y.

Property: owns the former holdings of the St. Nicholas Zinc Co., at nmitville, Sullivan county, originally taken over early in 1918 under a sing agreement.

Through clever manipulation the minority stockholders of the old com- ıy were eventually deprived of their property. No report issued and sumably no work being done. See St. Nicholas Zinc Co.

TTENVILLE COPPER CO., INC. NEW YORK

Leo Lowenstein, pres.

Works at Tottenville, Staten Island, N. Y. Has an extensive copper re- ry for the production of ingot copper, brass, and bronze alloys, copper ıds and white metal.

Annual capacity, 200,000,000 lb. Brand is known as "C. T. C." copper.

ITED METALS SELLING CO. NEW YORK

Office: 42 Broadway, New York.

Officers: John D. Ryan, pres., T. Wolfson, v. p.; C. W. Welch, sec.- as.; with Wm. Rockefeller and C. F. Kelley, directors. C. S. Henry & , Ltd., 12 Leadenhall St., London, E. C., Eng., European agts.

Inc. Jan. 29, 1900, in New Jersey. **Cap.,** $5,000,000; shares $100 par; solved in 1915 and reorganized March 15, 1915, in Delaware. Is con- lled by the Anaconda Copper Mng. Co., through ownership of entire re capital.

The company does a general commission business in metals, mainly copper, and is the largest copper broker in the world, being the sales nt for the Anaconda Copper Mng. Co. and affiliated corporation, and a number of other producers, having the marketing of upwards of 000,000 lb. of copper yearly.

THERBEE, SHERMAN & CO. NEW YORK

Offices: Port Henry, N. Y., and 2 Rector St., New York City. **Mine** ce: Mineville, N. Y.

Officers: Lewis W. Francis, pres.; Moses Taylor, v. p.; Geo. C. Foote, .-mgr., with W. C. Witherbee, E. S. Peasley, C. H. McCullough, directors. E. Rogers, sec.-treas.; A. M. Cummings, supt

Founded 1849. **Inc.** 1901. **Cap.,** $3,000,000; $100 par; all outstanding; no ded debt. Regular dividends paid. Annual meeting 1st Wednesday in rch.

Property: magnetite mines in Essex and Clinton counties, and 4 mills y magnetic concentration) with a total annual capacity of 1,000,000 to 0,000 tons per year, the concentrates averaging 64-66% iron.

Company also owns 7,500 acres of ore land on the north shore of ›a, which are not being operated (1919).

NORTH CAROLINA

Companies are arranged in alphabetical order.

HBORO COPPER MINING CO. NORTH CAROLINA

Dead. Formerly operated the Scarlett mine N. of Ashboro, Randolph nty, N. C., which see. Described in Vol. XII.

DE WING MINING CO. NORTH CAROLINA

D. M. Hill, sec., 60 Federal St., Boston, Mass.

Company voted to sell all its assets and go out of business, 1917. Fully in Vol. XII.

COPPER CO. NORTH CAROLINA

Atwater St., West Detroit, Mich. Mine near Cullowhee, N. C.

Officers: at last accounts, Lewis C. Waldo, pres. and treas.; S. H. Knight, v. p.; Geo. E. Berriman, sec., with S. H. Knight, Geo. W. Clad and F. W. Olds, directors.

Inc. Oct. 12, 1901, in Michigan. **Cap.,** $2,500,000; $25 par; issued $1,585,000.

Property: 1,450 acres, freehold, including the Wayehutte mine, show 4 veins, 27' estimated average width, carrying mainly chalcopyrite, wit estimated average values of 3% copper, 4 oz. silver and $1 gold per to opened by a 55' shaft and a 200' tunnel. Lands also include an undeve oped water power. Regarded as promising if worked under proper direc tion.

COPPER KNOB MINE **NORTH CAROLINA**

Owned by Monaton Mining Co., which see.

CULLOWHEE MINING & REDUCTION CO. **NORTH CAROLINA**

Idle. Cullowhee, Jackson county, N. C.

Offices: at last accounts, S. B. Ezell, pres.; D. D. Davies, v. p.; Thos A. Cox, sec. and managing director; Chas. Davies, smelter supt.

Inc. 1905, as successor of Cullowhee Copper Co.

Property: 1,300 acres, 12 miles from Sylvia, nearest rail point, shows considerable body of sulphide ore, claimed to average about 5% copper and $4 gold per ton, probably correct for small lots of ore, but cannot be realized from a large tonnage.

Equipment: includes hoists and an air compressor, with steam and water power, latter with a plant 3 miles from works. The 30-ton smelter near Sylvia, blown in January, 1909, with semi-pyritic smelting, suspended operations late 1910, and probably will remain idle until rail connection are secured.

GARDNER-HILL MINING CO. **NORTH CAROLINA**

Company's gold-copper property, 9 miles from Greensboro, N. C. reported sold May, 1919, to H. K. English, of Knoxville, and to be reopened after an idleness of over 50 years.

GOLD HILL CONSOLIDATED CO. **NORTH CAROLINA**

Office: Room 309, No. 42 Broadway, New York. Mine at Gold Hill Rowan county, N. C.

Inc. as successor of Gold Hill Copper Co., a notorious promotion of the late Walter George Newman, known to have caught many Wall Street operators. New company, under same management, became bankrupt and property sold at auction, January 27, 1910, for $45,000. Company does not own the adjacent Union Copper mine.

Property: consisted of 1,050 acres in Rowan and Stanley counties, the Gold Hill mine, where gold was discovered in 1799. Gold quartz veins were discovered 1831, and in 1845 this mine was the largest gold producer in the United States.

Development: by 2 shafts of 615' and 830, and 2 lesser shafts. The mine was operated in 1913 and part of 1914. Shipments to the Perth Amboy smelter returned 1.5% copper and about $3 gold per ton, with small silver values. Copper occurs in minute particles of chalcopyrite in hard quartz schist and recovery by wet concentration is not commercially profitable.

Equipment: includes ten 100-h. p. boilers and a 10-stamp mill.

This company and its companion, the Union Copper Mining Co., enjoyed decidedly checkered careers. Operations conducted on a considerable scale, 1901-1903, were unsatisfactory and failed to show up the much advertised orebodies. A receivership ensued which was ended early 1906, but a receiver was again appointed, August, 1906, for the old company, on the application of Newman, on claims aggregating $352,000. In June, 1915, the Court again appointed a receiver for the property, which has been shut down and apparently abandoned by the company.

Mr. Newman evidently used this property solely for stock-jobbing purposes. The mine is considered worked out and low grade, but worthy

ome drilling in depth. At best the company could never have paid st dividends on its capitalization, and under the late management was egarded as worthy of any confidence whatever.

GUL MINING CO. **NORTH CAROLINA**

Dead. See same title under Nevada.

Property: had a 10-year lease on the Mint Hill mines, Union county, 18 from Charlotte, N. C., which was relinquished, 1917. Also controlled Proskey-Regent mine at Rawhide, Nev., by ownership of the Proskey-nt Mines Co. See Seminole-Regent Mining Co., Nevada.

IATON MINING CO. **NORTH CAROLINA**

Hopkins, Ashe county, N. C. J. B. Shale, pres., 301 W. 108th St., New City, D. W. Lloyd, mgr., Garren, N. C.

Owns the old Copper Knob mine, 160 acres, freehold, also 90 acres ellaneous lands, said to show a 30" fissure vein in hornblende slate, ing carbonate and sulphide ores, mainly bornite. Carload shipments . S. & R. Co. of N. J. said to have averaged $15 per ton in gold, silver copper. The slate wall rock also carries metal. Property was opened Has steam power, hoist, 2-drill air compressor and a 5-stamp mill.

ISBURY COPPER CO. **NORTH CAROLINA**

Idle and probably dead. Mine near Gold Hill, Rowan county, N. C. . Brown, pres.; W. S. Blackmer, sec.-treas.

Inc. 1904, in Arizona. **Cap.**, $100,000; shares $100 par.

Property: 50 acres, freehold, showing altered schists, carrying a fissure with N.-E. strike, and estimated at 4' width. Developed by a 100' shaft, ing chalcopyrite reported to carry copper and gold values. Ore can be ed by flotation and property probably worthy of careful prospecting.

RLETT COPPER MINE **NORTH CAROLINA**

Address: Frederick R. Thorns, owner, 112 Duane St., New York City. Dickens, supt., Ashboro, N. C.

Property: at Ashboro, Randolph county, N. C., formerly operated by Ashboro Copper Mining Co.

Ore: is a sulphide, carrying principally copper and zinc, with iron, ina, a trace of silver and gold, and occurs in contact and fissure veins, ing N. 40° E., with dip of 35°. Pay shoot reported to be from 2 to 5'

Development: by 120' vertical shaft and several tunnels, longest 220'.
Equipment: includes 25-h. p. hoist, compressor, pump and steam power. pecting and development work only done in 1917.Since presumably idle.

N-EDWARDS COPPER MINE CO. **NORTH CAROLINA**

Greensboro, Guilford county, N. C. Inc. Sept., 1912. **Cap.**, $100,000; es $100 par.

Owns sundry old properties, including the Twin mine, with an 18' vein, h was worked previous to the Civil War. Property shut down many rs, but company understood to be only dormant, not dead.

ON COPPER MINE **NORTH CAROLINA**

Office: care Alfred Rossiter, administrator, 60 Broadway, New York. **address:** Gold Hill, Rowan county, N. C. S. T. McKinney, mgr.

Lands: 550 acres, freehold, about 15 miles from Salisbury, in Rowan Cabarrus counties, well watered and timbered. The property has t, carrying 5 veins with average strike of N. 20° E. and practically ical dip, and 2' to 20' width. Three veins carry copper ores, the other 2, rted to carry silver and gold ores, respectively, are but slightly devel-. The copper veins are mineralized zones carrying lenticular shoots e, longest about 100' in length.

In 1916, No. 7 and 12 shafts were unwatered to 140' and work started shoot of 3% copper ore, which is 5' wide and exposed for 250'. From mber, 1916, to April, 1917, ore was shipped from shaft and dumps. drill holes near the Big Cut and No. 5 shafts cut 4% sulphide ore.

Development: is on the Big Cut copper vein, trenched at intervals for a of about 1 mile, and having 10 shafts, deepest 650'; these shafts

show a vein 20′ in width. The Big Cut vein shows oxidized ores and a lit native copper in the upper workings, succeeded by chalcopyrite, with qua gangue. Sampling by Dr. A. R. Ledoux, many years ago gave average 4.40% copper, 4 oz. silver and 40c to $1.20 gold per ton. No. 7 shaft, of 2 depth, shows a vein 4″ wide at surface and 3 to 4′ wide on the bottom le where the ore is claimed to average 4.5% copper. There are 14 shafts told, and about 5,000′ of workings. The property has been claimed, in press, to have produced about $1,000,000 worth of gold in early days.

One vein is said to carry zinc ore of low value, but is little developed

Equipment: machinery plant is extensive and includes a small exp mental flotation plant.

Buildings include a machine shop, smithy, engine-house, boiler hous office buildings, 50-room hotel, dwellings and stable.

OKLAHOMA

(For map of the Tri-State region, see page 875.)

(Companies are arranged alphabetically.)

The Miami zinc-lead field is the newest great mining region of United States.

The following excerpts from a report on the district by the R Hunt Company, give an excellent idea of its salient features.

The Miami zinc-lead fields lies in Ottawa county, the extreme nor east county of the state of Oklahoma, and extends into Cherokee cou Kansas. As now developed, it is 3 miles wide and 5 long. The Oklaho towns in the field are Commerce, Quapaw, Century, Cardin, Tar Creek, a Picher. Baxter, Kansas, is at the north edge of thefield. The Oklaho portion of the field is in Township 29 N., Range 23 east, Ottawa cou The Kansas portion of the field is in Township 35, Ranges 23-24, Cherok county.

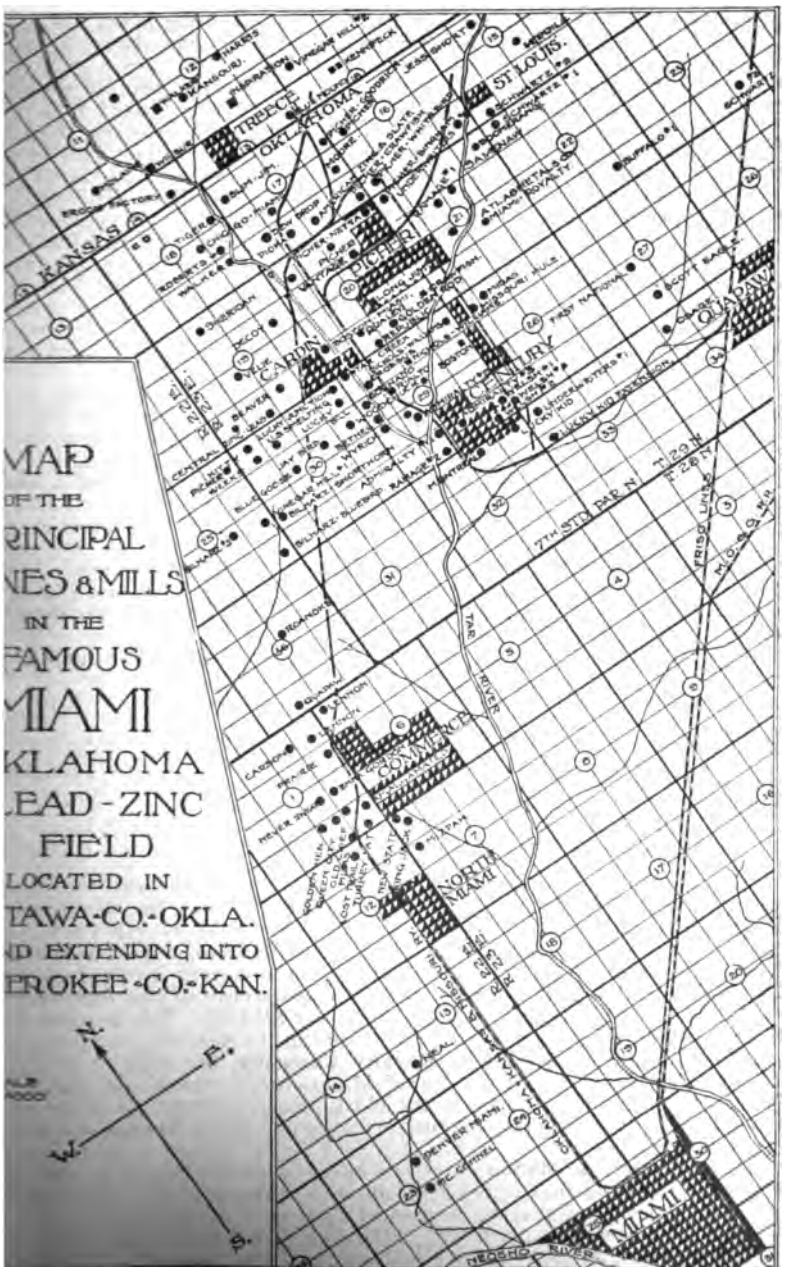
Geology: the mineralization of the Miami field occurs in trough posits of zinc and lead ores, found in the Grand Falls cherts of the Bo limestone series at various depths below surface from 100 to 300 feet. neath these cherts a very compact limestone forms a floor which water do not easily penetrate.

Water carries zinc and lead in solution until it reaches the faults overlying cherts. It rises through these fault cracks and penetrates thro the fractured and bedded cherts, depositing lead and zinc in them. greater the fracturing of the cherts, the greater the deposit of metal, as to quantity and value. The Miami or main fault of the district northeast-southwest through the district from Baxter, Kansas, to C merce, Oklahoma, and represents a throw of about 15 feet. Cross fa and fractures extend from this to East and West at varying angles. principal orebodies are formed along these cross fractures and in ground on both sides of them for a few hundred feet.

The main fault was sufficiently open to permit constant circulation water, while the side fractures retained water in a quiet state more fa able to precipitation of metal from the solutions contained. The nor west-southeast side fractures have the best ore bodies so far discovered.

The proven porton of the Miami field is within a limited area of abo five miles long by about three miles wide, in which small area are over concentrating mills. This remarkable development all occurred practic within three years. Nearly 700 churn drill rigs were in use in 1918 from 400 to 500 new holes are finished weekly.

Developments in the field generally show two principal sheets or bo ore; the upper at a general depth of 150 to 200′, and the lower between 25 300′, each bed of ore being from 15 to 30′ thick, and in some instances this thickness. It appears certain that the orebodies will prove to be more extensive, and especially much richer than drilling indicates, a



Note: Above properties described under Oklahoma, page 1270.

operations in this district have demonstrated that when the mines are open shafts and drifts the ore is from 50 to 100% richer than shown by assay drillhole samples.

Many operating mills in Miami are producing better than 10 tons of centrates from each 100 tons of mine ore. This is locally termed 10% reco It is probable that the field as a whole will average 8% recovery, though mills are actually recovering better than 15% in concentrates. This is pro to be one of the richest lead and zinc fields in the world, and, as its pro tion increases, will force the closing of leaner mineralized districts.

Prospecting is done by means of churn drill holes; Keystone typ drill rigs are used. A 300' hole costs from $450 to $500, and is drilled in 10 to 14 days. Samples are taken every few feet of the entire cuttings from mineralized area passed through, which are assayed for zinc and lead.

The ordinary amount of drilling on 40 acres is from 10 to 30 holes. operators in the district are satisfied if they find two or three holes near other carrying good ore, and will not drill further under such conditions sink shafts and build mills at once.

Shafts are sunk to the bottom of the orebody; the ore is mined, using room and pillar system; trammed to shaft; hoisted to mill bins, crushed by breakers and rolls, and concentrated in jigs and on tables, so that the mine ore is reduced to a concentrate containing about 60% metallic zinc 80% metallic lead. This is bought by smelters in the bins at the mills, and is no further expense.

The entire process of mining and milling is extremely simple and cheap does not require expert labor.

Mining and milling machinery is standardized and largely made in It is not high priced and can be obtained quickly. Wages are on a sliding depending on prices of concentrates, ranging from $3 per day at $50 per to $4.50 per day at $100 per ton.

Division of costs, so far as obtainable, indicate: Labor, 50%; supplies power, 15%; general expense, 5%.

Average of Miami, in 1917, costs were:

Crude Ore:

Mining, milling, general for 100 tons mine ore.....

Concentrates:

If 10 tons concentrates produced, cost per ton.....
If 8 tons concentrates produced, cost per ton.....

As examples of what has been done in the Tri-state field, the camp being conducted by some of the larger operators may be mentioned. **Eagle-Picher Lead Co.**, on first entering this field, is reported to expended a prospecting fund of approximately $100,000 merely in its explo work. The blocking out of its orebodies after discovery involved as much not more than the original expenditure. The investment of this concern prior the beginning of its production period was near $750,000. This concern now the largest single production of any company in the district.

The Commerce Mining & Royalty Company, the pioneer prospect and development company of that field, has never ceased drilling since original strike of ore in 1905 in the old Commerce camp. Its drills are going constantly, and its expenditure in exploratory work has reached extre large proportions.

The Church & Mabon interests have conducted some of the larg prospecting undertakings in the field, and as a criterion of how thoroughly work has been done, may be mentioned that upon one forty-acre tract 80 drill holes have been put down. This concern has developed a large of forty-acre tracts, many of which have proved to be some of the best ducers the district has yet known.

The Miami Zinc Syndicate has leases aggregating 4,000 acres, the Kansas and Oklahoma State line and west of Baxter Springs, Kans

:ted upon it a drilling campaign, with only a small part of the acreage out.

he largest undertaking, however, that has been started is that of the **ite Spelter Company**, which has to its credit approximately 16,000 of ground and whose operations promise to be the most extensive entire district. From 20 to 30 drills are kept at work doing explora- ınd development work. The field of its operations extends from the s-Oklahoma line north and northwestward to Asbury, Missouri. ng close behind the Chanute Spelter Co. is the **Waco Mining Co.**, ',100 acres in leases and fees, and P. B. Butler, with 6,500 acres in leases. large holdings, principally in the Kansas field, are being systematically ped on a large scale. Others who have done a large amount of exploratory :velopment work are Frank Danglade, T. J. Franks, J. G. Marcum, Vinegar inc Co., N. B. Gatch, H. Barndollar and many others.

1919 the State produced over 189,000 tons, the largest zinc output ever by any one State; 85% of it is from the Miami field. Detailed figures 344.062 tons of blende, 43 tons of calamine, and 43,448 tons of galena, all l at $17,875,970.

roduction figures (U. S. Geol. Survey) are as follows:

	1917	1918
rude ore, tons	3,523,200	5,754,700
ead concentrates, tons	32,775	69,912
alue	$3,301,534	$6,190,431
inc concentrates, tons	159,656	300,702
alue	$10,762,324	$15,182,135

ı calculating the weekly outputs of mines it may be stated that $55 is a fair for blende, and $80 to $100 for lead.

he mine owners of the State are indifferent and unresponsive to requests ıformation, so in many cases only the address can be given; this treatment marked contrast to the kindly co-operation of the operators of all other g districts.

E LEAD & ZINC CO. **OKLAHOMA**

ıddress: John Wingfield, Picher, Okla.
)fficers: C. C. Cole, pres.; J. R. Cole, Jr., sec.-treas.; L. Lockey, supt.; ohn Wingfield, mill supt.
nc. March 15, 1917, in Oklahoma. **Cap.**, $200,000; $1 par.
'roperty: 40 acres at Picher, containing zinc-lead ore.
)evelopment: by 170′ and 210′ shafts.
Equipment: mills of 500 and 600 tons capacity. Lack of water has pre- d regular operations.

IIRALTY ZINC CO. **OKLAHOMA**

(See this title in Kansas companies.)
)ffice: W. B. Shackelford, gen. mgr., Quapaw, Okla. O. F. Brinton, and mill mgr.
'roperty: 4 mines, 120 acres at Douthat, Okla. Shafts are down 220′ pen the usual type of 6 to 16% blende and galena ore. Four mills are ng 1,400 tons daily. A 500-ton (in 10 hours) plant was erected by lessees 18 to dress tailing from one of the dumps. Assays showed up to 5% zinc ead. Equipment includes rolls, jigs, sludge-tables and flotation plant.
'roduction: a normal weekly yield is 76 tons of blende, 60% metal, 30 tons of lead, 80% metal.

IO LEAD & ZINC CO. OKLAHOMA

ddress: J. T. Burgher, supt., Quapaw.
'roperty: is N. W. of Quapaw. A 200-ton

IANDER LEAD & ZINC CO. OMA

ddress: G. M. Ramsey, mgr., Tar River.
'roperty: is near the Larsh mine. A 500-

ALLIED LEAD & ZINC CO. OKLA

Address: Quapaw, Okla., but letters returned marked "unkn 1919. Reported, at last accounts, that the 250-ton mill was to be remodel

AMALGAMATED ZINC & LEAD CO. OKLA

Address: H. L. Huddleston, Miami, Okla.

A 250-ton mill was planned, at last accounts.

AMERICAN EXPLORATION CO. OKLAHO

Address: M. D. Draper, mgr., Tar River, Okla.

Company has two mines. No details available.

AMY T. MINING CO. OKLAHO

Address: Ed. Ballinger, supt., Miami, Okla.

Company proposed building a 200-ton mill, at last report.

ANNA BEAVER MINING CO. OKLAHO

Address: Tar River, Okla.

Property: mine and 2 mills in the Tar River field. Cages are u instead of buckets for hoisting, which is an innovation here. Mine is a ste producer, yielding over 50 tons of blende per week early in 1920.

ASSOCIATED LEAD & ZINC CO. OKLAHO

Address: T. Ricks, Quapaw, Okla. Company has a lease on a tract the town of Quapaw. A mill was erected in 1918.

ATOKA MINING CO. OKLAHO

Address: E. M. Applegate, supt., Miami, Okla.

Property: a lease on 40 acres west of Picher, on which 12 drill-h exposed good ore at 240'. A 300-ton mill was to be built in 1919, and hand erected to treat a tailing dump.

AURORA MINING CO. OKLAHO

Officers: T. S. Adams, pres.; J. E. Turner, v. p. and mgr.; and A. Crutchfield, sec.-treas.; all of Holdenville, Okla. J. W. Hale, supt.

Property: in the Leadville district, E. of Quapaw.

Development: shaft sunk to open ore shown by drill at depth of 95'. Assays averaged 19.7% blende and 1.9% lead.

Equipment: 150-ton mill driven by 100-h. p. gas engine, and compres

BAKER MILLING, SMELTING & REFINING CO. OKLAHO

John Baker, pres., writes that he holds the charter, keeping it in force the present, with no stock for sale. See Vol. XI, Copper Handbook.

BARTLESVILLE ZINC CO. OKLAHO

Subsidiary of American Metal Co., Ltd., 61 Broadway, New York, w owns 100% of the $500,000 capital.

Works: 2 zinc smelters at Bartlesville and one at Blackwell, Okla which $2,500,000 has been spent. One of the smelters was formerly owned by Lanyon Starr Smelting Co., which was merged into the Bartlesville Zinc Co plants include the following:

	Bartlesville No. 1	Bartlesville No. 2	Blackw
Furnaces	6	9	12
Retorts in each	576	576	800
Total retorts	3,456	5,184	9,600
Monthly ore capacity, total tons	....	14,000	....
Monthly spelter output, tons	....	5,000 to 6,000	....

At Bartlesville, one plant produces 350 tons of zinc oxide monthly, the o plant yielding 100 to 150 tons of zinc dust. At both places is a clinkering f that treats the residue from the retorts, making it available for blast-furna The clinker carries precious metals, mainly silver.

BEST MINING CO. OKLAHO

Organized in March, 1918, with capital of $200,000, by S. H. Lester, M. McLaughlin, and H. B. Callahan, of Shawnee, Okla.

BETHEL MINING CO. OKLAHO

Address: W. C. Miller, or J. A. Worley, Miami, Okla.

Pro l, Domado, and Croesus leases near Miami, 3 mills

roduction normally is 140 tons of blende (60%
third week of February, 1920.

CO. OKLAHOMA

kla.

her district. A concentrating plant was erected in 1918
made.

& ZINC CO. OKLAHOMA

Cole, Tar River, Okla.

INING CO. OKLAHOMA

Picher, Okla.

R. E. Stafford, pres.; H. H. Halsell, mgr.

rty: 40 acres and 250-ton mill. Mine was developed by A. E.
of the Eagle-Picher Lead Co., producing 33 tons of blende weekly
1920.

EIGHT MINING CO. OKLAHOMA

Property: at Miami, but letters returned unclaimed in 1919. Two shafts being sunk, at last accounts.

JIM MINING CO. OKLAHOMA

Address: G. W. Nesmith, supt., Commerce, Okla.

Officers: G. L. Benson, pres.; and C. R. Home, sec.

Property: 40 acres at Douthat, Okla., where one hole has been drilled ch acre, showing good ore. In January, 1919, ore was also found at 114'.)-ton mill was proposed.

SEVEN LEAD & ZINC CO. OKLAHOMA

Address: Commerce, Okla., but letters returned in February, 1919.)any was constructing a surface tram to connect its mines with the mill and s of its Queen City property, at last accounts.

THREE MINING CO. OKLAHOMA

Address: Quapaw, Okla.

Officers: Seth Conrad, pres.; V. Jenson, v. p.; Ira Edwards, sec.; C. C. bery, supt.

Property: 160 acres N. W. of Quapaw. On 80 acres 26 holes exposed arrying from 5 to 20% blende. Another 40 acre tract was sold to Howard al. of New York, for $75,000, plus 2½% royalty.

VEIN LEAD & ZINC CO. OKLAHOMA

ncorporated with capital of $250,000 in March, 1918, by W. A. Dotty, of i; G. B. Crumbine and J. A. Utterback, of Oklahoma City.

V MINING CO. OKLAHOMA

Address: C. S. Voorhees, supt., Quapaw, Okla.

Property: S. E. of Quapaw. A 250-ton mill was erected early in 1919.

HARZ MINING CO., O. M. OKLAHOMA

Address: Victor Rakowsky, Commerce, Okla.

Company has 3 mines, the Shorthorn, Chapman and Bluebird, and 3 mills, shut at mid-1919 on account of the market, but reopened, the weekly output 370 tons of blende and 33 tons of lead early in 1920.

LIKEN MINING CO. OKLAHOMA

Address: John Aycocks, pres. and mgr., St. Louis, Okla.

Property: a lease on ground adjoining that of the St. Louis M. & S. Co. larch, 1918, the U. S. Paymaster mill, near Joplin, Mo., was moved to the

CK EAGLE MINING CO. OKLAHOMA

Address: W. M. Garred, supt., St. Louis, Okla. Company operates in St. Louis district. A mill was erected and shipments made in 1918.

CK HAWK LEAD & ZINC MINING CO. OKLAHOMA

Address: Jack Williams, Picher, Okla.

Officers: J. Younts, pres.; Jack Williams, sec.-treas.; R. C. Ulmer, supt.

Capital $250,000.

a lease on Walker land, S. E. of Picher. Drilling revealed

ore from 218 to 248' depth. A concentrating plant erected and shipments began in 1918. In February, 1920, weekly yields were 29 tons of blende.

BLUE BONNET MINING CO. OKLAHOMA

Address: W. H. Logan, mgr., Hockerville, Okla.

Property: in southern portion of the Hockerville field, also the mine and mill of the Central Zinc & Lead Co., at Tar River, and another mine N. of Picher, both purchased in June, 1919.

Equipment: at Hockerville, a 250-ton mill driven by gas engines, originally by steam and electric power. The daily output averaged 55 tons of concentrate in 1919.

BLUE GOOSE MINING CO. OKLAHOMA

Address: Picher, Okla.

Production: 30 tons of galena (80% metal) weekly, at last report.

BON AMI MINING CO. OKLAHOMA

Address: Miami, Okla. In Nov., 1918, a 150-ton mill was to be built.

BREWSTER MINE OKLAHOMA

Owned by Federal M. & S. Co. of Idaho.

Address: 120 Broadway, New York; and Baxter Springs, Kan. P. V. George, supt.

Property: in St. Louis district, was bought for $125,000. Drilling since March, 1919, has revealed a large body of zinc ore, and $94,403 was spent on mill, employing flotation process.

Production: 130 tons of blende per week early in 1920.

BUFFALO MINING CO. OKLAHOMA-KANSAS

Address: F. R. Bouldin, pres.; C. B. Ward, sec., Miami, Okla.

Property: a lease N. of Quapaw, Okla., and another W. of the Big Mound in Kansas. Two mills were erected in 1918.

CANTON MINING CO. OKLAHOMA

Address: Box 511, or Room 317 Hancock Bldg., Miami, Okla.

Officers: J. L. Eggert, pres.; J. C. Abbott, v. p.; W. O. Johnston, sec.-treas.-mgr.

Inc. April, 1917, in Oklahoma. **Cap.**, $75,000.

Property: 40 acres at Lincolnville, Okla

Development: the deposit is 35 by 1,320 by 1,320', and is worked by shafts, 75' deep.

Equipment: gas engines, compressor, drills, and 500-ton (24 hours) mill. Developing.

CARNEGIE MINING CO. OKLAHOMA

Address: P. L. Bucy, Bartlesville, Okla.

Property: a lease near Douthat, on which the 300-ton mill bought from the National Zinc & Lead Co., of Webb City, Mo., was re-erected.

CARTHAGE MINING CO. OKLAHOMA

Address: Emma R. Knell, Carthage, Mo.

Cap., $32,000; shares $100 par; $16,000 paid in.

Property: 20-acre lease in the N. E. Oklahoma zinc field.

CENTRAL LEAD & ZINC CO. OKLAHOMA

Address: W. A. Geissing, mgr.-sec.-treas., Tar River, Okla.

Property: in the Picher-Century-Tar River area. Shaft sunk to 33 the deepest in the district, and mill was making two cars of lead concentrate and one of zinc, at last accounts. The mine was reported taken over by the Blue Bonnet interests in June, 1919.

CENTURY MINING CO. OKLAHOMA

Address: Carl Scott, or J. C. Trout, supt., Century, Okla.

Property: 40-acre lease S. E. of Douthat and E. of Century. A large deposit of ore was first entered at depth of 55'. A 150-ton mill was planned at last accounts.

CHICAGO-MIAMI LEAD & ZINC CO. OKLAHOMA

Address: Bob Eitle, Picher, Okla.

HOCTAW CHIEF LEAD & ZINC CO. **OKLAHOMA**

Address: Geo. Sullivan, Lincolnville, Okla.

Property: the Sullivan and Williams lease at Hockerville. Ore, 15' ck, assaying 8 to 17% blende and lead, was opened, a 250-ton mill erected and ipments made in 1918.

.IMAX MINING CO. **OKLAHOMA**

Address: Grant Mans, supt., Cardin, Okla.

Property: 40-acre lease N. W. of Cardin and 3 miles W. of Picher. aft cut ore at 230' in October, 1918, and a 150-ton mill was planned.

)MMERCE MINING & ROYALTY CO. **OKLAHOMA**

Address: J. F. Robinson, Picher, Okla.

Property: company is one of the largest operators in the region, in- ding the Blue Goose, and Cactus mines at Commerce, the Beaver and Webber Treece, Kansas, the Pelican mine and mill at Picher, and the Bennie, Jay Bird, ace Walker, and Wilbur at Tar River.

No details of operations are available.

)MMONWEALTH LEAD & ZINC CO. **OKLAHOMA**

Address: L. N. Dana, supt., Miami, Okla.

Property: a lease near Picher. Drilling revealed 12% ore at depth of 5'. Two shafts were sunk, and a 500-ton mill erected. This plant was burned June, 1918.

)NSOLIDATED LEAD & ZINC CO. **OKLAHOMA**

Address: Picher, Okla.

Property: S. E. of Picher. Water was troublesome in 1918. The mill :ludes sludge-tables, Dorr thickeners, and a flotation plant.

)NSOLIDATED ZINC & SMT. CO OF OKLAHOMA **OKLAHOMA**

Address: E. H. Squire, mgr., Commerce, Okla.

Property: the Emma Gordon mine at Commerce, formerly a rich pro- cer. Company was reorganized in March, 1919.

)NSTITUTIONAL LEAD & ZINC CO. **OKLAHOMA**

Address: Walter Eberlein, Picher, Okla.

Property: a lease at Picher, developing and shipping, at last accounts.

)RTEZ MINING CO. **OKLAHOMA**

Address: Jefferson City, Mo.

Officers: Houck McHenry, pres.; Charles Tweedie, v. p.; H. B. Church, , sec.-treas., with Cortez F. Enloe, A. W. Happy, G. E. Haigh, D. M. Oberman, C. Carson, W. T. Paylor, H. L. Grigsby, and W. T. Landrum (supt.), direc- rs.

Inc. 1917, in Oklahoma. **Cap.,** $140.000; $10 par; 7,000 outstanding.

Property: 40 acres at Picher, Okla. The deposit is a dissemination of lena and blende in flint and limestone.

Development: by 260' shaft and 400' of workings. Water was trouble- me during 1918.

Equipment: hoist, compressor, pump, gas power, and 200-ton mill, irted in February, 1919.

Production: 105 tons of blende per week in February, 1920.

)SMOS MINING CO. **OKLAHOMA**

Address: W. B. Campbell, Hockerville, Okla.

Property: formerly known as the Lucky Tiger, S. E. of Hockerville. 300-ton mill, employing flotation, was started in October, 1918. The ore is sily mined, as one machine-man and a helper broke down 1,159 cans of 1,000 . capacity each in one week of March, 1919. By the end of 1919 company had 500 tons of concentrate on hand. The first year's run averaged 12% zinc and ad.

Production: 120 tons of blende per week in February, 1920.

ROESUS MINING CO. **OKLAHOMA**

Address: W. E. Broach, Tar River, Okla.

Production: normally about 40 tons of galena (80% metal) per week.

CRYSTAL MINING CO. OKLAHOMA

Address: B. B. Dancey, pres., Picher, Okla.

A 250-ton mill was planned in 1918.

DALLAS-PICHER LEAD & ZINC CO. OKLAHOMA

Company had a lease on the Southland mine at North Century, but forfeited it for non-working. Mine now operated by Oko L. & Z. Co.

DANIEL BOONE MINING CO. OKLAHOMA

Incorporated in March, 1918, with capital of $150,000, by J. E. Jenkins of Springfield, Mo., and A. Avery, of Oronogo, Mo., to operate at Quapaw.

DEFENDER MINING CO. OKLAHOMA

Address: J. H. Wright, Joplin, Mo.

Property: between Cardin and Commerce. The 350-ton mill at the Wayland mine, Galena, Mo., was moved to the Defender in July, 1919. Conditional sale of mine made to A. M. Gaines in August. Rich ore is available for the mill.

DESPERATION MINING CO. OKLAHOMA

Formerly the Tiger L. & Z. Co.

Address: Charles Von Weise, or Mark Kirkpatrick, Ardmore, Okla. R. F. Glenn, supt.

Property: near the Harrisburg mine, west of Tar River. Drilling revealed three orebodies at depths of 150, 250, and 320'. The 350-ton mill was treating 8% ore in 1919.

Production: 42 tons of blende and 42 of lead per week early in 1920.

DEW DROP MINING CO. OKLAHOMA

Address: Picher, Okla. Operates on Eagle Picher Lead Co. land.

Production: normally about 43 tons of blende (60% metal) weekly.

DIAMOND JOE MINING CO. OKLAHOMA

Address: W. J. Strong, mgr., Lincolnville, Okla.

Property: S. E. of Hockerville, Okla. A 200-ton mill is yielding high-grade zinc concentrate.

DOMADO LEAD & ZINC CO. OKLAHOMA

Address: W. E. Broach, Tar River, Okla.

DOROTHY BILL MINING CO. OKLAHOMA

Address: J. R. Cole, supt., Tar River, Okla.

Property: a lease W. of Picher. Rich lead-zinc ore was opened at depth of 184' in September, 1918, a large mill erected, and shipments made.

DOUTHAT MINING CO. OKLAHOMA

Address: G. F. Dike, mgr., Commerce, Okla.

Property: between Cardin and Commerce. Some rich ore was opened in 1918, and hand-jigs were used to dress it, but a 200-ton mill was to be built at last report.

DUDLEY MILLING CO. OKLAHOMA

Address: C. Theuer, supt., Douthat, Okla.

Works: a plant, treating tailings from Admiralty No. 2 mine, equipped with gas engine, rolls, jigs, etc.

DULUTH-MIAMI MINING CO. OKLAHOMA

Offices: 819 Insurance Bldg., Oklahoma City, Okla.; 110 Sherman Bldg., Duluth, Minn.

Officers: G. W. Knox, pres.; E. P. Kreimer, v. p.; E. J. O'Rourke, sec.; E. L. Fogarty, treas., with John Lingelbach, J. B. Enfield, and Frank Nowkowski, directors.

Cap., $250,000; $1 par.

Property: 30 acres at Quapaw, Ottawa county. By May, 1919, a shaft had been sunk to the ore, and several drifts driven. Ore assays up to 38% lead. A mill is to be built at an early date.

DUNCAN LEAD & ZINC CO. OKLAHOMA

[illegible]ated with capital of $200,000 by W. E. Williams, J. H. Goodwin and [illegible]kett, of Miami, Okla.

\GLE-PICHER LEAD CO., THE OKLAHOMA-MISSOURI

Office: Continental & Commercial National Bank Bldg., 208 S. La Salle , Chicago, Ill.

Officers: O. S. Picher, pres.; Fred'k Hertenstein and H. G. Clopper, p.'s; Jos. Hummel, Jr., sec.; T. S. Brown, Jr., treas., with J. B. Swift, chair- n, F. L. Perin, J. E. Webb and S. M. Evans, directors.

Inc. June, 1916, in Ohio. **Cap.,** $9,000,000 com., and $1,000,000 6% non- nulative preferred; $100 par; $8,000,000 common., and $1,000,000 preferred istanding. Preferred dividends payable quarterly; initial dividend of 1½% d July 12, 1916. Central Trust & Safe Deposit Co., Cincinnati, transfer agent. nual meeting in January.

Company is a consolidation of the Eagle White Lead Co., of Cincinnati, io, and the Picher Lead Co.

The Eagle Picher Lead Co. is the third oldest corroder of white lead by the tch process in the United States, having been established in 1843 as the Eagle iite Lead Co., and in continuous operation ever since. Company is a manufac- er of carbonate of lead, dry and in oil; white and blue sublimed (sulphate of) d; oxides of lead for battery, glass, rubber, and paint-makers; and also mines l smelts zinc and lead ores.

Operations in the Picher field started on March 15, 1916. Company owns ne of the best mines in the State, and has 9 modern mills at work. The cen- l power plant contains the largest air-compressor in the district, of 4,000-cu. ft. ıacity.

Works: are situated at Joplin and Webb City, Mo.; Galena, Kan.; :her, and Henryetta, Okla.; Cincinnati, Ohio, and Newark, N. J., and Hills- o, Ill., the last acquired from Robert Lanyon Zinc and Acid Co. in July, 1919.

Production: normally 1,300 tons of blende (60% metal) per week.

The output of both galena and sphalerite by the Eagle Picher Lead Co. is ch larger than that of any other operator in the Miami district. Flotation ts have been installed at nearly all the plants and the concentrate recovered by t process has materially added to the production. The estimated capacity of concentrating plant is 6,400 tons in 24 hours. The ore is mainly derived from els between 250 and 270'. There is also a large production from ground leased the Big Chief Mining, Dewdrop Mining, Keltner Mining, Ohimo Mining, ıkee Mining, St. Joe Mining, Vantage Mining, National Lead & Zinc, and iite Mining companies, all separately described.

.RLY BIRD LEAD & ZINC MINING CO. OKLAHOMA

Address: Charles Neal, Treece, Kan.

Property: lease on Cooper land, near Tar River. Rich ore was opened 185' in depth and a mill built.

GHT FRIENDS MINING CO. OKLAHOMA

Probably dead. Reported to have taken over the Denver-Miami mine, near ami, in 1917. Letters returned unclaimed in March, 1919.

COSA MINING CO. OKLAHOMA

Address: Tar River, Okla.

Officers: M. Dawedoff, pres.; R. S. Sampson, Oklahoma City, v. p.; C. Greening, Oklahoma City, sec., with Messrs. Tolliver and Martin, directors.

Cap., $200,000.

Property: a 40-acre lease W. of Tar River.

Development: drilling exposed zinc-lead ore at depth of 180 to 215'. ıfts were to be sunk and a mill erected at last report.

EVEN O'CLOCK MINING CO. OKLAHOMA

Address: Quapaw, Okla.

Officers: Roy Nelson, pres.; A. A. Peniger, v. p.; John Pew, sec.; C. B. [illegible], treas.; J. A. Yearly, mgr.

Property: 20-acre lease on the A. W. Abrams' land, 2 miles N. of [illegible].

Development: drilling finished late in 1917, shafts and mill were to be [illegible] 1918. No recent report available.

ELLSWORTH MINING CO. **OKLAHOMA**

Incorporated in January, 1918, by Lloyd Weber, J. W. Brown, of Tulsa, Okla.; and A. B. Ellsworth, of Joplin, Mo., with capital of $150,000.

EMMA GORDON MINING CO. **OKLAHOMA**

Address: Miami, Okla.

ESSENTIAL PRODUCING CO. **OKLAHOMA**

Address: C. H. Hemmenway, mgr., Miami, Okla.

Company was organized in January, 1918, to drill leases, operate mills, and a smelter, etc. A 150-ton mill was secured in the Lawton-Waco district, Mo. Rich ore was reported cut by drilling between Hockerville and St. Louis, Okla. Company also owns 600 acres of oil leases in the Chelsea-Nowata field.

FARMERS' LEAD & ZINC CO. **OKLAHOMA**

Address: Lincolnville, Okla.

Property: the Katy mine in the Quapaw district, under development, and small shipments made in 1918.

FARMINGTON MINING CO. **OKLAHOMA**

Address: T. McCarthy, Picher, Okla.

FEDERAL LEAD & ZINC CO. **OKLAHOMA**

Address: Century, Okla.

Officers: H. L. Bolen, pres.; J. P. Whatley, v. p.; Verne Thompson, sec. and mgr.; A. M. Brannon, treas.; H. M. Martin, mill supt.

Inc. in Okla. **Cap.**, $40,000.

Property: 20 acres at Tar River and 40 acres at Quapaw, thoroughly developed in 1917-18. A 300-ton mill erected and regular shipments made.

FEDERAL MINING & SMELTING CO. **OKLAHOMA**

Address: 120 Broadway, New York, and P. W. George, Baxter Springs, Kan. See Brewster mine.

F. AND F. MINING CO. **OKLAHOMA**

Address: Oklahoma City, Okla.

Officers: Oscar H. Dietz, pres.; J. N. Dyer, v. p.; with George Frederickson, J. N. Dodson, and F. D. Bearley, directors. R. E. Finerty, sec.-treas.; Floyd Thompson, supt.

Inc. 1918, in Oklahoma. **Cap.**, $100,000; $100 par; all issued.

Property: 100 acres, one mile W. of Quapaw. A new mill was completed in May, 1919.

FIRST NATIONAL MINING CO. **OKLAHOMA**

Address: Quapaw, Okla.

Property: N. W. of Quapaw, Okla. Two shafts are down to ore at 145'. Rich ore was treated in the Red Rose mill in 1919.

FOCH MINING CO. **OKLAHOMA**

Address: A. E. Bendelari, mgr., and C. Funk, supt., Picher, Okla.

Property: a 40-acre lease, one mile W. of Picher, developed by 240' shaft, and equipped with 250-ton mill. Idle in 1919.

FORT WORTH LEAD & ZINC CO. **OKLAHOMA**

Address: E. T. Renfrow, Miami, Okla.

Property: a lease S. of Picher. Two shafts opened an orebody 35' thick. A 200-ton mill was built and shipments started late in 1918.

FOUR MILE MINING CO. **OKLAHOMA**

Address: J. M. Asbury, pres., Sayre, Okla.; P. B. Smith, gen. mgr., Oklahoma City.

Property: a 40-acre lease on the Minnie Trinkle land in western portion of N. E. Oklahoma field. Late in 1917, drilling was reported to have cut rich ore.

GALENA MINING & DEVELOPMENT CO. **OKLAHOMA**

Property is at Century, Okla.

GOLCONDA MINING CO. **OKLAHOMA**

Organized in March, 1918, with capital of $15,000, by J. M. Imrie, E. E. Owers, and O. C. Lashier, of Ardmore, Okla.

GOLDEN EAGLE MINING CO. **OKLAHOMA**

Letters returned in 1919. W. R. Housely, pres.

a property near Miami on which a 250-ton mill was under construction, d active underground development work carried on. Small shipments de.
ably idle, 1919, on account of depressed metal markets.

:N ROD MNG. & SMELTING CORP'N **OKLAHOMA**
ress: F. C. Wallower, mgr., Tar River, Okla., or Joplin, Mo.
perty: several mines, including the Dallas-Picher, near Tar River, lso 4 mills, No. 4 being of 1,500 tons capacity in 20 hours. In No. 5 tract, s said to have blocked out 1,500,000 tons of zinc-lead ore, assaying from ¾ blende and galena. The latest mill employs the best practice, including

luction: in 1918 was 13,696 tons of zinc and 2,260 tons of lead con- . Weekly output in February, 1920, was 310 tons of blende.
is one of the big producers of the Tri-State region.

:N SPIKE MINING CO. **OKLAHOMA**
nized in February, 1918, with capital of $125,000, by R. H. Drenna, F. E. nd O. D. Halsell, of Oklahoma City.

:N STATE MINING CO. **OKLAHOMA**
ress: John Gifford, mgr., Baxter Springs, Kan., or Picher, Okla.
perty: a 40-acre lease N. E. of Picher, in which good ore was t depth of 200'.

CHANCE MINING CO. **OKLAHOMA**
nized January, 1918, with capital of $30,000, by George Ostrander, of R. W. Eastman, and H. H. Sherman, of Alva, Okla.

:AGLE MINING CO. **OKLAHOMA**
ress: T. Chapman, Commerce, Okla.

Y CONSOLIDATED MINES CO. **OKLAHOMA**
ress: W. G. Wilkerson, supt., Granby, Mo. Mine presumably near)kla.

WESTERN LEAD & ZINC CO. **OKLAHOMA**
nized April, 1918, with capital of $100,000, by M. B. Rook, of Miami; Kesler, of Carter, and J. G. Wherry, of Commerce, Okla.

BACK MINING CO. **OKLAHOMA**
ress: T. C. Greenback, supt., Miami, Okla.
perty: at Quapaw, where water has been troublesome. Hand-jigs his mine, but a 200-ton mill to be erected

FIELD LEAD & ZINC CO. **OKLAHOMA**
nized in March, 1918, by J. E. Ross, J. C. Collier, and J. W. Baker, of d, Okla.

ING MINING & SMELTING CO. **OKLAHOMA**
idiary of the Hare M. & M. Co., which see for officers.
perty: at Quapaw. A mill was erected for both mines, and ship- rted in 1918.

ZINC CO. **OKLAHOMA**
ress: Miami, Okla.

G MINING CO. **OKLAHOMA**
ress: J. Pulver, supt., Douthat, Okla.
pany planned a 250-ton mill, at last report.

ER LEAD & ZINC CO. **OKLAHOMA**
nized December, 1917, with capital of $160,000, by J. J. Strong, C. W. Rudolph Johnson, of Cushing, and J. T. Dickinson, of Edmond, Okla.

MINING & MILLING CO. **OKLAHOMA**
ress: Picher, Okla.
ers: Alfred Hare, pres. and gen. mgr.; J. D. Carruthers, v. p.; W. , sec.; A. E. Fritsche, treas.
erty: one mile W. of Picher. Also owns control of the Greening and bought the Jack Rabbit mine for $35,000. Good ore was opened and a 200-ton mill erected. Is one of the large producers in the ern part of the Picher camp.

LARSH LEAD & ZINC CO. OKLAHO

Address: Harry Larsh, Box 593, Miami, Okla.

Property: N. E. of Commerce. Ore occurs from a depth of 215 ft and is high-grade. In 1918, the mill was reported making 22 tons of blende concentrate and 3 or 4 tons of galena concentrate daily.

LA SALLE MINING CO. OKLAHO

Address: W. L. Kirby, supt., Picher, Okla.

Property: N. of Picher. Hand-jigs were used prior to the erection a 500-ton mill in December, 1918. The jig product paid for the mill.

L. C. H. CORPORATION OKLAHO

Address: Peoria, Okla.

In July, 1918, a 200-ton mill was erected.

LEAD BOY MINING CO. OKLAHO

Address: W. R. Womach, supt., Picher, Okla.

Property: Lead Boy mine on Crescent L. & Z. Co. land, in the S... side field. The 250-ton mill was remodeled and enlarged in 1918 and shi... made. Mine has been under lease to W. R. Womack and C. M. Evans ... July, 1919.

LENNAN ZINC & LEAD CO. OKLAHO

Property: a lease on the Commerce Mng. & Royalty Co.'s land ... N. E. end of the town of Commerce. Equipped with concentrator.

Producing since 1914 Production in 1918 came from the old workings ... to 375', which was the deepest mining in the district.

LEONORA MINING CO. OKLAHO

Address: C. Chamberlain, Joplin, Mo.

Property: formerly the Lucky Five mine, 1 mile S. of Picher, ... thoroughly drilled, a shaft sunk, and mill under construction in March, 1919.

LIGHTFOOT O. & M. CO. OKLAHO

Address: William Lightfoot, mgr., Miami, Okla. A mill was ... erected, at last accounts.

LINCOLNVILLE LEAD & ZINC CO. OKLAHO

Address: T. H. Newborn, pres., Miami, Okla.

Property: a lease between Lincolnville and Sunnyside, on which ... siderable drilling has been done, shaft sunk, and mill erected.

LION MINING CO. OKLAHO

Address: Picher, Okla.

Production: about 106 tons of blende (60% metal) per week.

LITTLE JEWEL MINING CO. OKLAHO

Address: Lincolnville, Okla.

Property: the Miami Sunrise, S. E. of Quapaw. Ore is mined ... depth of 85'. The mill contains crusher, rolls, and 6 hand-jigs, and the co... trate shows the ore to carry 15% mineral in equal portions of zinc and lead ... veloping.

LOGAN & CO., W. & H. OKLAHO

Address: F. Sleck, mgr., Picher, Okla.

In August, 1919, the old Coronet mill north of Blue Mound in Kans... to be moved to the mine at Picher.

LONE STAR LEAD & ZINC CO. OKLAHO

Organized with capital of $200,000 by B. C. Clark, Purcell, Okla.; C. A. ... Oklahoma City, and R. I. Tibbs, Maypearl, Texas.

LORANE MINING & ROYALTY CO. OKLAHO

Organized ... 1919, with capital of $40,000, by Ray Thompson, ... Moses, J. T. ... and J. T. Gephart, of Miami, Okla.

LOST TRAIL OKLAHO

Property ... the Commerce M. & Royalty Co., at Commerce. ... New shaft sunk, mill re-...

OKLAHO...

1920

UCKY DOZEN LEAD & ZINC CO. **OKLAHOMA**
Property: N. W. of St. Louis, Okla. Ore was opened at 195' in Octo-:r, 1918, and hand-jigs installed to treat the ore.

UCKY JEM MINING CO. **OKLAHOMA**
Address: W. C. Booman, mgr., Miami, Okla.
A 200-ton mill was planned in 1919.

UCKY JOE MINING CO. **OKLAHOMA**
Address: J. P. Matthews, Quapaw, Okla. Mail unclaimed at Miami in larch, 1919.
A 200-ton mill was erected, at last report.

UCKY KID MINING CO. **OKLAHOMA**
Address: J. G. Marcus, mgr., Tar River, Okla.
Property: at Douthat, has two mills whose normal weekly production 40 tons of blende (60% metal) and 40 tons of galena (80% metal).

UCKY STRIKE LEAD & ZINC CO. **OKLAHOMA**
Address: J. C. Austin, Picher, Okla.
Property: 1 mile E. of Picher, S. of St. Louis. Drill-holes exposed ore, ıafts were sunk, and a 200-ton mill erected. This mill was burned in No-:mber, 1918, and property went into hands of a receiver. In May, 1919, drilling ɔerations were resumed.

UCKY SYNDICATE CO. **OKLAHOMA**
Mill at Douthat was burned in June, 1918, but was, it is said, re-built later year.

AHUTSKA MINING CO. **OKLAHOMA**
Office: 608 Frisco Bldg., Joplin, Mo. J. H. Capelli, mgr.; W. L. Kep-:r, supt. Controlled by R. Y. Ramage interests.
Inc. May 9, 1917, in Oklahoma. **Cap.**, $150,000.
Property: 40 acres at Picher, Okla. **Development:** by 3 shafts, 250' :ep. Ore carries 7% zinc and 3% lead. A feature of the deposit is the occur-nce of rich ore in the caves opened in mining.
Equipment: 500-ton mill, in 70 hours' test run in April, 1919, dressed 300 tons of "dirt", yielding 185 tons of lead and 99 tons of zinc-concentrates. he company is a large producer of both galena and sphalerite concentrate.

ARY ANN MINING CO. **OKLAHOMA**
Address: Box 624, Joplin, Mo.
Officers: A. J. Roth, pres.; R. V. Newton, v. p.; F. H. Kissling, sec.; arl C. Smith, treas., with W. H. Johnson, Clyde Riggs, Ned Cotton, G. O. Fos-r, and George Darsee, directors.
Inc. in Oklahoma. **Cap.**, $350,000; $1 par.
Property: 40 acres near St. Louis, just S. of the Kansas line, on which nc-lead ore occurs in limestone and flint.
Development: by 192' shaft. Extensive drilling was done in 1919 to :ep development ahead of ore extraction and keep the 300-ton mill fully sup-ied.
Production: 240 tons of blende weekly in February, 1920.

AURICE MINING CO. **OKLAHOMA**
Address: Douthat, Okla.
A 300-ton mill was to be put up, at last report.

AURINE MINING CO. **OKLAHOMA**
Address: J. R. Cole, Quapaw, Okla.

AXINE MINING CO. **OKLAHOMA**
Address: W. C. Miller, supt., Tar River, Okla.
Property: a tract S. E. of Picher on which 26 drill-holes showed good at depth of 205', the ore being 35' thick. A 400-ton gas-driven mill was nned, at last report.

CURDY BROS. MINING CO. **OKLAHOMA**
Address: D. McCurdy, supt., Quapaw, Okla.
Property: between Picher and Quapaw. Rich ore was opened, and a -ton mill built in 1918-19.

MEDICAL MINING CO. **OKLAHOMA**

Address: E. S. Lain, pres., or S. B. Bobo, v. p., Baxter Springs, Kan.

Property: 40-acre lease of the Tucker-Jane tract, near the Indian Queen mine, W. of Quapaw. A 250-ton mill was planned in 1918, as drilling in 25 holes had opened good ore.

MELROSE MINING CO. **OKLAHOMA**

Address: Quapaw, Okla.

Property: 1 mile N. of Quapaw. Drilling exposed ore from 138 to 210' deep. One shaft is down 170', part of the way in a soft, black shale. No. 2 shaft is being sunk. Equipped with a 300-ton mill.

METALS MILLING CO. **OKLAHOMA**

Address: Tar River, Okla.

Production is normally 65 tons of blende (60% metal) per week.

MIAMI-ADA MINING CO. **OKLAHOMA**

Address: Quapaw, Okla., but letters returned unclaimed in March, 1919.

Officers: G. M. Ramsay, pres.; J. M. Taylor, v. p.; Orville Sneed, sec.-treas., with J. R. Phagan and Ed. Guin, directors.

Property: a lease near Quapaw; also the Phillips zinc mine near Yellville, Ark. Drills at the former passed through 42' of ore, beginning at 190' depth; while drifts in the Phillips were in ore. A mill was to be erected at each mine, at last accounts.

MIAMI METALS CO. **OKLAHOMA**

Address: W. J. Briggle, mgr., Douthat, Okla., but mail returned in 1919.
J. L. Sadler, supt.

Property: the Southeast Missouri lease at north Picher, to which the Buffalo mill was moved in October, 1918.

MIAMI MINING CO. **OKLAHOMA**

Address: J. P. McNaughton, supt., Miami, Okla.

A 400-ton mill was built in July, 1918.

MIAMI NATIONAL LEAD & ZINC CO. **OKLAHOMA**

Address: H. C. Austin, mgr., Miami; and O. L. Parry, pres., 110 W. Grand St., Oklahoma City, Okla.

Inc. in 1917. **Cap.,** $200,000.

Property: 1,000 acres and an 80-acre millsite in the Miami district. A 200-ton mill at Badger and a 150-ton mill at Peacock were erected in mid-1918.

MIAMI ROYALTY CO. **OKLAHOMA**

Address: Miami, Okla.

A 300-ton mill was planned in 1918.

MIAMI SUNRISE MINING CO. **OKLAHOMA**

Now the Little Jewel Mining Co., which see.

MIAMI VOLUNTEER MINING CO. **OKLAHOMA**

Address: Claude Hollman, supt., Commerce, Okla.

Property: operates on Sarah E. McBee land, near Hockerville, in the Commerce field. **Development:** by winze to depth of 330'; 8% blende and 8% galena ore was opened at depth of 290'. Two mills were operating during first quarter of 1918, and one mill after that period.

MIAMI WONDER MINING CO. **OKLAHOMA**

Address: F. D. Whitney, pres., Picher, Okla.

Property: S. E. of Picher. Rich ore was opened at depth of 208'. A mill erected and shipments made in 1918.

MIAMI ZINC & LEAD CO. **OKLAHOMA**

Address: Miami, Okla.

Property: operates on the Sarah E. McBee land, in Miami district. Workings at a depth of 330' are deepest in the field. Three electrically-driven mills turn out over 200 tons of concentrate per week.

MINT MINING CO. **OKLAHOMA**

Address: Julius Labaup, supt., Miami, Okla.

Property: lease N. of Picher, in which 5 drill-holes showed ore. A 75-ton mill was to be [illegible] 1918.

MIO MINING CO. **OKLAHOMA**
Address: W. J. Briggle, Joplin, Mo.
Property: the W. F. White mine and flotation mill at Picher, taken over in July, 1919.

MISSOURI MULE MINING CO. **OKLAHOMA**
Address: Ed. Standefer, Picher, Okla.
Developing and producing at last account.

MOGUL MINING CO. **OKLAHOMA**
Address: A. E. Dunlap, mgr., Miami, Okla.
Cap., $250,000.
Property: a 20-acre lease E. of Picher; also operates west of the town. Drilling exposed from 4 to 51% ore, at 180′ and 212′ depth, and a shaft was sunk late in 1918. Hand-jigs were formerly used to dress the ore, but a new mill was started in November, 1919. In 1920 the output exceeds 30 tons of blende per week.

MONTREAL MINING CO. **OKLAHOMA**
Address: C. F. Dike, mgr., Douthat, Okla.
A partnership operating a mine S. of the Kansouri mine, which is in the Treece district, Kansas. The weekly output in 1918 was 330 tons of blende, 60% metal, and the same early in 1920. This mine was the largest shipper of phalerite in the district.

MOUNT NEBO LEAD & ZINC CO. **OKLAHOMA**
Address: J. E. Turner, mgr., Peoria, Okla.
Development: 3 shafts open ore at a depth of 130′ to 176′. A 200-ton mill erected in 1918, includes 100 h. p. steam engine for mill, 80 h. p. engine for compressor, crusher, 4 sets of rolls, 3 jigs, and 5 tables.

MUSKOGEE LEAD & ZINC CO. **OKLAHOMA**
Address: J. C. Isbell, mgr., Quapaw, Okla.
Property: 60 acres, just W. of Quapaw. Ore was encountered at 165′ and 180′, but water was so troublesome that company joined with the Imperial Development, St. Louis, and Big Three companies to drain the ground. A 10″ Texas pump is working in the Muskogee, while the Imperial also has one besides two 12″ and one 14″ Pomona pumps. The Muskogee shaft was cemented, and a depth of 200′ attained. A mill was planned.

NEVER SWEAT MINING CO. **OKLAHOMA**
Address: Miami, Okla.

NEW CHICAGO MINE **OKLAHOMA**
Address: A. M. Gaines, Tar River, or Picher, Okla.
Mine is completely equipped and a good producer.

NEW STATE MINING CO. **OKLAHOMA**
Address: Homer Seals & Co., Commerce, Okla., or Joplin, Mo.
Property: operates the New State mine on McBee land at Commerce. [illegible] and sphlarerite ores are reported mined at the 110′ level and treated in [illegible]-ton mill.

NIANGUA MINING CO. **OKLAHOMA**
Address: Ray Munson, mgr., Picher, Okla.
Officers: E. S. Warner, pres.; R. W. Smith, v. p.; W. S. O'Bannon, sec.-treas.
Cap., $100,000. Company has no debt. Work in 1918 was principally development and construction, but since mill was placed in operation in February, 1919, earnings have been $8,000 per month.
Property: lease of 20 acres on Tar River, midway between Picher and Cardin. The royalty is 17½%. In August, 1919, the M. & M. mine was acquired at a cost of $150,000.
Geology: orebodies lie on three levels—145′, 179′, and 200′. At 149′ level ore is all lead; at 170′ horizon, ore is mixed lead and zinc, the latter predominating; and on the 200′ level ore is 75% lead. About 30% of the ore is of disseminated type in flint and lime-breccia; remainder is lump ore in broken flint. Ore now being milled assays 6.5% lead and 4% zinc.
Development: 2 shafts to 200′ level, all ore now being hoisted from [illegible] level

Equipment: mill treats 250 tons, in 10 hours. It includes a 500-ton ore bin, 18-in. crusher, 42-in. rolls, with 36 in. return rolls, 2 rougher Colley type jigs, one cleaner and one sand jig, same type, one 36 in. high-speed rolls for re-crushing, and 10 tables. The recovery is 82%.

Power furnished by 150- h. p. gas engine; hoist and drills are operated by air furnished by three 400 cu. ft. gas-driven compressors.

Production: 110 tons of blende per week.

OHIMO MINING CO. **OKLAHOMA**

Address: Lindsey Allington, Miami, Okla.

Property: a tract northwest of Picher.

Development: by 2 shafts. Crude ore is mined at level between 220' and 265', the ore is concentrated in a 250-ton mill built in 1918, with a recovery of 10% as concentrates. The weekly output is over 100 tons of blende.

OKLAHOMA WOODCHUCK ZINC LEAD CO. **OKLAHOMA**

Office: 25 Broad St., New York, N. Y.

Officers: C. C. Burger, pres.; R. M. Atwater, Jr., v. p.; L. E. Whicher, treas., with D. T. Rosen and Herman Aaron, directors. H. Pelz, sec.; H. I. Young, mgr., Mascot, Tenn.

Inc. May 5, 1915, in Delaware. **Cap.**, $1,000.000; $10 par; all outstanding. Notes authorized and outstanding, $250,000.

Company received from ore sales, $367,971; operating expenses for year ended April 30, 1919, totaled $258,324; net income was $84,470, which was charged against depreciation and depletion.

Property: leases just east of the Meridian mine, Tar River, Ottawa county. Mine contains a chamber deposit of zinc and lead sulphides, assaying 10 to 30% zinc and 3 to 10% lead. A peculiarity of the mine is the exudation of tarry matter from the rock.

Development: by shafts to a depth of 250'. **Equipment:** includes a 500-ton mill with flotation unit.

Production: 1917, 8,001,400 lb. zinc, and 5,588,200 lb. lead; 1918, 15,267,400 lb. zinc, and 1,079,100 lb. lead. Concentrates for 1918, averaged $50.20 zinc and $68.82 lead per ton. In February, 1920, the weekly output was 130 tons of blende.

OKLA LEAD & ZINC CO. **OKLAHOMA**

Address: T. P. Lennan, Tar River, Okla.

OKO LEAD & ZINC CO. **OKLAHOMA**

Address: John Reno, Century, Okla.

Property: the Southland mine at North Century, lease formerly held by the Dallas Picher Lead & Zinc Co., but forfeited for non-working. The Lennan mill at Commerce was moved to the mine, and was yielding over 40 tons of blende weekly in 1920.

OLD RELIABLE MINING CO. **OKLAHOMA**

Address: V. E. Conkle, Tar River, Okla.

Developed and small shipments made in 1918.

OMAHA LEAD & ZINC CO. **OKLAHOMA**

Address: care A. E. Bowers, Lincolnville, Okla.

ONTARIO SMELTING CO. **OKLAHOMA**

Address: C. V. Jones, pres. and mgr., Joplin, Mo.

A lead smelter, at Hockerville, in the Oklahoma section of the Tri-State region. Plant has been working since March 15, 1918. It consists of baghouse, motor-room, and furnace-room, all of brick, concrete, and steel; also a refinery of frame construction. Five Newman furnaces have a capacity of 1,600 tons of "Ontario" lead per month.

OTTAWA METAL CO. **OKLAHOMA**

Address: Picher, Okla.

A 175-ton mill was planned in 1918.

OZARK LEAD & ZINC CO. **OKLAHOMA**

Address: St. Louis, Okla.

Report [illegible] was put up a year before any development was done, and the lit[illegible] done up to July, 1919, failed to find ore.

'ALATIVE LEAD & ZINC CO. **OKLAHOMA**
Address: E. L. Warner, mgr., Peoria, Okla.
A 250-ton mill planned at last accounts.

'ICHER-OKLAHOMA MINING CO. **OKLAHOMA**
Address: R. P. McReynolds, mgr., Picher, Okla.
A mill was purchased and erected on a lease S. of the Golden Rod mine in une, 1918.

'IOKEE MINING CO. **OKLAHOMA**
Address: Picher, Okla. Operates a lease on Eagle Picher Lead Co. and.
The normal production is 40 tons of blende (60% metal) per week.

'IONEER LEAD & ZINC CO. **OKLAHOMA**
Address: Harry G. Larsh, Commerce, Okla.
Officers: Harry Larsh, pres. and mgr.; J. L. Wilken, treas.; S. P. .arsh, sec.; C. M. Britt, supt.
Property: a 40-acre lease near the Bluebird mine of the Bilharz company, in Tar River area. Drilling opened 15 to 42% ore.
Equipment: a mill was erected in 1918, and mine has been a steady producer. In June, 1919, there was 2,000 tons of concentrate on hand. In 'ebruary, 1920, the weekly output was over 40 tons.

'ITTSBURG-MIAMI LEAD & ZINC CO. **OKLAHOMA**
Address: C. C. Whittier, Picher, Okla.
The 500-ton mill was burned in February, 1920, but is being re-built.

'ORTLAND LEAD & ZINC CO. **OKLAHOMA**
Company has a lease near St. Louis, Okla., on which it sank a shaft that cut ıe orebed at 131'. At last report company expected to put up a mill.

'OTOSI ZINC CO. **OKLAHOMA**
Address: F. E. Blunt, Picher, Okla.

'RAIRIE LEAD & ZINC CO. **OKLAHOMA**
Address: Commerce, Okla.
Officers: C. O. Bedwell, pres.; Lester Eads, sec.-treas.; C. G. Giles, ıpt.
Property: a tract E. of Quapaw, on which at depth of 81', a drift shows re to be 18' thick for a distance of 300' and drill holes show the ore horizon to ary between 62' and 112' below the surface. The 150-ton mill on the Crescent ase, E. of Quapaw, had a 3,000 ton dump to treat while mine development was nderway.

REMIER ZINC CO. **OKLAHOMA**
Address: A. M. Gaines, Tar River, Okla.
Property: a lease on Tri-State company ground on South Main street, icher; said to be one of the richest tracts in the district.
Development: drilling revealed ore at 193' to 230' depth. Caves of ch ore are found frequently. Two shafts were sunk.
Production: in August, 1918, 11,150 tons of ore hoisted in twenty-five)-hour shifts yielded 520 tons of zinc and 385 tons of lead concentrates. In the rst half of 1919 the output was 5,502 tons of blende and 1,471 tons of galena. egular dividends are paid.

RODUCERS LEAD & ZINC CO. **OKLAHOMA**
Address: George Brown, mgr., Picher, Okla.
Officers: F. W. Hemme, pres.; A. C. Black, v. p.; I. G. Conkling, sec.-eas.
Dividends amount to $35,000.
Property: leases in the Picher district. Shafts were sunk to open 6 ' 30% ore found by drills, and a 300-ton mill erected. A recovery of 7% lead ıd zinc is made.

RUDENTIAL MINERAL CO. **OKLAHOMA**
Address: St. Louis, Okla.
A 250-ton mill was planned at last report.

UAPAW JACK LEAD & ZINC CO. **OKLAHOMA**
Address: B. W. Ward, Quapaw, Okla., supt. in 1918. In July, 1918,

company built a 200-ton mill and small shipments were made, but the slump in prices closed this and many other small plants at the time the armistice was signed.

QUAPAW MINING CO. **OKLAHOMA**

Address: Quapaw, Okla.

Property: an 80-acre lease near Lincolnville station, S. of Quapaw. Royalty paid the land-owners is 5%.

Development: drilling revealed a deposit 20′ thick at depth of 100′. A 250-ton mill was to be built, at last accounts.

QUEBEC MINING CO. **OKLAHOMA**

Address: Tom Shelton, mgr., Douthat, Okla.

Mining and milling with production of lead and zinc concentrates began in September, 1918. In February, 1920, the weekly output was over 40 tons.

QUEEN CITY MINING CO. **OKLAHOMA**

Address: Commerce, Okla.

RAINBOW LEAD & ZINC CO. **OKLAHOMA**

Address: Ed. Dunkin, Quapaw, Okla.

Officers: F. E. Herring, pres.; O. D. Halsell, v. p.; R. H. Drennan, sec.-treas.

Inc. in Oklahoma. **Cap.,** $100,000.

Property: E. of Picher and N. W. of Quapaw. Ore is found at 160′ depth, and is from 20′ to 35′ thick. A 300-ton mill was built.

RAMAGE MINING CO. **OKLAHOMA**

Address: John Capelli, Douthat, Okla.

Operates a mine and a 250-ton mill in which flotation was tried in 1918. Weekly production averages 90 tons of blende, 60% metal, when operating normally.

RED EAGLE MINING CO. **OKLAHOMA**

Address: Ira D. Guthrie, mgr., Baxter Springs, Kan.

Property: 40-acre lease at Sunnyside, S. E. of Baxter and E. of Quapaw. Lead ore extends from depth of 70 to 80′, and zinc ore from 80 to 92′. A 100-ton mill was erected, whose operation showed the ore to average 10% blende and galena.

RED GRANITE COPPER & WATER POWER CO. **OKLAHOMA**

Address: W. E. Hudson, mgr., Tulsa, Okla.

Property: a lease near Spavinaw, Mayer county, Okla. While prospecting for zinc a pyrite deposit was found, at depth of 20′, assaying 52% sulphur. A mill costing $25,000 was to be built, at last report.

RED ROSE MINING CO. **OKLAHOMA**

Address: W. D. Adkins, Quapaw, Okla.

A 200-ton mill was erected in 1918.

RED SKIN MINING CO. **OKLAHOMA**

Address: Harry Myers, Picher, Okla.

REPUBLIC MINING CO. **OKLAHOMA**

Address: W. J. Scafe, mgr., Joplin, Mo.

Officers: W. H. Langford, pres.; F. J. Huttig, v. p.; F. Huttig, sec.

Cap., $250,000.

Property: a lease on the Wright land near Tar River, Okla. Two shafts are in rich ore to 224′ depth. A 250-ton mill is operating.

RICH STRIKE MINE **OKLAHOMA**

Address: A. O. Baker, supt., Quapaw, Okla.

Reported drilling, shaft sinking, and a mill erected in 1918.

ROYAL MINE **OKLAHOMA**

Address: Picher, Okla.

Operated intermittently. Normal production 60 tons zinc ore weekly.

SAFEGUARD MINING CO. **OKLAHOMA**

Address: Commerce, Okla.

A 200-ton mill was planned at last report.

ST. JOSEPH MINING CO. **OKLAHOMA**

Address: E. F. McClellan, Box 564, Picher, Okla. Operates a lease on land of Eagle Picher Lead Co. Weekly output is 70 tons of blende.

ST. LOUIS LEAD & ZINC CO. **OKLAHOMA**

Address: George Lumick, supt., Quapaw, Okla.

Property: S. W. of Quapaw. Drilling has proved ore and shafts have been sunk. The mill near Quapaw was moved to the Jefferson mine south of St. Louis, Okla., late in 1918. Gas-driven compressors are at work.

ST. LOUIS SMELTING & REFINING CO. **OKLAHOMA**

Subsidiary of National Lead Co., and of St. Louis Smelting & Refining Works of National Lead Co., a branch of National Lead Co.

Address: J. A. Caselton, 2nd v. p., 722 Chestnut St., St. Louis, Mo.; and C. E. Schwarz, supt., Miami, Okla.

Property: 160 acres of leased property at St. Louis, Okla., on which two 400-ton modern mills are erected. Also 1,240 acres of partly developed ground about 3 miles E. of St Louis, Okla.

More than half of all the crude ore mined in the territory E. of Picher was treated in the mills of this company, which are regarded as the best in the district. Ore was hoisted from 4 shafts from levels between 232 and 245'.

Production: over 600 tons of blende weekly early in 1920.

SAMBO MINE **OKLAHOMA**

Address: Walter Peltier, Lincolnville, Okla.

Reported purchased in August, 1918, by C. H. and W. S. East, of Lima, Ohio, and Walter Peltier, of Miami, Okla.

Property: 40 acres of land and a mill adjoining Nemo and Moran properties at Lincolnville. Mine has 5% ore, between 75' and 100' levels. Mill enlarged to 500 tons daily and shipments made.

SANTA FE MINING CO. **OKLAHOMA**

Address: A. J. Davidson, mgr., Hockerville, Okla.

Operates a 400-ton mill, driven by 15, 37½, 50, and 100 h. p. oil engines; operations show a recovery of 10% zinc and lead. Weekly output is about 50 tons of concentrate.

SCOTT EAGLE MINING CO. **OKLAHOMA**

Address: Commerce, Okla.

SILVER CROWN MINING CO. **OKLAHOMA**

Address: J. W. Thomas, supt., Peoria, Okla.

Company took over and was drilling the Gebo mine, at last accounts.

SILVER FOX LEAD & ZINC CO. **OKLAHOMA**

Address: Frank Childers, Picher, Okla.

SINDEN ZINC CO. **OKLAHOMA**

Address: W. B. Shackelford, Tar River, Okla.

SKELTON MINING CO. **OKLAHOMA**

Address: Frank Childress, mgr., Douthat, Okla.

Property: 3 mines at Douthat, and 2 at Tar River, with 7 mills.

Production: the mills dress about 1,000 tons of ore per shift. Company is second largest producer in Oklahoma.

The total weekly output was 750 tons in February, 1920.

SOUTHEAST MISSOURI MINING CORP. **OKLAHOMA**

Address: O. C. Whitener, pres., Picher, Okla.

In 1918, two shafts were sunk, to open a 35' face of ore exposed by drills at depth of 185', and a 300-ton mill erected.

SPELTER MINING CO. **OKLAHOMA**

Address: J. J. Gurlach, Quapaw, Okla.

Cap., $150,000.

Property: a lease on Abrams' land E. of Quapaw. Eight drill-holes found ore, one lot assaying 38%. A 200-ton mill was planned before the metal market broke in 1919.

STANDARD ZINC LEAD MINING CO. **OKLAHOMA**

Office: 314 Frisco Bldg., Joplin, Mo. J. F. Haley, gen. mgr.

Property: at Tar River, Okla.

Development: two 220' shafts were sunk during 1918-19, opening a thickness of 30' of unusually rich ore of indefinite length. High-grade lead ore has

also been developed from which a concentrate is made that assays up to 85% Pb.

Equipment: a 300-ton mill, completed in Feb., 1919, and operating regularly since.

Production: 33 tons of blende and 44 tons of lead per week early in 1919.

TAR RIVER MINING CO. OKLAHOMA

Address: W. C. Miller, Douthat, Okla.

TEXAS MINING CO. OKLAHOMA

Address: given as care of T. P. Turner, mgr., Picher, Okla., but mail sent there was returned.

Property: 2 miles E. of Picher. Rich ore—20 to 30% blende—was opened at 176' depth, and a mill erected in 1918. Water has hampered development. Weekly output is over 40 tons of blende.

TIGER LEAD & ZINC CO. OKLAHOMA

Reorganized as Desperation Co., q. v.

TRIANGLE MINES CO. OKLAHOMA

Address: Commerce, Okla.

Officers: N. C. Barry, pres.; E. H. Hoffman, v. p.; K. N. Sween, treas.; J. D. Bomford, sec.-mgr., with A. E. Turner, directors.

Property: near Commerce. Two shafts were sunk and a 300-ton mill erected in 1918. Oil engines are used to generate power.

TRI-STATE COMPANY OKLAHOMA

Address: Picher, Okla.

Company has over 1,000 acres under lease in Oklahoma. Two mills, the Premier and Blue Bonnet, are at work.

TULSA-SAPULPA-MIAMI ASS'D MINES CO. OKLAHOMA

Address: H. R. McCreary, sec., Tulsa, Okla.

Property: leases around Wyandotte, S. W. of Miami, Okla. Drilling was completed and shaft sinking started in June, 1918. A 200-ton mill was to be built, at last report.

UNDERWRITERS LAND CO. OKLAHOMA

Address: Box A-32, Picher, Okla.

Officers: Geo. H. Worthington, pres.; Andrew Squire, v. p.; Alvin Good, sec.-treas., with Warren S. Hayden, F. N. Bendelari, A. E. Bendelari, Harry W. Davis, directors. F. N. Bendelari, mgr.

Inc. 1901, in Delaware. **Cap.,** $1,000,000; $1 par; all outstanding. Annual meeting in February. No bond issues. Transfer office, 1015 Hippodrome Bldg., Cleveland, Ohio; registrar, the Citizens Savings & Trust Co., Cleveland, Ohio.

Dividends: 6% in 1917; 13% in 1918.

Property: 208 acres owned in fee in Jasper county, Mo., and 160 acres under lease in Ottawa county, Okla.; also lease on 40 acres of the Poffis land south of the Underwriters No. 1, drilled by 43 holes.

Development: the workings at No. 1 mine at Commerce are at a depth of 160'; those of No. 2 mine at Picher, 235'; and of No. 3 mine at Douthat, 240'. At Commerce, in No. 1 mine, mineralization is along lines of brecciated rock, or "water-courses," forming a series of lodes separated by barren intervals, 8' to 30' wide. Vugs of rich blende and galena ore are often encountered.

Equipment: includes mills at each of the three mines. The concentrates carry 62% Zn. and 82% Pb. A fourth mill was planned for No. 4 shaft in August, 1919.

Production: normal output over 500 tons of zinc concentrate weekly. This company is the second largest zinc producer of the Miami field. The Underwriter No. 2 and No. 3 mines opened in the Whitebird land in 1918, yielding rich ore at levels 230 to 246' below the surface. The mills have flotation units and handle 550 tons daily of the ore yielding 12% in high-grade concentrate.

UNITED STATES SMELTING CO. OKLAHOMA

Address: U. S. S. R. & M. Co., 120 Broadway, New York; or P. O. Box, Tar River, Okla.

Property: a mine [illegible] opened in 1916 in the Rifle [illegible]

near Cardin. Drilling cut good ore from 280 to 312' depth. The Ravens-nill was moved from Joplin, Mo., to this mine. Developments in 1917 and ere favorable.

oduction: in 1918, the weekly output was about 300 tons of blende metal).

mpany also owns a zinc smelter at Checotah, Okla., acquired in 1916. It ıtural gas for fuel, but failure of the supply resulted in its being shut down e, 1918.

'AGE MINING CO. **OKLAHOMA**

ldress: R. B. Sharp, Tar River, Okla.

operty: operates on land of Eagle Picher Lead Co., in Picher dis-roducing 30 tons of blende weekly, early in 1920.

E MINES CORPORATION **OKLAHOMA**

ldress: Frisco Bldg., Joplin, Mo., or Frank Weeks, Tar River, Okla.

mpany operates the Lion and Panther mines, both producing in 1918, and

OR MINING CO. **OKLAHOMA**

ldress: Picher, Okla.

erates a lease on Eagle Picher Lead Co. ground.

ORY MINING CO. **OKLAHOMA**

ldress: A. E. Bendelari, Picher, Okla. W. N. Corbett, supt. A part-).

operty: a 20-acre lease, 1 mile E. of Picher, developed by 250' shaft. ents, over 40 tons weekly in 1920.

KER MINING CO. **OKLAHOMA**

ldress: Miami, Okla.

KER MINING & DEVELOPMENT CO. **OKLAHOMA**

ldress: Dr. C. V. Warner, Picher, Okla.

BABY LEAD & ZINC CO. **OKLAHOMA**

ldress: Seneca, Mo.

fficers: J. E. Morse, pres.; C. T. Jobes, v. p. and mgr.; C. J. Twohy, as., also directors. F. C. Reutledge, supt.

c. Nov., 1917, in Oklahoma. **Cap.,** $100,000; $1 par; all issued. Trans-ice, 616 Security Bldg., Oklahoma City. Annual meeting, third Tuesday ember.

operty: 2 leases in Peoria district, Ottawa county, Okla. The de-s a blanket conglomerate in limestone, the ore assaying 4% lead and 8%

evelopment: by 117 and 127' shafts, and 300' drift. Mining is by un-ıd and bench stoping.

quipment: 22-h. p. hoist, pump, etc. Figures as to ore reserves, pro-n, and financial results are confidential.

D MINING & MILLING CO. **OKLAHOMA**

ldress: W. F. Fox, Lincolnville, Okla.

AHACHIE MINING CO. **OKLAHOMA**

ddress: Alfred Hunsicker, Lincolnville, Okla.

oduction in 1920, over 30 tons per week.

VER MINING CO. **OKLAHOMA**

ddress: Commerce, Okla.

CH MINING CO. **OKLAHOMA**

ddress: Miami, Okla.

VIRGINIA LEAD & ZINC CO. **OKLAHOMA**

ddress: Parkersburg, W. Va.

c. May, 1918, by Chas. Heinselman, A. D. Sees, A. A. Haught, and H. d

operty: at Sunnyside, adjoining the Lead Boy, in the Quapaw dis-Drill holes said to show good ore, and a mill is to be built.

TE BIRD MINING CO. **OKLAHOMA**

ddress: T. Stoars, Picher, Okla.

roduction: 430 tons of blende per week early in 1920.

WHITE MINING CO.; WM. FOSTER OKLAHO

Address: Picher, Okla.

Operates a lease on land of Eagle Picher Lead Co.

WINGFIELD MINING CO. OKLAHO

Office: Webb City, Mo. Charles T. Orr, pres. and gen. mgr., Jo Millar, treas.

Operated in conjunction with Athletic Mining & S. Co. and Bertha A ing Co.

Property: at Quapaw, Okla., carries high-grade zinc ore, and 1,200-ton mill (per 24 hours). See above named companies.

WOLFTON MINING CO. OKLAHO

Address: Henry Gneissing, supt., Picher, Okla.

Cap., $200,000. Company had a 60-acre lease on the Whitebird le of Picher, and planned to erect two 500-ton mills.

ZINC LEAD CORPORATION OKLAHO

Address: C. C. Whittier, Picher, Okla.

Erected a concentrating plant in 1918 and regular shipments being ma

OREGON

Oregon is not a great metal-producing State, possibly because its districts are as yet but slightly developed, owing largely to inadequate tran tion facilities. Most of the mines are in Baker county, whose ore deposi 90% of the gold and most of the other metals mined in the State. Durin copper production increased 500,000 lb. to 2,935,000 lb., while gold decrea $200,000 to $1,270,000.

A preliminary estimate of the metal production in 1919, made by C G. Yale, of the U. S. Geological Survey, shows a decrease in the gold an produced, but an increase in the silver and copper. The output of gold was $1,270,465 and the estimated output in 1919 is $1,072,661, a decrease of $197,804. The output of silver in 1918 was 107,323 fine ounces, valued at $1 in 1919 it was 211,523 fine ounces, valued at $234,790. The output of co 1918 was 2,451,016 pounds, valued at $605,401; in 1919 it was 2,638,714 p valued at $501,355, an increase in quantity of 187,698 pounds and a decre value of $104,046. The output of lead in 1918 was 10,601 pounds, valued at the output in 1919 was 2,000 pounds, valued at $114, a decrease in quan 8,601 pounds and in value of $639.

There are only about a hundred producing metal mines in Oregon a of these produce 80 per cent. of the total output of all the metals mined State, and one of them produces 25 per cent. of the total value of the meta duced. These six mines are those of the Baker Mines Co., Cornucopia Co., Homestead-Iron Dyke Co., and the Commercial Mining Co., all in county, and the Queen of Bronze Mining Co., in Josephine county. The placer mine in this group is the Powder River Gold Dredging Co.

The larger copper companies of the State show some increase in outpu ing the year, notwithstanding unfavorable conditions. Though less co been produced in Oregon during the last two years than in 1917, the av value of all the metals mined and treated has increased about 90 cents pe

The mines are described under the names of the individuals or corpora owning them, given in alphabetical sequence.

ALICE MINE OREG

Owner: Gustav Pinson, Prairie City, Ore.

Property: 2 claims, near Prairie City, Grant county; said to show lar deposits of soft gold-silver ore in fissure vein. Orebody dips 50° E.

Development: by 180′ tunnel.

ALMEDA MINES CO. OREG

Offices: 1014 Board of Trade, Portland, Ore., and Opera House Grants Pass, Ore.

)fficers: S. C. Spencer, pres.; L. E. Crouch, 1st v. p.; Nat P. Ellis, 2nd H. E. Thurman, sec.; C. M. Huddle, treas.
nc. July 28, 1916, in Oregon. **Cap.**, $3,500,000; shares $1 par; 3,000,000 s common, 500,000 shares preferred. Successor to Almeda Consolidated ; Co. Annual meeting, second Tuesday in April.
Property: 17 lode claims, 340 acres, also 500 acres placer ground, in hine county, about 26 miles from Grants Pass, and 17 miles from Merlin, st railway station on the Southern Pacific, with daily stage line to Almeda. s include a 200-acre town site.
'he quartz claims are in three groups known as the Almeda, on the north)f the river and the Rocky Gulch and Rand groups on the south side of ver.
'he Almeda group consists of 3 claims developed by 5 tunnels and a 535' with about 2 miles of underground workings. Orebody estimated by the gement to show approximately 2,000,000 tons blocked out for production.
:onsiderable development work has been done on the Rocky Gulch and groups by tunnels and crosscuts. The main vein is said to be 10' to 20' on the slate hanging wall, ore being strongly auriferous and slightly argen- us chalcopyrite. Paralleling the main vein is a body of low-grade ore 30' wide, highly silicious, mainly chalcopyrite with occasional bornite, giving ise of greater values at increased depth.
Equipment: consists of a 100-ton blast furnace for matting, distillate es to develop 225 h. p., compressors, motors, boilers, complete laboratory ll necessary buildings. The 17-mile mountain road from Merlin to the mine good condition and motor trucks operate over it the entire year.
'he mines are not being operated owing to litigation between factions of the holders and the directorate.

LGAMATED MINES CO. **OREGON**
)ffice: Baker, Ore.
)fficers: W. F. Downie, pres.; W. Burnham, sec.; G. J. Burnham, treas.
:ap., $1,000,000; $1 par; 800,000 issued.
Property: 21 quartz claims in Eagle Creek district, Baker county. De- ing.

:RICAN ALMADEN QUICKSILVER & GOLD MINING CO.
.ast address: 100½ Fourth St., Portland, Ore.
)fficers: W. B. McKinney, pres., E. N. Wheeler, sec.-treas.
:ap., $1,500,000; $1 par; all issued.
Property: 3 claims in Sec. 20, T. 14 S., R. 20 E., 11 miles from Howard, : Ochoco district, Crook county, developed by tunnels. Ore contains cinna- altered andesite.

:RICAN EXPLORATION CO. **OREGON**
Address: John Hampshire, pres., Grants Pass, Ore.
nc. 1916, in Oregon. **Cap.**, $1,000,000.
Reported to have bought the Queen of Bronze mine in 1916, formerly owned e Takilma Sm. Co., and the Waldo copper mine, in September, 1917, for 00.
:ompany dissolved, 1918, and holdings taken over by the John Hampshire which see.

:ER MINES CO. **OREGON**
)escribed in Vol. XIII. Operated a lease on the Last Chance mine of the ucopia Mines Co., which see.

D MOUNTAIN MINING CO. **OREGON**
Address: Geo. N. Putnam, pres., 35 Congress St., Boston, Mass.
nc. March, 1916. **Cap.**, $100,000.
Property: Bald Mountain mine, on the N. E. extension of the Ibex vein, :acker Creek district, Baker county; reported consolidated with the Ibex which see.

HARRISON MINE **OREGON**
Property: 10 claims, 7,000' above sea level, in Grant county, 23 miles by

road west of Whitney, and 28 miles by road from Sumpter, the nearest rail stations.

Ore: occurs in the Ben Harrison vein, strike N. 3° E., dip [illegible] which varies in width from 18" to 21', with an average stoping width [illegible] opened, of 77". The vein is a brecciated replacement in granodiorite. Ore erals are pyrite, stibnite, chalcopyrite, sphalerite, pyrargyrite, and stephanite gold of about equal value to the silver in the ore.

Development: by adits, the lowest at the 600' level. Several hun feet of drifting has been done on the various levels and in 1915 there was to be above the 500' level, 87,000 tons of ore blocked out on 3 sides, with an av value of $10 per ton.

Equipment: includes 20-stamp mill, tube mill, classifiers, vanners, flotation unit.

See Mineral Res. of Ore. Vol. 1. No. 4, p. 29.

Operated under option, 1917-18, by E. H. Dewey, Nampa, Ida., but option linquished, April, 1918, after expenditure of $50,000. Several cars of gold ore were sent to smelter during 1919.

BLACK BUTTE QUICKSILVER MINING CO. ORE

Office: New York Block, Seattle, Wash.

Officers: John N. Powell, pres.; Marion T. Edwards, sec.; W. B. Mc Carlton, Oregon, managing agent.

Inc. in Washington. **Cap.**, $5,000,000; shares $100 par; fully issued.

Property: 1,040 acres, patented, in Sec. 16, 17, 9, 8, T. 23 S., R. 3W., county, Ore., about 17 miles by wagon road from Cottage Grove, said to a low-grade cinnabar deposit. Developed to depth of 900'.

Equipment: includes a 40-ton retort. Production not reported. 30 men employed at last accounts.

BLUE BIRD MINING CO. ORE

Office: 67 N. Third St., Portland, Ore.

Officers: at last accounts, S. M. Carter, Blue River, Ore., pres.; F. Brooke, sec.; C. Marco, treas.

Cap., $100,000; $1 par; fully issued.

Property: Blue Bird mine, 7 unpatented claims, in Sec. 28, T. [illegible] 4. E., 6 miles from Blue River, Linn county, said to carry a deposit of ore, containing gold and silver values and some iron pyrite. Developed and 220' tunnels and several crosscuts. Is a prospect.

BLUE MOUNTAIN MINING CO. ORE

Office: C. L. Arzeno, pres., gen. mgr., 9 E. Fifth St., Covington. **Mine office:** Sumpter, Baker county, Ore.

Inc. in Arizona. **Cap.**, $2,000,000; $1 par; 1,373,999 issued. Also $50,000 6% bonds; $47,500 outstanding. **Annual meeting fourth Friday** In May, 1919, the Imperial Eagle M. Co. was organized to liquidate the standing bonds and other indebtedness of the Blue Mountain company eventually take over its holdings.

Fully described in Volume XIII.

BLUE RIBBON MINES GROUP ORE

Y. B. Tardiff, owner, Pendleton, Ore.

Property: 4 unpatented claims, 1 mile E. of the Buffalo-Monitor in Granite district, Grant county, said to carry 4' quartz vein in slate and the ore assaying $18 per ton in gold and silver.

Development: by 1,030' tunnel and 1,635' of drifts with 500 tons reported blocked out. Expended $1,200 in 1918.

BOLEN CREEK MINING CO. ORE

Address: P. J. Neff, Medford, Ore.

Inc. Nov., 1919, in Arizona. **Cap.**, $150,000.

Property: a gold placer on Sucker creek, in Holland district of [illegible] county, 30 miles W. of Medford. Mine is fully equipped.

BOULDER CREEK GOLD MINING CO. ORE

[illegible] from former office: 80 Sixtieth St., Portland, Ore.

Officers: R. D. Hewitt, pres., Agness, Ore.; John Gardner, sec.-treas.
Cap., $25,000; $100 par; $21,076 outstanding.
Property: an extensive bar known as the Star group of mining claims, about 240 acres in Sec. 25, T. 34, R. 13 W., Ophir district, Curry county, on which $4,800 has been spent in the following improvements: 4,800′ ditch, sawmill, dam, 1,000′ of piping and 800′ pipe giant. Results of operations not reported.

BRADEN MINE **OREGON**

Operated by C. R. Ray, of Medford, Ore., at last accounts.
Property: S. E. ¼ section 27, T. 36 S., R. 3 W., 3 miles from Gold Hill Jackson county, opened up about 30 years ago. Largest production for any one year was $30,000 in 1907.
Ore: gold in 2′ vein, strike N. 30° E., dip 25° S. E. Vein filling is quartz and sulphides. Ore assays about $9 gold per ton.
Development: several thousand feet of drift tunnels, longest over 1,200′.
For geology, see U. S. G. S., Bull. 546, p. 39.

BRIGHT CARBONATE MINING CO. **OREGON**

Office: 118 East Webb St., Pendleton, Ore. Geo. Darveau, pres.; John Seibert, sec.-treas.
Cap., $60,000; par $1; all outstanding.
Property: 3 claims in the Greenhorn range, Grant county, at an elevation of 7,250′, is reported to carry a quartz vein in granodiorite, containing mainly gold and silver values. Mine but slightly developed and still in the prospect stage.

BUFFALO MONITOR MINE **OREGON**

Operated under lease by Wm. Narkaus, at last accounts. Mine, about 5 miles from Granite, in Grant county, reported to have 3 veins, carrying pyrite, chalcopyrite, tetrahedrite, galena and stibnite; the main or Monitor vein is said to be 50′ wide. Production to date amounts to $75,000. The lessee installed compressor and air drills.

BURNT RIVER DREDGING CO. **OREGON**

Address: 506 Oregonian Bldg., Portland, Ore. O. E. Tisch, pres.; D. L. Wallace, sec.-treas.
Cap., $250,000; par $1; 39,125 outstanding.
Property: 680 acres, known as the Pomeroy dredging ground, 8 miles S. of Durkee in Baker county.

CANYON MOUNTAIN MINING CO. **OREGON**

Address: Jackson Chambers, pres., Canyon City, Ore.
Cap., $1,000,000; $1 par; 876,392 issued.
Property: Mountain View mine, 1¼ miles S. E. of Canyon City, Josephine county, said to carry free milling gold.
Development: by 500′ tunnel. Inactive since 1914.

CHETKO COPPER CO. **OREGON**

Idle. **Office:** Ashland, Ore. Mine near Kerby, Josephine county, Ore.
Officers: C. W. Evans, pres and gen. mgr.; C. C. Hicks, v. p. and supt.; C. E. Shepard, sec.-treas.; Theo. R. Heintz, mgr.
Inc. Aug. 10, 1905, in Arizona. **Cap.,** $1,000,000; $1 par; issued, 730,516.
Property: 36 claims, 720 acres, fairly timbered, and 2 water rights, in Curry county, about 70 miles from Grant's Pass, the nearest railroad point. Said to show 8 orebodies, one reported by company as of 240′ average width, accessible 1¼ miles, carrying native copper in schist, also covellite, bornite and chalcopyrite, of 9% average copper tenor, with $4.75 gold per ton.
Development: by shafts of 45′, 34′ and 80′, and by 6 tunnels, of 30 to 0′ length, with 969′ of workings, estimated by company to show 600,000 tons of ore, with 115,000 tons blocked out for stoping, which figures are regarded as excessive. Closed down, 1918.

COLUMBIA GOLD MINING CO. **OREGON**

Operated the Columbia gold mine, near Sumpter. Company sold its entire [illegible] 1917. Fully described in Min. Resources of Oregon, Vol. 2, No. 4.

[illegible] MINING CO. **OREGON**

[illegible] Chamber of Commerce Bldg., Portland, Ore.

Cap., $1,750,000; $1 par; 1,666,000 issued.

Property: the Rainbow mine covering the Rainbow vein, a brecciated zone, 5'-50' wide, made of rock fragments cemented by quartz.

Development: by 400' shaft with 1,700' of drifting on vein on 200' level

Equipment: 15-stamp mill, with tube mill, Dorr classifier and thickener etc. The mill is reported to make a recovery of 95%. (See Min. Resources of Oregon, December, 1916, Vol. 2, No. 4, p. 66.)

Production: previous to 1911, the mine produced $242,000. During 32 months ending December 1, 1915, the U. S. Sm. M. & R. Co. extracted 9547 tons of ore averaging $12 per ton and representing $1,083,360 in bullion.

CONTINENTAL MINING CO. OREGON

W. W. Robbins, pres.; E. J. River, sec.-treas., 1308 Sixteenth St., Spokane, Wash.

Property: 23 miles from Sumpter, Baker county, said to show a vein 18-36" wide with 4-16" of high-grade gold-silver ore.

Developed to depth of 400'. A 20-ton flotation plant was erected in 1916

COPPER DYKE MINING CO. OREGON

Office: Homestead, Ore.

Officers: Wm. S. Kuhn, pres., Amer. Nat'l Bank Bldg., San Francisco, Cal.; A. S. Humphreys, sec.-treas. Herbert Stone, mgr.

Inc. Oct. 13, 1917, in Washington. **Cap.**, $100,000; par 10c; none issued.

Property: Macdougal group, 80 claims, 19 patented, 1,600 acres on Snake river, 5 miles N. of Homestead, Baker county, said to show a fissure vein in porphyry, with strike N. 20° W., dip 75° E., containing copper, silver and some gold. Copper occurs as chalcocite and bornite. Mill ore runs 3 to 6% copper, shipping ore 20 to 50% copper.

Development: by 200' incline shaft and 6 tunnels having a total length of 3,340'. **Equipment:** includes steam power, air compressor, etc.

Geology fully described in Min. Res. of Oregon, Vol. 2, No. 4, p. 146.

COPPER KING MINING CO. OREGON

H. W. Webber, mgr., Placer, Ore.

Property: 8 claims, near Placer, Josephine county, reported under development, 1918-19.

CORNUCOPIA MINES CO. OREGON

Officers: Robt. M. Betts, pres.-mgr., Cornucopia, Ore.; J. P. Wald v. p.; W. H. Richardson, sec.-supt.; Jos. B. Thomas, treas., 132 E. 19th St. New York City.

Cap., $1,000,000; $10 par; all outstanding.

Property: the Union-Companion mine at Cornucopia, Baker county, Ore., 25 miles from a railroad. Gold was discovered in this district in 1880 and in 1895 the Union-Companion claims, although but slightly developed, were sold for $60,000, and a 20-stamp mill built.

The vein is said to be traceable on surface for 6,800' with strike of N. E., dip of 45° W., and 2-5' wide, maximum width 20'. Wall rock is granodiorite and schist. Vein material is massive white quartz containing 3 to 5% of pyrite which carries the gold. There is some silver sulphide present, also appreciable quantities of chalcopyrite, arsenopyrite and blende. Ore ranges in value from $10 to $20 per ton. Company also owns the Last Chance mine at Cornucopia, formerly operated under lease by the Baker Mines Co.

Development: by incline shafts, with the 800' the lowest level, said to show 4 ore-shoots having an average width of 3' and an aggregate length of 1,200'.

Mill: 20 stamps, weight 850-lb. each, making 98 drops per minute through 7". Ore is crushed in a 4-lb. KCN solution. Stamp duty is 4½ tons per stamp. Fine grinding is done in two 5'x22' tube mills, each driven by a 75-h. p. motor. The cyanide plant is equipped with Dorr thickeners, 3 Pachuca tanks, and 2 continuous revolving drum filters. An extraction of 87 to 89% of gold and silver is obtained. Average consumption of supplies per ton of ore is cyanide, 1.4 lbs.; lime, 3 lbs.; zinc dust, 0.9 lb. Power is furnished by the company's hydro-electric plant, 2 miles from the plant. Current is trans-

at 6,600 volts and transformed to 2,200 volts for use. Cost of treatment is said to be $2 per ton. Production estimated at $1,000,000 in gold annually up to time of the war. Operations have since been curtailed. See Min. Res. of Oregon, Vol. II, No. 4, p. 74. Company is reported to be doing extensive experimental work on its low grade ores with the object of building a new and large mill if tests are successful.

DOROTHEA GOLD MINES CO. **OREGON**

Address: 122 Oregon Terrace, Medford, Ore.; and J. F. Reddy, Grants Pass, Ore.

Officers: J. F. Reddy, pres.; Lincoln McCormick, sec.; Mary F. Reddy, treas.

Inc. 1916, in Oregon. **Cap.,** $50,000; $1 par; all issued.

Property: 200 acres, 120 patented, on Coyote creek, Josephine county, Ore.

Claims show a contact deposit between serpentine and diorite; the mineralized zone is 2 to 12′ wide dipping 20°, with N.-S. course, the ore containing 30% chromic oxide. Ore shoot is said to be 200′ long and 5′ wide, and to average $5 per ton.

Development: by 500′ crosscut tunnel and 300′ drift on vein, workings amounting to 1,000′ to depth of 170′. Reserves given by company as 8,000 to 10,000 tons.

Equipment: includes a 5-stamp mill and concentrator, expected to make a 65% concentrate. Concentration of low-grade chrome ores is increasing, as less than 40% grade has a narrow market.

ELDORADO COPPER MINING CO. **OREGON**

Address: Andrew Laidlaw, Columbia Bldg., Spokane, Wash.

Incorporators: Andrew Laidlaw, S. W. Miller, C. P. Ritter, F. W. Beyer and Henry Banfield.

Inc. 1916, in Washington. **Cap.,** $2.000.000; $1 par. Company organized to take over the Banfield mine, 32 miles east of Riddle, Ore., on the S. P. railway. The price is said to have been $300,000, partly in stock.

Property: 9 claims, formerly owned by the Douglas-Umpqua Mng. Co., said to show nine veins, 3 of which have been developed. Ore estimated to average 4% copper with slight gold and silver values.

Development: by 6 tunnels, lowest 900′ below surface, with about one mile of workings, estimated by management to block out 300,000 tons of ore. This is an old mine which has been under development for 16 years.

EMPIRE GOLD DREDGING & MINING CO. **OREGON**

Office: 250½ Third St., Portland, Ore.

Officers: W. F. Burrell, pres.-mgr.; O. L. Kennedy, sec.-treas.; Chas. H. Timms, supt.

Cap., $100,000; $100 par; $72,000 issued.

Incorporated to rework placer ground in John Day Valley and Canyon Creek, Grant county, credited with past production of $15,000,000 in gold.

Equipment: 6 cu. ft. bucket dredge.

EQUITY COPPER & GOLD MINING CO. **OREGON**

Mine P. O.: Prairie City, Ore.

Officers: Rev. W. J. Hughes, pres.-treas.-gen. mgr.; C F. Godwin, v. p.; Mrs. Kate Palmer, sec., with E. T. Johns, E. J. Hughes, August J. Smith and H. J. Smith, directors.

Inc. 1901, in Oregon. **Cap.,** $150.000; 10c par. Paid one dividend of $3.000.

Property: 6 claims, unpatented, 88½ acres, with a 5-acre millsite in the Quartzburg district, 7 miles N. of Prairie City, Grant county. Reported to show several veins, 3 of which are developed by tunnels and are traceable ½ mile. The sulphide ore is estimated by company to average 1.5 to 3% copper with lead, zinc and silver values.

Development: by 3,000′ of tunnels to depth of 375′. **Equipment:** includes 5-stamp amalgamating and concentrating mill, crusher, tables and 3 slime tables.

Total output to date $125,000. Mine worked in a small way by lessees from 1903-1914. Greater depth and more adequate equipment necessary.

EUREKA MINING, SMELTING & POWER CO. OREGON

Idle. P. O. Box 63, Clarkston, Wash. W. E. Howard, sec.

Property: 40 claims, patented, at Imnaha, Wallowa county, Ore. Secretary reports, property idle for many years, awaiting railway facilities.

FLAGSTAFF MINE OREGON

J. H. Sullivan, supt., Baker, Ore.

Property: in Virtue district, 6 miles N. E. of Baker, Baker county. Ore occurs in quartz fissure veins, with values in small high-grade shoots. The main or Big Ledge vein, 5-8′ wide, runs N. 15° W. with dip of 60° E. and is said to average $16 per ton in gold.

Development: 5,000′ of workings with 760′ three-compartment shaft.

Equipment: 20-stamp mill, cyanide plant, steam power.

Property controlled in Boston, operated intermittently by lessees.

FREELAND CONS. MINING CO. OREGON

Dissolved, March 25, 1914.

Property now owned by Cons. Copper Mng. & Power Co., which see. Fully described in Vol. XII.

GIRAFFE MNG. & MLG. CO. OREGON

Officers: at last accounts, G. Cartright, pres.; A. O. Weatherman, sec. Grace Nichols, treas.

Cap., $150,000; $1 par; 75,000 issued.

Property: 7 gold claims in Mormon Basin, Baker county, said to show ore occurring in a narrow mineralized porphyry dike cutting argillite, with intrusive bodies of serpentine and dikes of basalt. At 85′ depth, gold bearing ore assaying about $4 per ton was reported cut.

Development: by shaft and tunnel.

GOLCONDA MINE OREGON

R. J. Rowan, lessee.

Property: 2 chrome claims, 6 miles N. E. of Takilma, Josephine county.

Ore: occurs in lens shaped masses in serpentine, 33′ thick with N. 15° E. course and dip of 65° E. As usual, with chrome deposits, they are irregular in shape and variable in quantity, but geologic conditions are considered favorable.

In 1918, property was equipped for extensive development, and a production of 5,000 tons of concentrates annually was contracted for with the Atlantic Ore & Alloys Co. of Philadelphia.

Production: 2,000 tons of ore averaging 40% chrome oxide in 1916. In 1918 shipments amounted to 450 tons in May; 1,035 tons in June, and 1,500 tons in July.

GOLD BAR MINE OREGON

Property: placer claims in the Agness district, Illahe, Curry county. Worked intermittently since 1856, but regularly only since 1911. Reported sold 1918, to Seattle, Wash. people, who are said to be operating 3 giants and a steam shovel. Bedrock is black shale; gravel is 9′ thick with 4′ of overburden. Yields have been fair. Property has plenty of water for washing.

GOLD CREEK MINING & MILLING CO. OREGON

Address: Salem, Ore.

Officers: Otto Hansen, pres.; W. I. Staley, sec.-treas.

Cap., 3,500,000 shares; $1 par.

Property: 17 claims, 16 miles N. E. of Gates, on S. P. R. R., N. Santiam district, Marion county, said to show massive pyrite, chalcopyrite, galena, sphalerite, in a vein in andesite.

Development: 1,500′ crosscut tunnel and 1,000′ of drifting on orebodies.

GOLDEN CHARIOT MINING & MILLING CO. OREGON

Address: Sumpter, Ore.

Officers: Chas. Wiedemann, pres.; O. E. Conner, Jr., mgr.: Rose Reimkamp, sec.

Inc. in Oregon. **Cap.,** $350,000; $1 par.

Property: 400 acres at 4,500′ elevation, 2½ miles from Sumpter

o show a fissure vein in limestone. The gold-bearing ore is reported to in shoots, 6′ wide on the 210′ level.
evelopment: to 300′ by vertical shaft, to be sunk another 200′. Core g to 500′ below 210 level; winze below reported in free milling ore.
quipment: includes 50-h. p. friction hoist, steam-driven compressor, umps. A 50-ton mill is to be installed in 1920.

DEN EAGLE MINING CO. **OREGON**
ffice: The Dalles, Ore., J. S. Fish, pres.; J. C. Hostetler, sec.-treas.
ap., $441,000; $1 par.
roperty: 8 claims in Greenhorn district, Baker county, Ore. Past :tion, $75,000. Claims said to show a number of non-persistent fissures; hree of them ore-bearing. No. 2 vein has been followed to depth of 200′, esides free gold, the ore contains some galena and copper.
evelopment: by tunnels aggregating 2,600′, to depth of 175′; also 75′ below lowest tunnel. Work to be resumed in 1920.

DEN GATE MINING CO. **OREGON**
ffice: 145½ S. Main St., Marion, Ohio.
fficers: M. F. Douce, pres.; J. F. Lust, treas., both of Marion, Ohio; Bender, sec., Greenhorn, Ore.
ap., $1,500,000; shares $1 par; 135,000 shares issued.
roperty: 2 miles N. of Greenhorn, Grant county, Ore., said to show rtz vein in greenstone, pinching and widening to 48 inches.
evelopment: 2 tunnels on vein; upper 800′ long, lower with other ngs, 2,400′. Best ore found near mouth of lower tunnel. Two shoots o be 225′ and 60′ long with maximum width of 20″; a third is 200′ long p to 42″ wide. Ten stamps crushed ore in 1915, but operations were itable, and in 1917 mine was closed down and equipment sold.

DEN RULE CONSOLIDATED M. & M. CO. **OREGON**
ffice: Salem, Ore.; C. L. Johnson, sec. **Cap.,** $500,000; shares 5c par.
roperty: 26 claims, 15 miles S. E. of Disston, Bohemia district, Lane . Ore. Idle.

DEN STANDARD MINING CO. **OREGON**
ormer office: 308 Commercial Block, Portland, Ore.
fficers: at last accounts, K. K. Kubli, pres.; E. B. Wilson, sec.; E. J. treas.
ap., $100,000; $1 par.
roperty: 82 acres (known as the Kubli) in Gallo Creek district, Jack- unty, said to show a 1 to 18″ quartz vein opened for 200′, carrying rich

quipment: 2 -stamp mill and concentrator. Idle.

D HILL MANGANESE CO. **OREGON**
ddress: Grants Pass, Ore.
ic. 1918. **Cap.,** $1,000,000.
roperty: 4 claims, on Shan creek, 6 miles from Rogue river, Josephine . Ore: gold-bearing quartz said to run 24-44% manganese. To be de- d and equipped with stamp-mill, etc.

D HILL QUARTZ MINING CO. **OREGON**
ffice: Medford, Ore.
fficers: C. R. Ray, pres.-treas.; E. W. Liljegran, sec., at last report.
ap., $60,000; $100 par.
roperty: some claims, 2 miles S. E. of Gold Hill, Jackson county, Ore. has been done, save assessment work.

D & PLATINUM MINES CO. **OREGON**
ffice: Grants Pass, Ore. I. F. Peck, pres.
ic. 1916. **Cap.,** $1,000,000; $1 par.
roperty: 1,280 acres of placer claims on Cave creek, Josephine county, ich dam, flume, sluice-boxes, etc., have been constructed.

D STANDARD MINING CO. **OREGON**
ffice: Ashland, Ore.
fficers: P. S. Casey, pres.; F. G. McWilliams, sec., at last report.

Cap., $82,000; par $1.

Property: 30 acres, 2½
Vein supposed to be extensi

GREENBACK GOLD M

Address: Placer, Jose
by R. C. Robinson, Parish,
H. L. Holmes of Geneva, N.

Property: 1½ miles N.
railroad), in Greenback distr
in greenstone, cut off by s
assaying $8 per ton in upper

Development: since 1
Above No. 9 most of the o
No. 9.

Equipment: largest pl
(motor driven), 3 crushers,
and compressor.

Developing at last acco

GREYBACK COPPER M

Address: Selma, Ore.

Property: 20 claims, 1
sephine county, Ore., purcha
tractors of California and O

Development: 700' of
large copper deposit.

JOHN HAMPSHIRE CO

Address: John Hamps
Inc. 1918. Succeeds th
of the Waldo Sm. & Ref. Co

Property: Queen of
Waldo district, Josephine c
Oregon, Bull. 2, No. 4, 1916,

Equipment: includes s
and 50-ton Waldo mill. Bot

HECLA CONS. MINING

Former office: Baker,

Officers: J. L. Rand, pr

Cap., $1,000,000; par $1

Property: 11 claims, al

Ore: chiefly galena an
lenticular bodies less than
occasional copper staining al

HEPPNER MINING CO

Office: Heppner, Ore.
S. A. Wright, treas.

Cap., $1,000,000; 10c pa

Property: 13 claims, i
18 miles from Austin, the r
quartz veins from 1-20' wid
surface. No recent returns.

HIDDEN TREASURE G

Known locally as 'I. X.

Officers: F. T. Kelly, p

Cap., $1,250,000; $1 par

Property: 11 claims, n
3 veins carrying gold ore. I

HIGHLAND MINE

Address: Baker, O
Formerly owned

Co.; latter company dissolved January, 1917. Mine sold to National Mines
1 February, 1920.
roperty: 6 claims, in Rock Creek district, Baker county, Ore., 14
from Haines, the shipping point. Claims show 4 ore shoots carrying lead-
-gold values.
Development: by 6 tunnels with about 5,000′ of work.
Equipment: 100-ton mill, including flotation plant, in which average
ery has been 2 oz. silver and 0.25 oz. gold per ton. Tailings reported
ntain $1.80 to $2.20 per ton in gold and silver.
roduction: from 1905 to Apr., 1914, was 6,322 tons of ore and concen-
, yielding $311,552. Reported shipping ore and concentrates in 1920.

IESTEAD-IRON DYKE MINES CO., INC. **OREGON**

. R. Buchanan, gen. mgr., care of Goodrich, Lockhart Co., No. 60 Broad-
New York. D. M. Goodrich, pres.; Chas. C. Goodrich, sec.-treas.
Cap., 1,000 shares, all issued.
Operates property of Iron Dyke Copper Co., which see.
Production about 50 tons per day in 1919, producing 1,000 tons of concen-
a month.

IRO SIXES MINES CO. **OREGON**

Office: 57 Post St., San Francisco, Cal.
Officers: W. J. Bell, pres.; G. W. Root, sec.; C. J. Pease, treas.
Cap., $70,000; $1 par; all issued.
Property: 1,200 acres placer ground between Otter and Elephant Rock
c. just below the forks of Sixes River, Curry county. Company uses water
: 150′ head, from Big Otter Creek.
Employed 50 men at last accounts. Company spent $100,000 improving and
ping property.

K MINE **OREGON**

Address: Sumpter, Ore.
Property: near Granite Creek, Cracker Creek district, Baker county, 8
N. W. of Sumpter, Ore.
Development: the work done in the past 15 years consists of about
of tunnels, etc., with 3,000′ of it on the gold bearing vein. The vein
ges 5′ in width, but has a maximum of 25′. It occurs entirely in argillite,
ins sulphides, and is generally low-grade.

AHA MINE **OREGON**

Address: S. L. Winchester, Imnaha mine, Joseph, Wallowa county, Ore.
Property: 25 miles N. of Homestead and 40 miles E. of Joseph, the
ad terminus.
Development: 4,000′ of tunnels, etc. Vein said to be 3½′ wide. Re-
s estimated at 50,000 tons of gold ore.
Equipment: 10-ton mill driven by water-power. No recent returns.

ERIAL EAGLE MINING CO. **OREGON**

Address: 9 E. 5th St., Covington, Ky. **Mine office:** Sumpter, Ore.
Officers: C. L. Arzeno, pres.-mgr.; Fred A. Salmer, v. p.; Alvin David-
sec.-treas., with B. Moeller, Chas. J. Summers, Frank C. Marty and John
so, directors. John S. Schmidt, supt.
Inc. May 8, 1919, in Oregon, to take over the holdings of the Blue
tain Mining Co. and the Imperial Mining Co. **Cap.**, $500,000; 2,000
fd. shares, par $100 and 300,000 com. shares, par $1; subscribed for, $460,000;
ly issued (July, 1919) $99,200. Company reports $40,000 in treasury.
al meeting, second Tuesday in March.
Property: 23 patented claims, 25 acres, in Cable Cove district, Baker
, 10½ miles N. W. of Sumpter.
Ore: occurs in fissure veins in diorite, running E.-W. and dipping in
ite directions. Values are mainly gold, silver, and lead, with a little
r and zinc. Mill ore said to average $5.30, and shipping ore $30 to $40
n. Reserves were estimated by management at 67,364 tons opened up,
d at $670,000.
Development: by 16 tunnels to depth of 690′.

Equipment: amalgamating-concentrating mill of 125 tons daily cap steam power, 6-drill compressor being installed.

Production: steady shipments have been made for several years roads are poor, hampering operations. Company will eventually absorb the Mountain M. Co.

IMPERIAL MINING CO. ORE

Described in Volume XIII. Reorganized 1919, as Imperial Eagle M Co., which see.

IRON DYKE COPPER CO. ORE

Office: Homestead, Baker county, Ore.

Officers: F. F. Curtze, pres.; F. A. Brevelier, sec.; A. A. Claus, t J. R. Buchanan, mgr.

Inc. in Pennsylvania. **Cap.**, $500,000; par $1; 380,000 issued. Erie Co. holds title by trust deed and bond. Worked by Homestead-Iron Mines Co., Inc., a Goodrich-Lockhardt subsidiary.

Property: a copper deposit discovered 1897, about 2,000′ from rail at Homestead. Lower tunnel, 300′ above town, is about 1,300′ long, c the orebody at 800′ in and connected by raise with 3 tunnels above. The has several thousand feet of workings. The lower tunnel shows massive copyrite and pyrite ore about 6′ wide, said to extend upward to the upper t Ore said to contain $2 to $3 gold, 3 oz. silver and 4% copper per ton. Res said to be proven by diamond drilling, are estimated to amount to 500,00 of a gross value of $10,000,000.

Reopened 1915, after years of idleness, and is largest copper produc the State. A wide body of 4% ore, with good precious metal content, was c at a depth of 850′.

A 125-ton concentrating plant commenced work in September, 1916, flotation as part of the process with a 93% recovery claimed. Concen aggregate about 1,000 tons a month, and are hauled by team, as R. R. burned out in 1918, has not been reopened. About 90 men employed.

Mine is a steady producer and apparently has promising future.

KOEHLER MINE ORE

Address: A. Koehler, Baker, Ore.

Property: in the Virtue district, 4½ miles from Baker, was a pr of high-grade antimony ore in 1915. Has a well-defined vein, up to width, carrying massive and disseminated stibnite, together with gold valu

Output to date is said to be $15,000, and mine still contains considerabl

LAST CHANCE MINE ORE

Owned by Cornucopia Mines Co., which see.

LEWIS & CLARK M. & M. CO. ORE

Officers: Dr. F. M. Brooks, pres., Oregonian Bldg., Portland Thos. Skaife, sec.; M. Palmer, treas.

Cap., $100,000; shares 10c par; 710,000 issued.

Property: 5 claims in North Santiam district, Marion county, a miles N. E. of Gates, on a branch of the S. R. Ry. Developed by tunnel show veins 1-5′ wide in andesite. Ore contains copper and iron sulphide and silver in zinc.

Working on a small scale.

LINCOLN MINES CO. ORE

Office: Albany, Ore.

Officers: A. M. Hammer, pres.; J. D. McLain, sec.; J. Mc treas., all of Albany.

Cap., $250,000; $25 par; all issued. Is the successor of the Alba & M. Co.

Property: 8 claims, known as the Albany mine, in Quartzville Linn county, about 23 miles from Gates. **Ore:** lead-zinc sulphide gold values occur near the surface in veins in andesite. Veins are shear zones up to 50′ wide with lenses of sulphides on the foot or hang and distributed through the zone.

ɛN LAKE GOLD MNG. CO. **OREGON**
ficers: F. W. Thomas, pres, Fargo, N. D.; C. I. Flynn, sec.
ip., $500,000; $10 par; all issued.
operty: 4 quartz claims and the McNamee placer about 6 miles from on the Sumpter Valley railroad, in Greenhorn mining district, Baker Ore.
velopment: by 120′ shaft, under water below 10′ from surface.

Y BART GROUP **OREGON**
H. Beeman, Gold Hill, Jackson county, Ore., owner and mgr.
operty: 11 claims, partly patented, 220 acres in Sardina mining dis- ear Gold Hill, said to carry veins averaging 2′ in width. Ore is free , running from $5-$100 and said to average $50 per ton. Developed by unnel to depth of 190′.
uipment: includes 40-h. p. steam plant, 10-stamp concentrating mill. trates said to average from 3-5 oz. gold and silver. Mine has been oper- ore or less regularly for many years.

ANESE METALS CO. **OREGON**
c. October, 1917.
operty: Tywell mine on Tywell ranch, 5 miles S. W. of Lake creek, 1 county.
ploratory work reported to have exposed a face of ore averaging 20% nese for 10′ in height and 150′ in length. **Ore:** occurs as pyrolusite ilomelane disseminated through a bed of volcanic tuff breccia from hick, lying between flows of basalt.
uipment: includes 20-ton concentrating mill, concentrates produced average 45% Mn. The shipping point is Eagle Point, 17 miles distant. rly in 1918 Victor Rakowsky took a lease on the Tywell and adjoining ts, but extensive churn-drilling failed to prove sufficient ore of commercial o warrant erection of the proposed 500-ton mill.

JTAIN GEM MINING & DEVELOPMENT CO. **OREGON**
dress: Joseph, Ore.
ficers: Harry Dawson, pres.; T. F. Tomkins, sec.-treas.
p., $200,000; 10c par; $124,211 issued.
operty: the Gem mine, 11 claims in Wallowa district, 10 miles from Wallowa county.
ology: ore occurs in a contact zone between grano-diorite and lime- ith calcareous schists, the values being in pyrite, chalcopyrite and molyb-

velopment: by crosscut tunnel. Output in 1915 was 14 tons of $30

ELDORADO MINING & REDUCTION CO. **OREGON**
ice: Austin, Ore.
ficers: E. B. Reed, pres.; E. H. Saxe, sec.-treas.
p., $100,000; $1 par; 1,750 issued.
operty: known as the Pioneer, on the south slope of Greenhorn New Eldorado district, Grant county, said to show granodiorite cut by grained dikes of grano-diorite porphyry. The altered zone carries veins h quartz from a few inches to 5′ wide, containing gold, a little antimony, and low silver-gold values.

H FAIRVIEW MINING CO. **OREGON**
dress: Herbert Leigh, 38 E. 6th St., Eugene, Ore.
ficers: G. W. McQueen, pres.; Herbert Leigh, sec.; Darwin Bristow,

p., $300,000; par 10c; all issued.
operty: 15 claims N. of Fairview mountain, ½ mile from Bohemia, unty.
ology: a mineralized fracture zone in andesite, 12′ wide, said to have for over a mile.
velopment: 2 tunnels, one 300′ long, 100′ below outcrop; the other epth of 450′. No recent returns.

OAK MINE OREG

Address: G. A. Baker and Geo. Buell, owners, Grants Pass, Josep county, Ore.

Mine is 6 miles E. of Hugo, in Grants Pass district, Josephine co **Ore:** main vein is gold-bearing; also several small copper veins.

Development: by tunnel with total of 800' of workings. Equipped 20-h. p. gas engine and compressor.

OGLE MOUNTAIN MINING CO. OREG

Office: 1003 Main St., Oregon City, Ore.

Officers: J. B. Fairelough, pres.; W. J. Wilson, sec.-treas.

Cap., $1,000,000; $1 par; all issued.

Property: 22 claims, 14 miles from Gates on the S. P. R'y, in the Creek mining district, Clackamas county.

Ore: low-grade ore which occurs in a well-defined fissure vein ab in width. The average value is $5 per ton.

Development: by 1,460' tunnel driven 560' below the two old tu cut the downward extension of the vein. Several small veins have be but contain only very low-grade ore.

Company lost money building a mill which proved a failure, and ha done very little work.

OLD GLORY GOLD MINING CO. OREG

William Stock, sec.-treas., Grants Pass, Ore.

Cap., $1,000,000; shares $1 par; 604,200 issued.

Property: the Old Glory mine, 4 lode and 2 placer claims, on creek in western Josephine county, said to show a large lode of l copper ore carrying gold and silver values. Property was to be equipp machinery, but the death of the president delayed financing and develop been retarded.

OLIVE CREEK MINING CO. ORE

Idle. **Office:** Baker, Ore.

Officers: Thos. M. Tobin, pres., 9332 So. Chicago Ave., Chica S. A. Tobin, sec.; A. J. Weckler, treas.

Cap., $1,000,000; $1 par; all issued.

Owns the Olive Creek and Quartz gulch placers in Greenhorn mining Grant county, Ore.

OPHIR MAYFLOWER MINE ORE

Idle. **Address:** A. J. Champion, Howard, Ore.

Property: 8 miles from Howard, in Ochoco district, Crook county 41 miles from railroad at Redmond.

Geology: the rocks are andesite, occurring as flows interbedde tuffs and breccias. Mineralization is in wide fracture zones of altered r

Development: by 1,400' crosscut tunnel, and one 200' above. follow the fracture zones. Ore is 1 to 6' wide and 70' long; shipments $70 gold. A second shoot, 20' long and 4' wide, averaged $125 per t values in the lower tunnel only carry about $3 per ton.

Equipment: includes a small amalgamating-concentrating st

OPP MINE ORE

Address: J. W. Opp, Jacksonville, Ore.

Property: 373 acres, situated 1½ miles W. of Jacksonville, J county, Ore.

Geology: three main veins from 2 to 4' wide, occur in shale site. Two ore shoots, one 300', the other 150' long, carry free gold the ore averaging $5 per ton.

Development: by 18 adits, with 7,000' of workings. One cross another 550' long.

Equipment: 3,600' tram, 6-drill compressor, 20-stamp mill. 12 , etc., credited with past production of $100,000.

GOLD MINES CO. OR

1208 W. Monroe St., Chicago, Ill

. in Arizona. **Cap.**, $2,000,000; $1 par; 1,657,436 issued. Is a re-
ition of the American Gold Fields Co.
perty: the Granite Hill mine, 9 miles N. E. of Grants Pass, Jo-
county, active from 1902 to 1907 and credited with a production of $75,000.
:: quartz carrying chalcopyrite, galena and pyrite with gold values,
n veins in tonalite and greenstone. Main vein said to average 5′ in
id ore treated in 1907 averaged $5 per ton.
elopment: by 430′ vertical shaft with total of 12,000′ of workings,
ler water.
ipment: includes 20-stamp mill, compressor, steam hoist, 5 machine
d 150-h. p. electric motor. Idle since 1907.

)N-IDAHO INVESTMENT CO. **OREGON**

er, Baker county, Ore.
cers: Jas. A. Howard, pres.; John Arthur, v. p.; Fred R. Mellis,
s.
., $50,000; par $100. Is a close corporation organized as a develop-
holding company. Operates a sampling plant at Baker.
perty: includes the Poorman group, 8 claims, 160 acres, surveyed
it, on Balm Creek, 25 miles N. E. of Baker. The group shows a copper-
vein for 2,000′ that has a gossan cap 200′ wide in places.
elopment: by an 800′ tunnel with several short crosscuts at depth
showing 2.5 to 3.5% copper, present as chalcopyrite.
a lease and bond on the Taber Fraction and has use of the Bourne
ig. company's tunnels to operate the mine.
)tation plant is to be erected in 1920.

CREEK CONS. MINING CO. **OREGON**

ce: 1st Nat'l Bank Bldg., Grants Pass, Ore. **Officers:** Chas. Burk-
res.-treas.; A. H. Gunnell, sec.
., $250,000; $1 par; all issued.
perty: the Jewell & Moore group of 5 placer claims, 3 patented, also
)nal unpatented claims and 92 acres of dump ground, 2 miles E. of
and 10 miles S. of Grants Pass, Josephine county. Credited with past
)n of $40,000.
ipment: includes 3 miles of ditches and 300′ flume line.

C MOLYBDENUM MINES, INC. **OREGON**

ress: J. B. Philips, mgr., Greenhorn, Baker county. Mine reported
an 8′ vein of molybdenum, running from 20 to 25%.
mill was to be equipped with a 1,000-ton oil flotation unit at last report.

MINING CO. **OREGON**

:e: Central Point, Ore.
:ers: W. C. Leever, pres.; J. W. Merritt, sec.-treas.
., $4,400; $20 par; all issued.
)erty: the Buzzard mine, 10 quartz claims, in Elk Creek mining
27 miles N. E. of Trail, Jackson county.
logy: ore deposit occurs in a N. W.-S. E. shear zone in andesite;
contains complex sulphides and is handjigged before shipment, 4 tons
$2,100.
elopment: by 1,600′ crosscut tunnel, total work 3,000′, to depth of
the vein. Mine worked under lease, by Paul Wright, of Trail, Ore., at
unts.

ER RIVER GOLD DREDGING CO. **OREGON**

:e: Insurance Exchange, California St., San Francisco, Cal. **Oper-**
ice: L. T. Roberts, supt., Sumpter, Ore.
:ers: W. P. Hammon, pres.; R. K. Barrows, v. p.; A. E. Boynton,
.; with A. L. Dahl and F. J. Mott, directors.
Oct. 18, 1911, in California. **Cap.**, $500,000; $1 par; all issued. An-
ting, fourth Monday in October.
earnings in 1918 were $237,603, of which $233,307 was from the gold
. Operating costs were $135,260; sundry expenses, depreciation, min-

eral depletion, $86,353; leaving $15,989 profit from operations in Oregon, compared with $314,990 for the previous year.

In 1919 the revenue was $232,839, of which $111,400 was profit. Cur assets exceed liabilities by $320,338.

Dividends: aggregate $1.50 per share, or $750,000 to Sept. 30, 1919

Property: about 1,500 acres placer ground, near Sumpter, Ore. of which is considered payable. The gravel channel is from 300 to 2,000' wi it will average 1,000' wide, 18 to 20' deep, and the pay gravel rests on a decomposed rock called "clay webfoot." Dredge digging may be termed to and as a result, the bucket-lips wear out in 5 months' use.

Equipment: consists of a dredge in Oregon that has yet from two three years' work. A boat in Colorado, after digging 864,375 yds. of 7.69 gravel in 1919, at a loss of 3.18 c., was sold to Benjamin Griffith for $16 plus $24,000 for supplies.

Production: from Oregon properties, yielded $2,600,000 to Septem 30, 1919. Results for the past two years, ending September 30, are:

Year	Yards	Yield per yd., c.	Cost per yd.,c.	Daily yardage	Da bo
1918-'19	1,805,582	12.90	6.73	4,960	
1917-18	1,783,180	13.06	7.97	4,885	

QUEEN OF BRONZE MINE OREG

Described in Volume XIII. Owned by John Hampshire Co., which see

QUEEN OF THE WEST MINES CO. OREG

Office: 209 Pillsbury Bldg., Minneapolis, Minn. **Mine office:** Co copia, Ore.

Officers: A. Y. Bayne, pres.; Lewis W. Campbell, sec.: H. U. Ma treas.; R. G. Amidon, mgr.

Inc. in West Virginia. **Cap.,** $1,000,000; $1 par; 993,466 outstanding

Property: 11 claims in the Cornucopia district, Baker county, de oped by tunnels and equipped with 10-stamp mill, concentrating plant, 50 cyanide plant, 3,600' aerial tramway, capacity 6 tons per hour, water power air compressor.

Geology described in Min. Res. of Oregon, 1916., Vol. 2, No. 4, p. 180

RAINBOW MINE OREG

See Commercial Mining Co.

RAINIER MERCURY CO. OREG

T. H. Ellis, pres.-mgr., Beagle, Ore.

Inc. 1918, and reorganized 1919 as War Eagle M. Co., which see.

RED BOY MINES CO. OREG

Stock worthless as property was sold for $34,500 at sheriff's sale in and bid in by bondholders.

Reorganized June, 1916, as Red Boy Mng. & Dev. Co., which see.

RED BOY MNG. & DEV. CO. OREG

Idle. **Address:** Fremont, Neb.

Officers: Ray Nye, pres.; L. A. Peckham, sec.; Paul Colson, treas

Inc. June, 1916. **Cap.,** $250,000; $1 par; all issued. Is a reorganiza of the Red Boy Mines Co.

Property: the Red Boy mine in Granite district, Grant county, ited with past production of $800,000. (The geology is fully described in Mi Resources of Oregon, Vol. 2, No. 4, pp. 188-191.)

RED, WHITE AND BLUE MINE OREG

Owned by Geo. H. Bodfish, Malheur, Oregon. Property at Malheur to show a quartz vein, 8 to 10" wide, carrying gold values that average $5 to per ton. Developed by 134' vertical shaft and equipped with steam hoist, and 6-stamp concentrating mill.

SAMPSON CO., LTD. OREG

Promoted 1910 by F. Wallace White, 115 Broadway, New York, who under indictment (since December, 1918) for misuse of the U. S. mails, dea

30,248 received from the sale of the valueless stock of

onds and $7,000,000 in stock.

that company owned the Cracker-Oregon and
e North Pole Columbia Lode, Baker county, which are
spects of doubtful value.

hite bought control of the practically defunct Sampson Gold
and later sold the property to the Sampson Co., Ltd., for
tock and a $100,000 cash compensation in the form of a promis-
he subsequently paid to himself out of the proceeds of stock
atedly organized companies with valueless or mythical holdings
to the Sampson Co., Ltd., for large sums, payable to himself
stock, thus keeping control of the Sampson Co.

ing to report, White is one of the most dangerous and brazen
of innocent investors" known, who worked his game openly and undis-
nder various names for eight years from a New York office. He is now
indictment and a fugitive from justice. The widely distributed stocks
onds are valueless.

NGER GOLD MINES CO. **OREGON**

Idle. **Office:** J. K. Romig, sec., Baker, Ore. F. W. Paine, pres., at last eport.

Inc. in Oregon. **Cap.,** $2,000,000; $1 par; 1,295,146 issued.

Property: 600 acres of quartz and placer claims on W. side of Eagle eek, in an area which has produced about $1,500,000, but where since 1900 ere has been little work done.

Geology: quartz veins in a black clay slate. Ore contains 3% sul-hides and is considered to be similar to many Californian gold quartz veins. wing to older slates being fractured, cut by dikes, etc., prospecting is difficult.

Development: by tunnels and an incline shaft 400′ deep. In upper orkings the vein shows ore 15″ wide, worth $20 to $25 per ton; in the lower, low the zone of oxidation, the ore is 24″ to 48″ wide, and assays $12 per ton. n 1916 several open cuts and short tunnels were driven to pick up the extension f the vein. Idle since that year.

ORTY HOPE M. & M. CO. **OREGON**

Address: H. S. Sanford, pres., Ashland, Ore.

Cap., $1,000,000; par $1; 784,498 issued.

Property: 4 miles up Wagner creek from Talent, in Ashland district, kson county.

Development: by 1,480′ tunnel. **Equipment:** 10-stamp mill driven by r power.

Work appears to have been spasmodic, but results were not without promise.

VER KING MINING CO. **OREGON**

Address: Albany, Ore., or J. J. Langmack, Gerlinger Bldg., Portland, on.

Officers: J. J. Langmack, pres.; E. E. Williams, v. p.; Wm. S. Risley, ec.-treas.

Inc. March, 1909. Reorganized and capital reduced under Oregon Blue ky Law, June, 1914. Present capital, $500,000; $1 par.

Property: 12 claims covering 4 veins on Little North Santiam river, ear Elkhorn, Oregon, in the Cascade Mts., 75 miles from Portland, and 17 iles from railroad. The veins occur in and follow shearing zones, and carry e with gold, silver, lead, and zinc.

Development: by 2 shafts, 2 prospect tunnels, and a number of open-ts on veins. The main working tunnel, over 100′ long, will be driven to the principal vein of the group at about 1,050′ from portal, at depth of over on vein below the prospect tunnels. Tunnel will drain mine and permit ore by gravity system. Average of samples from prospect tunnels silver, 15 oz.; lead, 3 to 4%; and zinc, 3 to 4%.

by the war is to be resumed.

SIXES MINING CO. **OREGON**

Offices: 741 West 3rd St., Salt Lake City, Utah, and 625 Market St., San Francisco, Cal.

Officers: L. R. Eccles, pres.; C. B. Edington, sec.; John Pingree, treas.; W. A. Bechtel, S. F. mining agent.

Inc. in Utah. **Cap.,** $1,125,000; $5 par; 157,900 issued; assessable. Assessment of 20c. per share levied March, 1918.

Property: an option on placer claims, 300 acres, owned by the Divelbiss family, on the Sixes River, Curry county, 11 miles from Port Orford. Ground contains considerable black sand which holds both gold and platinum, about 10% of the gravel value said to be in the platinum. Three distinct gravel channels are known, one of which is to be dredged, the others hydraulicked. For sluicing a 4½ mile flume is available.

SNOW CREEK MINING CO. **OREGON**

Officers: Henry B. Smith, pres., Bay City, Mich.; Fred D. Smith, v. p., Ithaca, N. Y.; C. H. McColloch, sec.; R. J. Davison, treas., with J. H. Bowlby, directors.

Inc. June 25, 1914. **Cap.,** $200,000; $1 par; outstanding, 132,000 shares.

Property: 5 claims, 85 acres, including the Snow Creek mine, formerly owned by Oregon Mines Exploration Co., near Greenhorn, Baker county. Ore carries gold, silver, lead in contact deposit, 3′ to 8′ wide; country rock is diorite and slate. Ore extracted in the past is said to have assayed $12 per ton in gold and silver and 5% lead.

Development: 225′ vertical shaft and tunnels, aggregating 1,315′. Claim 9,400 tons of ore blocked out.

Equipment: includes 10-stamp mill. Total output to date about $40,000.

Title was obtained by present company under foreclosure of mortgage. Plan sinking shaft 100′ deeper and developing.

SUMPTER GOLD DREDGING CO. **OREGON**

Address: Sumpter, Baker county, Ore.

In November, 1919, company purchased a boat from the Powder River Gold Dredging Co. for $160,000, arranged for electric power, and expected to start dredging in the spring of 1920.

TAKILMA SMELTING CO. **OREGON**

Office: 301 Mining Exchange Bldg., Colorado Springs, Colo.

Inc. in Colorado. **Cap.,** $250,000; $10 par. Owned a controlling interest in the Waldo Smelting & Mining Co. Fully described in Vol. XIII. Holdings sold to John Hampshire Co., which see.

THREELODES MINING CO. **OREGON**

Officers: C. E. Wickstrum, pres.; N. L. Townsend, sec., Medford, Ore.; George Lindley, treas.

Cap., $350,000; 35c par; all issued.

Property: 9 claims, and 9 others bonded, 2 miles W. of Gallice, Josephine county, said to have been exploited in recent years for tin, tungsten, molybdenum, and platinum.

TRI-STATE CHROME CO. **OREGON**

Controlled by Walter J. Nicholls, Sherwood Bldg., Spokane, Wash.

Acquired Jupiter mill between Canyon City and Prairie City, Grant county, early in 1918 and reported to have produced 8 tons of 40% chromium concentrate daily during part of the year.

TROUT CREEK M. & M. CO. **OREGON**

Office: Canyon City, Ore.

Officers: O. J. Darst, pres.; F. S. Slater, sec.-treas.

Cap., $100,000; $1 par; all issued and paid up.

Property: the Bullion Quartz mine near Burns, Harney district, said to show granite cut by large porphyry dikes. The ore carries gold, silver, lead and zinc.

Development: by tunnels and shaft. Shipments were made via Dayville way of Crane, 22 miles from the mine, in 1916.

UNITED COPPER CO. **OREGON**

Office: 95 Union St., Seattle, Wash.

Officers: S. S. Fluhart, pres.; B. E. Fluhart, sec., Leland, Ore.; R. N. Leezer, treas. **Cap.,** $1,000,000.

Property: the Copper King mine, 18 miles east of Leland, Greenback district, Jackson county, said to show a fissure vein in andesite. Ore contains chalcopyrite reported to average 4% copper. A concentration mill was erected in 1916, and work continued until war conditions stopped operations.

UNITED COPPER GOLD MINES CO. **OREGON**

Idle. **Office:** Murphy Blk., Salem, Ore. Mine at Selma, Ore.

Officers: W. S. Low, pres. and gen. mgr.; E. O. Moll, v. p.; Daniel Webster, sec.; C. E. Lebold, treas., with W. C. Buckner, James Greig and H. Neugabauer, directors.

Cap., $500,000; $1 par; issued 219,654.

Property: 11 claims, in Illinois district, about 12 miles N. W. of Selma, Josephine county.

Geology: ore occurs in serpentine near porphyry and diorite contacts. A dark gossan sometimes stained with copper is underlain at 15′ depth by ore carrying 18% copper and 5 to 10 oz. silver and upwards of $1 gold, according to management.

Development: amounts to 1,000′, with a 500′ tunnel and 200′ crosscut, exposing 1,000 tons of ore. Property is 34 miles from S. P. R. R. Is regarded as a prospect which might be worked on a large scale were railroad transportation nearer.

UNITED GOLD MINING CO. **OREGON**

Office: 505 Hyde Block, Spokane, Wash. A. B. Lee, pres

Inc. in Washington. **Cap.,** $1,000,000; $1 par; 568,050 issued.

Property: the Cougar mine, 3 miles N. of Granite, Grant county, formerly owned by the Cougar Gold M. & M. Co.; also the Independence mine, 17 miles from Sumpter, Baker county.

Geology: at Cougar mine country rock is a black, silicious, and semi-slaty argillite. Gold occurs in pyrite and ore is not easily amenable to treatment. Three shoots of ore have been exposed.

Development: at Independence, by tunnels. In November, 1919, a shoot had been opened for several hundred feet and the mill was treating 50 tons of ore daily.

UTAH QUICKSILVER CO. **OREGON**

Described in Volume XIII. Succeeded 1918, by Rainier Mercury Co., which was reorganized 1919, as War Eagle Mng. Co., which see.

VANGUARD GOLD-COPPER CO. **OREGON**

Probably dead. Mine near Kerby, Josephine county, Ore. C. E. Phillips, mgr.

Inc. 1910. **Cap.,** $1,000,000; shares $1 par.

Property: 7 miles W. of Kerby, said to carry gold-copper ore. Idle.

VESUVIUS MINES CO. **OREGON**

Office: Eugene, Ore. **Mine office:** Bohemia, Ore.

Officers: E. M. Johnson, pres.; F. J. Hard, sec.-treas.

Inc. in Oregon. **Cap.,** $6,000,000; $1 par; 2,000,000 shares in treasury March, 1919.

Property: 50 claims, including the Vesuvius mine, 15 miles S. E. of Disston, Bohemia district, Lane county.

Geology: andesite flows interbedded with andesite tuffs, traversed by a fracture zone in which the ore occurs. Gold, silver, galena, chalcopyrite, pyrite and sphalerite are the ore minerals.

Development: by 20,000′ of workings with 3 tunnels, the main one 2,000′ long, said to disclose 18″ to 36″ of ore which assays from $7.50 to $20.64 per ton.

Equipment: includes a 10-stamp mill with tables for treatment of gold ores, steam plant, saw mill, etc. Concentrating plant for copper bearing ores to be installed.

VINCENT CREEK GOLD & COPPER CO. **OREGON**

Probably dead. **Former address:** Austin, Grant county, Ore.

Officers: Burton Miller, pres.-gen. mgr.; Ernest Blackwell, v. p.; Nellie H. Miller, sec.-treas., and J. S. Edwards, directors.

Inc. Dec. 5, 1907, in Oregon. **Cap.,** $200,000; $1 par; issued 100,002 shares.

Property: 6 claims, 100 acres, in the Greenhorn district, 5 miles N. W. of Austin, on the S. V. R. R., shows a strong vein, traceable 1,500', said to average 15' in width and 3.5% copper. The country is greenstone and copper mineral chalcopyrite.

Development: by a 25' shaft and 215' tunnel being driven 600' with back of 400'. In February, 1916, a 20' vein of copper ore was opened in this tunnel. There are 3 buildings. Mine has no power equipment.

VIRTUE MINES DEVELOPMENT CO. **OREGON**

Address: Baker, Ore.

Officers: J. K. Romig, pres.; M. Boswell, sec.-treas., at last report.

Cap., $1,500,000; $1 par; 1,384,075 issued.

Property: bonded in 1916 to G. W. Field & Co., of Boston, for $500,000, consists of 16 claims and placer ground, a total of 400 acres in the Virtue district, Baker county. From 1878 to 1898 the gold yield was about $2,189,000, the largest production being $259,000 in 1898. Mine was idle for nearly 15 years, but in 1917 it was reported working and electric power was installed. In 1920 the mine was worked by lessees.

Claims said to show quartz veins in serpentine striking N. W., dipping 45° to 80° S. W. and averaging 14" in width. Ore carries gold and a little pyrite and chalcopyrite.

Equipment: includes hoist, boilers, 20 stamps, vanners, cyanide plant and electric power.

WALDO CORPORATION **OREGON**

Office: G. M. Esterly, mgr., Waldo, Ore.

Cap., $100,000; $100 par. Company has but two stockholders and no stock for sale.

Property: purchased 1916 for $140,000, includes the Cameron, Simmons and Logan placer mines covering 4,200 acres in Waldo district, Josephine county, which carries auriferous gravel 10' to 25' deep that lies on a bed rock of conglomerate and sandstone with some serpentine. Gravel worked thus far is reported to have yielded 12½c. per cu. yd.

Equipment: consists of 3 ditches, 25 m. in length, 6 giants and hydraulic plant.

Annual output averages $45,000 in gold dust and $10,000 in platinum. Considered a valuable property.

WALDO MINE **OREGON**

Described in Volume XIII. See John Hampshire Co.

WALDO SMELTING & REFINING CO. **OREGON**

Office: 301 Mining Exchange Bldg., Colorado Springs, Colo. **Mine office:** Takilma, Josephine county, Ore.

Inc. Dec. 3, 1901, in Colorado. **Cap.,** $3,000,000; par $100.

Property now owned by John Hampshire Co., which see.

WALLOWA COUNTY MINING & DEV. CO. **OREGON**

Address: J. A. Burleigh, Enterprise, Ore.

Officers: Jesse Walker, pres.; J. A. Burleigh, sec.; G. W. Williams, treas.

Cap., $200,000; $1 par; all issued.

Property: 14 claims, on Lick Creek, Wallowa county, said to show a vein in greenstone, limestone and argillite, cut by aplite dikes. **Development:** by 125' shaft.

WAR EAGLE MINING CO. **OREGON**

Address: Medford, Ore.

Inc. 1918, to acquire holdings of the Rain[illegible]

Officers: C. M. Kid, pres.; A. L. Hill, sec. and Edward Skewis, directors.

roperty: Bertleson group and 35 adjoining lode claims formerly owned e Utah Quicksilver Co., 12 miles N. of Gold Hill, Jackson county.
)re: occurs in an andesite fault breccia and is generally low grade. A ein was tapped in 1919, said to carry 3.5-4% cinnabar. **Equipment:** in- s 12-pipe furnace.
roduction: August 1, 1918, to Jan. 15, 1919, amounted to 17,425 lb. of . June, 1919, production was estimated at 100 lb. mercury per day. **Plan** ng 500-ton furnace.

T COAST MINES CO. **OREGON**

)fficers: W. J. Zimmerman, pres.; W. M. Cake, sec.; W. W. Elmer,

ap., $1,500,000; $1 par; 890,000 issued.
roperty: the Champion, Helena, and Musick mines, 47 claims, 12 miles of Disston, Bohemia district, Lane county. Mines under lease to Mahon, of Portland, at last accounts. The Champion is said to have d $1,700,000; the Helena, $150,000, and the Musick, $180.000.
)evelopment: by tunnels. In the Champion the main lode is 3' wide t 200' in depth and below, the principal ore minerals are pyrite, chal- ite, sphalerite, and galena. The other mines contain similar complex

quipment: includes 3,000' aerial tram, 20 stamps, concentrators and -electric power plant.

T SIDE GOLD & SILVER MINING CO. **OREGON**

ddress: R. Baird, sec. and mgr., Yamhill, Ore.
)fficers: J. A. Simmons, pres.; G. W. Perkins, v. p.; R. Baird, sec.; . Busbee, treas., with C. C. Laughlin, N. H. Perkins, H. C. Gist, ors.
nc. April, 1900, in Oregon. **Cap.,** 1,000,000 shares; 1c par; 814,307 out- ing. Annual meeting, first Monday in January.
roperty: 3 patented claims, about 57 acres, at Greenhorn, Baker and counties, under lease and bond to R. Baird, at last accounts. Min- are gold, silver, copper, lead. A number of veins cutting through stone and schist run at right angles, the N.-S. veins dipping E., and veins south.
lteration and faulting are considerable. Ores contain free gold sul- s in quartz and dolomite; cinnabar is also reported. Shipping ore is o average about $60 per ton and milling ore $20.
)evelopment: by several shallow shafts, comprises about 1,000' of work- greatest depth being about 40'.
quipment: includes a small steam pump. About $10,000 spent in de- **ment** to 1917. No recent returns.

TED MINING CO. **OREGON**

ddress: Aldred Whited, Unity, Ore.
nc. Nov., 1916, in Oregon. **Cap.,** $15,000; $1 par.
roperty: 8 claims situated 5½ miles south of Unity, Baker county. eins show shoots of gold-bearing quartz, the largest one along the g wall of a porphyry dike.
evelopment: includes 2 crosscut tunnels with drifts on the veins. ment: 10-stamp mill with amalgamating plates and Wilfley tables. developing late in 1916. No recent returns.

PENNSYLVANIA

RICAN ZINC & CHEMICAL CO. **PENNSYLVANIA**
bsidiary of American [illegible] Office: 61 Broadway, New

ap., $2,500,000.
Works: at Lanyelo[illegible] for treat-
of 7,000 to 8,000 [illegible] am of 3,000

to 4,000 tons of spelter. Company also owns a sulphuric acid plant with a capacity of 7,000 to 8,000 tons monthly. This property represents an investment of over $4,000,000, and may be divided into the following heads:

1. Zinc smelting plant. This consists of eight blocks of two furnaces each, each block containing 912 retorts, making a total capacity of 7,2 retorts. Each block is equipped with waste-heat boilers; the furnaces are fired by gas-producers, one producer to each block. The smelting plant has complete accessories, such as power-house, two steam-turbine generator units of 2,000-k. w. each, up-to-date machine-shop, carpenter-shop, and pottery plant.

2. Sulphuric-acid works. This department has a chamber-capacity from 8,000 to 8,500 tons of 60° B. acid monthly, and also has a contact plant for the conversion of about 3,500 tons of 60° acid into 66° acid. The raw material used in the manufacture of sulphuric acid is zinc-sulphide ore for the roasting of which four Hegeler kilns with necessary accessories are available. The kilns have a capacity of about 5,000 tons of ore monthly, which would correspond to approximately 5,000 tons of 60° acid. For the handling of the crude ore the works are equipped with modern drying and sampling plants, and storage-bins with a capacity of about 18,000 tons, with overhead cranes. The sulphuric acid plant is one of the most modern in the country, and can be expanded for the production of other acid-products whenever desired.

3. Coal mine. The company owns coal-mining rights over an area of 2,450 acres of the Pittsburgh and Rooster veins. It was estimated that there was a coal reserve in this tract of over 18,000,000 tons, from which only a little over 1,000,000 tons have been mined. Of the above acreage the company owns surface and mining rights on 723 acres and mining rights on the remainder. The mine is equipped to produce about 500 tons of coal monthly. The coal mine is subject to a mortgage of $476,0 against which there was on deposit with the Colonial Trust Co., of Pittsburgh, on December 31, 1918, a sinking-fund credit of $23,906.

4. The Langeloth Townsite Co. was incorporated for the purpose of taking over a block of real estate adjacent to the works of the American Zinc & Chemical Co., embracing about 400 acres, with the idea of developing it into a modern industrial town. The town-site has nearly 400 houses completed, some of which have been sold and others leased to the workmen on easy payments. Modern sewage, complete sanitary water-supply, first-class schools, and playgrounds have been provided.

5. For the convenience of the workmen, the company operates a general store under the name of the Langeloth Mercantile Co. The store building is owned by the American Zinc & Chemical Co., which leases it to the Mercantile Company. The latter sells from $300 to $400 worth of merchandise per day, on which it attempts to make profit only sufficient to cover operating expenses.

6. By-products plants. The company owns and operates:

(a) A zinc-oxide plant with a capacity of about 500 tons monthly.

(b) A zinc-dust plant which produces from 150 to 200 tons monthly.

(c) A zinc-sulphate plant which has been running only intermittently owing to lack of demand for this material.

AMERICAN VANADIUM CO. **PENNSYLVANIA**

Described in Volume XIII.

Merged 1919 into the Vanadium Co. of America, which see under Pennsylvania.

DONORA ZINC WORKS **PENNSYLVANIA**

Operated by the American Steel & Wire Co., a subsidiary of the United States Steel Corporation.

Works: at Donora, near Pittsburgh, Pa. Plant includes bins of 2,000-ton capacity, crushing plant for ore that requires reduction, 6 Hegeler hearth roasting furnaces, mixing house, 10 Hegeler furnaces each con-

912 distillation retorts, pottery, power plant, and sulphuric acid . Furnaces are fired by producer gas.

LE METALLIC COPPER CO. **PENNSYLVANIA**

nactive. **Address:** care H. D. Deshler, Belvedere, N. J. **Branch office:** Haas Bldg., Allentown, Pa. **Mine office:** R. F. D. 3, Fairfield, Adams ty, Pa.

Officers: at last accounts, F. H. Cuyle, pres.; Dr. P. A. Stem, v. p.; A. Fickert, sec.; Thos. Zellner treas.; Owen H. Nagle, gen. mgr., with A. iefenderfer, directors.

nc. 1903, in New Jersey. **Cap.**, $500,000; $1 par, and reinc. Dec. 9, in Pennsylvania; $150,000 in treasury after raising $60,000 to build a ter in 1911.

Property: 500 acres in Jacks Hollow, on the Maryland border, one-mile from and crossed by the Western Maryland railroad, near Char-

Development: by open-quarry work from pit 200' across, connected with ter by 750' aerial rope tram. The mine is apparently a large open-cut with water. Careful examination of exposed rock and surface ma- said to show no indication of copper whatever. It is also reported a pile of crushed ore in smelter bins, 1915, did not contain the minutest cle of mineral. Samples of matte from furnace said to run 2% cop- which evidently came from the pyrite used for flux.

Equipment: includes a 250-h. p. steam plant, 150-h. p. engine and a 2⅝" drill, with office and laboratory. Smelter built in 1911. Regarded as ueless property.

IONAL COPPER MNG. & DEVEL. CO. **PENNSYLVANIA**

Out of business. Property, described in Vol. XII, is now owned by . Deshler.

TED M., M. & COPPER SM. CO. **PENNSYLVANIA**

See description under Maryland.

GIN COPPER CO. **PENNSYLVANIA**

Last address: 12 West Bldg., York, Pa. **Mine office:** Charmian, Frank- ounty, Pa.

Officers: John H. Dechert, pres.; Chas. E. Wills, v. p.; Clarence A. , sec.; Harry S. Wiest treas.

Property: about 1 mile N. of Charmian, in the Blue Ridge mountains, the Maryland state line, shows ore carrying native copper, with silver gold values said to give assays of $25 to $600 per ton.

Development: by 215' shaft sunk at 47°. Four diamond drill-holes, of o 800', were bored, 1907.

Equipment: includes small hoist and compressor. Is considered an un- ising venture. Idle.

PHILIPPINE ISLANDS

See ASIA in this book.

PORTO RICO TERRITORY

See WEST INDIES in this book.

SOUTH CAROLINA

MINING CO. **SOUTH CAROLINA**

A. K. Blakeney, Kershaw, S. C., or J. H. Watkins, 200 Fifth

gold mine, near Kershaw, Kershaw county,
rs for its gold ores, and operated 1915-18

Geology: rocks of the region are sericite and quartz-schists, [illegible] from old volcanic tuffs and porphyry. Pyritization is widespread deep-seated, the whole series of schists being more or less impreg with pyrite, but along certain zones this mineralization is highly in fied, the schists in some bands holding so much pyrite that the rock 25 to 30% sulphur; wide belts carry 15 to 20% sulphur, and in spots pyrite occurs in lenses around which the schists are folded. gold values vary with pyrite content.

Development: by extensive workings, open-pits, a 100' shaft drill-holes, which prove the existence of a large quantity of ore 25% sulphur.

Equipment: complete mining plant and 300-ton mill with crushe and jigs, producing a concentrate containing 47% sulphur.

SOUTH DAKOTA

Metal mining in the State is practically restricted to the gold of the Black Hills, in which silver and tungsten are important by-p A little lead, tin, and various rare minerals of chemical importance mined.

Preliminary estimates of the U. S. Geol. Survey, indicate th mines in South Dakota produced $5,391,000 in 1919, as compare $6,563,337 in 1918, and 114,000 ounces of silver as compared with ounces in 1918. The ores shipped to smelters contained only quantities of lead and copper.

The Homestake, Trojan and Mogul companies were the only operators in 1919.

Our thanks are due to Mr. Otto Ellerman, State Inspector of for information concerning the mines described herein.

The companies are arranged alphabetically.

AMERICAN MINING CORPORATION — SOUTH DA

Address: Deadwood, S. D. Owns the Bismarck mine at Fl gold-silver-tungsten producer. Mill and cyanide plant on the ground

AMERICAN TIN & TUNGSTEN CO. — SOUTH DA

Address: 50 Broadway, New York City.

Officers: Simon Lederer, pres.; Leo Bloch, v. p.; Robt. S. W sec.; Chas. P. Bland, treas.

Inc. Jan., 1917, in Delaware. **Cap.**, $1,500,000: par $1; 1,200,00 Listed on New York Curb; quoted at ⅝ January, 1920.

Property: the old Harney Peak tin mines and claims, in Pen county, under lease to National Tin Corporation, this company to g of net profits as royalty. Company shares have been extensively

ANACONDA GOLD MINING CO. — SOUTH DA

Idle. **Address:** Metropolitan Life Bldg., Minneapolis, Mi **office:** Roubaix, S. D.

Officers: Martin H. Brede, pres.-mgr.; Daniel Lynch, v. p.; D. H sen, treas., with Adolph Carlson, G. G. Gustafson, H. M. Hok Malm, O. H. Carlson and G. A. Mattison, directors. C. D. Ap

Inc. in South Dakota. **Cap.**, $1,500,000; $1 par; half comm preferred stock; 498,405 shares issued.

Property: 34 claims, patented, 685 acres, in Roubaix district, a wood, carries gold-quartz ore in fissure veins running N. W.-S E of 50° N. and said to average $8 per ton.

Development: 340' shaft and crosscuts.

Equipment: steam power and compressor. Plan sinking 3- shaft to depth of 700', down 135' May, 1917. Management co raise $50,000 for further development work.

BISMARCK MINE — SOUTH

Ed. Manion, supt., Deadwood, S. D.

A gold mine at Flatiron near Deadwood, Lawrence county, said to con- gold-silver ore of milling grade. Equipped with 200-ton cyanide mill. Operated intermittently by lessees. Treated 5,120 tons of gold-silver valued at $18,864 in 1918 and shipped 30 tons of tungsten ore worth 82.

ACK HILLS COPPER CO. **SOUTH DAKOTA**

Idle. **Office:** Rochford, Pennington county, S. D.
Officers: E. A. Hoffman, pres.; George M. Thresher, sec.; John H. Kerr, as.

Inc. June 2, 1900, in South Dakota. **Cap.,** $2,000,000; shares $1 par.
Property: 27 claims, 510 acres, in the Hornblende district, shows fissure is in slate, with gossan capping, carrying carbonate and oxide ores. body is said by company to average 20′ width, and to be more than in length, opened by incline shafts and crosscut tunnels, giving a l of about 1,200′ of underground openings. Ores average, 1.5 to 3% per, with small values in gold, silver and nickel. Has steam power, 60-h. p. hoist, good for 1,500′, and 4 power drills. Property considered loubtful value.

ACK HILLS TUNGSTEN M. & M. CO. **SOUTH DAKOTA**

Dead. Property sold at sheriff's sale, August, 1917, to Elkhorn Tung- Co., which see.

PITAL GOLD M. & M. CO. **SOUTH DAKOTA**

P. A. Griswold, pres.; R. M. Harrot, sec.-gen. mgr.
Reorganized 1917, in South Dakota. **Cap.,** $1,500,000.
Property: 60 acres, in Deadwood gulch, adjoining the Trojan mine and to carry ore assaying from $3 to $12 per ton. Development was to arted in 1919.

LUMBIA MINING CO. **SOUTH DAKOTA**

Idle. **Address:** Richard Blackstone, Lead, S. D.
Inc. in South Dakota. **Cap.,** $500,000; 300,900 shares issued.
Property: a group of claims at Keystone, Pennington county. Gold ore h $65 per ton said to have been shipped, from a quartz vein in diorite chist, strike N. 56° E. dip 80°.
Development: 225′ shaft and 300′ of drifts.

BERLAND MINING CO. **SOUTH DAKOTA**

s. Graham, receiver, Hill City, S. D.
Property: the J. R. mine, long idle owing to differences among the holders which ended in a receivership, January, 1919.

ER PEAK COPPER CO. **SOUTH DAKOTA**

Office: Roubaix, S. D. Burt Rogers, sec., Black Hills Trust & Sav. Bldg., Deadwood, S. D. D. Grupe, pres.; John O'Brien, v. p.-supt.; ohn Plunkett, directors.
Cap., $1,500,000; $1 par; assessable; 100,400 shares outstanding.
Property: the Jungle mine at the southeast base of Custer Peak, show- porphyry dike cutting schist with 5′ of copper ore on both walls. ngle mine was acquired in 1918.
Development: includes 65′, 90′ and 300′ shafts, showing a 12′ vein of pper ore. The older holdings of the company, 1½ miles from the mine and S. W. of Deadwood, are said to carry average values of $6 in oxidized ore to depth of 100′, changing below to pyrite and chal- te, showing on the 200′ level, a vein of 85′ width, assaying about pper with $1.60 in gold.
Equipment: includes hoist, air compressor, pump and steam power. A 0-ton dry concentrator was reported in operation, May, 1919, at the mine.

ING MINING CO. **SOUTH DAKOTA**

Address: Deadwood, S. D.
Officers: Fred W. Cutting, pres.; Burt Rogers, sec.
Property: adjoins the Homestake on the W., near Central, Lawrence

county. Several veins have been opened by tunnels and a 500' two-co partment shaft is being sunk, down 250', July, 1919.

Equipment: includes elec. power, single-drum hoist and compress About 16 men employed.

CUYAHOGA MINING CO. SOUTH DAKOT

Address: Custer, S. D.; J. H. Snyder, v. p.

Property: the Spokane silver-lead mine. In 1917 the shaft was sunk 200'. Ore containing 43% sulphur and some copper was shipped to Cle land, Ohio, for chemical purposes. Good gold ore was opened and hoist and additional boilers installed. Presumably idle, 1918-19.

DAKOTA CONTINENTAL COPPER CO. SOUTH DAKOT

Idle. **Office:** 300 Commonwealth Trust Bldg., Harrisburg, Pa. C pany is a reorganization of the Continental Copper Mining & Smelting C

Property: near Sheridan, Pennington county, S. D., in the Black Hi known as the Dakota-Calumet, or Lillian property, 52 claims, patented acres. Claims show quartz schist with a pyrrhotized zone, from 50' to wide, traceable one-half mile. The mineralized zone shows bands of nea pure pyrrhotite, with occasional traces of copper. At boundary betwe oxidized and unaltered material, a little copper is occasionally found, a secondary concentration. Small amounts of rich ore were found at surface and down to 25-30', but property is valueless as a copper mine. E tensive diamond drilling and exploration work prove a large amount pyrrhotite available for acid making. A body of gold quartz ore of co mercial grade was cut in diamond drilling and one shipment was made 1918.

Development: includes an 850' shaft, 1,170' crosscut tunnel and 9 tunnels.

Equipment: includes 300-h. p. steam plant, with hoist good for 1,5 7-drill compressor, all necessary shops and an old smelter of no pre value.

Company had a bond on the Golden Summit gold mine 4 miles Hill City and did some diamond drilling in 1918.

DEADWOOD-HEIDELBERG MINING CO. SOUTH DAKO

Address: Deadwood, S. D.

Officers: John Treber, pres.; H. S. Vincent, v. p.; Jacob Goldb treas., A. T. Roos, mgr., with B. Stewart, Jim Hogarth and Geo. Pet directors. Wm. L. Treber, sec.

Inc. June, 1914, in South Dakota, by the Deadwood Business Club an attempt to promote the mining interest of the section. **Cap.**, $125,0 25c par; 295,000 issued. Annual meeting in June.

Property: 9 claims, unpatented, 185 acres, on Two Bit Creek, La rence county, shows gold ore in a contact deposit between shale and p phyry. The orebody is reported to be 20' thick, 6 to 15' wide, 200 to 3 long, with N. E. course and dipping W. Milling ore averages $5 per t Ore reserves said to be 5,000 tons.

Development: 7 tunnels, 65-380' long, with deepest workings at from surface; total development, 2,000'.

Production. 180 tons, averaging $20 per ton. Management plans sh ing to the contact of the shale and underlying quartzite. Inactive, 1918.

DEADWOOD LEAD & ZINC CO. SOUTH DAKO

Address: Deadwood, S. D. Aaron Dunn, supt.

Property: in Spruce gulch, near Deadwood, Lawrence county, un development by tunnels.

Ore: complex sulphide carrying gold-silver-lead-zinc values. A stamp concentrator installed July, 1918, made but one test run. Con trates showed $25 p. t. in gold, $15 in silver, 22% lead and 8% zinc.

ECHO GOLD MINING CO. SOUTH DAKO

W. L. Mason, gen.-mgr., Manchester, N. H.

Officers: Dr. Henry H. Jewell, pres.; Dr. Andrew J. Pitman, v. p.

nelling, sec.; Judge Geo. A. Wagner, treas., with Herbert W. Lake, John J. Gailey, John S. Rand and Burt Rogers, directors.
Inc. 1892, in South Dakota.
Property: 62 acres, in the Maitland district, 4 miles N. W. of Dead-l, Lawrence county.
Development: by 200' vertical shaft, and several tunnels. About 100' the shaft a pyrite vein was cut showing 4' of lead-silver-gold bearing Shaft is being extended to 500' depth.
Equipment: includes a special electric power line to shaft house, 25-h. p. ric hoist, air compressor and sinking pump. Management reports com-is well financed, and is yet in the prospective stage.

:HORN TUNGSTEN CO. **SOUTH DAKOTA**
Office: Hill City, S. D.
Officers: Arthur E. Wiedmann, pres.; Dr.: E. K. Curry, 1st v. p.; Dr. James, 2nd v. p.; C. W. Crosby, sec.-mgr., 3310 Harrison Ave., Kan-City, Mo. A. A. Anderson, supt.
Inc. Feb., 1917, in Arizona. **Cap.**, $2,000,000; $1 par; all outstanding. pany purchased the property of the old Black Hills Tungsten Mining illing Co. at sheriff's sale, August, 1917.
Property: 361 acres near Hill City, Pennington county, shows quartz dipping 70°, said to contain tungsten as wolframite. Developed by and equipped with electric and steam power and a concentrator. to sink shaft and recommence operations, 1920.

MOUNTAIN M. & M. CO. **SOUTH DAKOTA**
Address: Lead, S. D.
Operated the Slavonian group near Crown Hill and treated the ore e Deadwood Standard mill during part of 1917; estimated production tons of ore valued at $9,215.

MONT FRACTION **SOUTH DAKOTA**
Address: Jas. T. Street & Sons, 822 W. Main St., Lead, S. D.
Property: 1 claim in Whitewood mining district, near Lead, Lawrence ty. Vein runs S. E.-N. W. dips 80°, and averages 3' in width. Assays ge 49.6 Mn., 1.82% Fe., 3.76% Silica, 0.0039% Phos.
Development: by 160' shaft and 145' tunnel. The ore is hand-sorted. uced 31.2 tons of ore in 1918, at a cost of $1,500 and valued at $1,670. hipments made.
Mine examined by State Mine Inspector Ellerman.

D DOLLAR MINE **SOUTH DAKOTA**
n Crown Hill district, Black Hills, S. D. Leased to Coleman, Madill, others at last accounts.
Property has been a gold producer, whose ore was treated in the Mogul near Deadwood.

DEN CREST MINING CO. **SOUTH DAKOTA**
Address: Deadwood, S. D.
Owned by F. W. Bird, Victor Bird, Alex Bird and J. G. Playford, all of Deadwood, S. D.
Property: 12 patented and 8 unpatented claims, 275 acres, in Bear and Whitewood mining districts, Lawrence county, 5 miles E. of wood. **Ore:** occurs in fissure veins in porphyry, varying in size up to nd carries gold, silver, lead. Mine worked about 1902; reopened and ded in 1917, and some development work done in 1918.
Development: Nine shafts, greatest depth 335', with about 6,000' of drifts.
Equipment: includes electric double-drum hoist, 10-drill compressor, 40 stamps, 200-ton cyanide mill, Moore filter, etc.

DEN REWARD CONSOLIDATED GOLD M. & M. CO. **S. D.**
Office: 475 Fifth Ave., New York. **Mine office:** Deadwood, Lawrence ty, S. D.
Officers: C. T. Tegethoff, pres.; Harris Franklin, v. p.; with R. W. Henry de Forest, W. B. Devereaux, Walter Luttgen, Ed. de Witt W. A. Harriman, all of New York, directors. W. J. Johnson, sec.; N.

E. Franklin, asst. sec., Deadwood; Henry Schnitzel, gen. mgr.; F. Baldwin, gen. supt.

Inc. June 25, 1896, in South Dakota. **Cap.**, 1,000,000 shares; $10 ... 841,793 shares issued to June, 1916. Stock transferred at company's ... Annual meeting 1st Tuesday in August at Deadwood, S. D.

Property: 442 patented claims, 3,391 acres at Terry, in Whitewood ... Bear Butte mining districts, near Deadwood, includes, the Union and ... toria mines.

Ore: occurs as contact deposit in shale, carrying gold-silver values ... 75% silica. Pay ore occurs in shoots from 5-100' long, said to give ... assays of $5 per ton.

Development: by several tunnels and vertical shafts from 100-350' ... with about 15 miles of workings.

Equipment: includes electric power, electric double-drum hoist, ... pressor, 150-ton cyanide plant, 100-ton filter and 75-ton roaster. The ... nace was stopped in July, 1916, for further investigation of the blue ... which does not give high recovery. Average gold extraction is 75.5% ... Experiments failed to show a higher extraction and practically all ... was stopped in April, 1918, owing to high costs and low grade ore.

Ore reserves: estimated by management June, 1916, at 2,000,000 ...

Production: in 1911-12, $323,846 from 52,583 tons; in 1913, $423,840 ... 53,712 tons; in 1914, $369,182 from 51,355 tons; in 1915, $484,995 ... 58,837 tons; in 1916, $311,204 from 52,204 tons; in 1917, $198,040 from 33,... tons; in 1918, $36,589 from 6,542 tons.

GOLD KING MINING CO. **SOUTH DAKOTA**

Developing a gold-silver property on Silver creek, near Rochford, Pe... ington county.

Equipment: includes boilers, hoist and compressor, installed in 19...

HIDDEN TREASURE MINING CO. **SOUTH DAKOTA**

Trojan, Lawrence county, S. D. Described, Vol. XIII.

HILL CITY MINING & DEVELOPMENT CO. **SOUTH DAKOTA**

Hill City, Pennington county, S. Dak.

Officers: John Wise, pres. and gen. mgr.; with J. W. Stoner, and ... bert Booth, directors; E. A. Schilliman, sec.-treas.

Inc. 1911, in South Dakota. **Cap.**, $500,000; $1 par; 300,000 issued. ... nual meeting, March 9.

Property: 11 claims, 6 patented, 220 acres in Burnt Fork gulch, 3 ... north of Hill City. **Ore:** gold, in fissure vein, in schist; strike N. S., dip ... Said to have an average width of 16'.

Development: by shafts, deepest 200'. **Equipment:** includes ... drum hoist, compressor and a 10-stamp mill. Company planned to sink ... 400' depth and later to build a cyanide plant. No recent returns.

HILL CITY TUNGSTEN PRODUCERS CO. **SOUTH DAKOTA**

Office: Hill City, S. D. Described Vol. XIII.

HOMELODE MINING & MILLING CO. **SOUTH DAKOTA**

Idle. Silver City, Pennington county, S. Dak. L. A. Richards, ... mgr.; L. L. Farnam, supt.

Property: shows several quartz veins, 1' to 2' wide, containing ... silver, antimony, lead and zinc ore. Two veins have been opened ... one by a 200' adit, connecting with a shaft, sunk on the vein, at the ... level; a 50' winze shows the ore to be continuous to that depth. In ... workings ore varies from 12" to 18" and is 150' in length; values are ... in gold and antimony. The second vein parallels the first, is ¼ mile ... said to be 24" wide and to contain more zinc than No. 1. Two shafts, ... apart, 66' and 103' deep, respectively, have been sunk on the vein.

At ... 2, there is reported to be a 4 to 6' quartz vein ... gold-silver ... Develop... 0' shaft with 500' of drifting.

E... ... boilers and an amalgamating ... equip... ... mill, tables and classifiers.

ate shipped reported to carry 2-4 oz. gold, and 6-10 oz. silver, prin-
y as arsenopyrite. Cyanide plant to be added.

IESTAKE MINING CO. **SOUTH DAKOTA**

lain office: American National Bank Bldg., San Francisco, Cal. **East-**
ffice: 15 Broad St., New York. **Mine office:** Lead, South Dakota.
)fficers: Edward H. Clark, pres.; Frank G. Drum, v. p.; Fred Clark,
Louis P. Haggin, treas.; preceding, with Harry L. Tevis, Thos.
er and Richard A. Clark, directors; B. C. Yates, supt.; W. J. Shar-
, metallurgist; C. W. Merrill and Allan J. Clark, cons. metallurgists; R.
ayland, asst supt. and chief engineer.

nc. Nov. 5, 1877, in California. **Cap.**, $21,840,000; increased March 25,
to $25,116,000 by payment of 15% stock dividend; shares $100 par.
nbia Trust Co., New York, transfer agent; Union Trust Co., New
registrar. Annual meeting, third Tuesday in March, in San Fran-
Listed on New York Stock Exchange since 1879.

alance Sheet, years ending December 31:

Assets.

	Mines and works	Cash balances and Liberty loans	Bullion in transit	Supplies	Total
.....	$27,355,435	$570,326	$16,885	$665,444	$29,275,642
.....	27,105,865	1,184,947	214,382	671,316	29,176,511
.....	26,713,219	1,077,354	309,594	553,241	28,653,408
.....	25,116,000	1,332,006	325,569	383,635	27,157,210
.....	25,116,000	1,222,812	302,097	.....	26,640,909

Profit and loss account for year 1919 was $667,551.

Liabilities.

	Capital stock	Out-standing drafts	Sundries	Profit and loss account	Reserve for depreciation	Total
.....	$25,116,000	$239,492	$5,101	.....	$3,915,048	$29,275,642
.....	25,116,000	273,608	18,508	$380,532	3,387,863	29,176,511
.....	25,116,000	371,749	5,126	1.189,403	1,971,130	28,653,408
.....	25,116,000	522,353	5,224	949,934	563,600	27,157,210
.....	25,116,000	486,640	5,336	1,032,933	.....	26,640,909

Income.

	Receipts mng. oper.	Other income	Balance brought forward	Total
.....	$4,352,631	$37,908	$1,048,083**	.....
.....	5,916,890	204,457	1,189,403	.....
.....	6,531,003	586,505	1,032,933	$8,150,442
.....	6,448,024	77,758	897,596	7,423,378
.....	6,160,160	148,562	1,428,248	7,736,970
.....	6,186,652	132,716	1,455,958	7,775,326

Expenditure.

	Oper. expenses(a)	Dividends	Balance Dec. 31	Total
Includes profit and loss account.				
.....	$3,781,217	$1,130,220	$667,551	.....
.....	4,006,526	1,506,960	380,532	.....
.....	4,990,300	2,210,208	949,934	$8,150,442
.....	4,180,238	2,210,208	1,032,932	7,423,378
.....	4,629,166	2,210,208	897,596	7,736,970
.....	4,200,853	2,146,225	1,428,248	7,775,326

[illegible] salaries, legal, general, etc.; bills payable; taxes; property
[illegible]

1914, amounting to 16c per ton of ore milled, 15c in
1917; 21c in 1918; 34c in 1919.
[illegible] paid monthly almost continuously since Jan.,
May, 1907, as result of a fire in the mines, and

resumed January 25, 1908; continued to December, 1909, inclusive, wh they were suspended owing to labor troubles at the mines; resumed March, 1910. Present rate is 50c per share per month. Dividends paid September, 1919, total $41,927,559.

Property: 468 claims, about 3,723 acres, in the Whitewood mining d trict, Lawrence county. The towns of Lead and Deadwood and the sett ments of Blacktail, Terraville and Central City have grown up around t mines and mills.

The first claims acquired by the company were the Grant and Old A located by J. B. Pearson, December 11, 1875. In the Fall of 1876, repres tatives of Haggin and Hearst bought these claims, and the Homest Mining Co. was incorporated. In July, 1878, the first and only assessm was levied, $1 per share; it furnished the $200,000 required to build the stamp Homestake mill. In 1899, company acquired the Highland Mi Co., an adjoining property of about 73 acres; also the Black Hills Canal Water Co., owning 40 miles of ditches, flumes and pipe-lines, with re voirs, improvements and water rights covering the water supply of De wood and Lead districts.

Geology: the orebody is a great mass of silicified slate, averaging $3 to $6 per ton in gold. The ore is several hundred feet thick and has b mined to a depth of 1,700'. This deposit lies in a mineralized zone of nea vertical Algonkian slates and crystalline schists, into which enormous mas of rhyolite have been intruded. The ore-bearing zone is approximately mile wide and several miles long. Only the northern end of the zone h been extensively developed. The deposits are not fissure veins, impregnations that appear to have taken place along two converg lines of crushing; they follow roughly the direction of schistosity and sh a general pitch southward; where several unite, the aggregate thickness over 500' and many stopes are carried across that width of ore. The lar lenses are on the west side of the zone and are flanked on the east by series of smaller parallel lenses, some of which join the larger at de Near the surface the orebodies follow the rhyolite porphyries, but at de diverge from them and become in part associated with phonolite. The varies considerably in composition in different portions of the deposit, that of the deeper levels, the unoxidized ore, usually contains either chlo or ferruginous hornblende (cummingtonite), with quartz, carbonates lime, magnesia, iron, arsenopyrite, pyrite and pyrrhotite. Ferrous mine predominated and this has been an important factor in determining metallurgical treatment. In the upper oxidized parts of the deposits the is dark red, but deeper, in the sulphide zone, is greenish-blue to blue-bl Sulphides vary in amount from 3 to 5%, and even as high as 10% or m of the ore. In the sulphide zone the distribution of gold is uniform averages $4 to $4.50 per ton. Over 60% of the ore is free milling condary enrichment has not resulted in the formation of any particu rich zones.

Development: 6 shafts; 4 in the footwall, one in the hanging, and in the lode; depths January 1, 1917, were:

Ellison	B. & M.	Golden Prospect	Golden Star	Old Brig	Gold Gate
2,195'	1,700'	1,100'	1,400'	800'	800'

The 1,850' and 2,000' levels of the Ellison shaft will eventually be c nected with the B. & M. shaft, through which outlet the bulk of the will be hoisted to surface. The B. & M. shaft is equipped with bi pockets at 800, 1,000, and 1,550', a hoist and skips, which will dump N. 8 Gates crushers, and their product carried by a belt-conveyor sy to smaller gyratories. Total cost of sinking at the Ellison shaft is n have averaged $60.64 per ft. There are in all about 130 miles of worki Underground work during 1916 amounted to 24,381'; 19,320' in 1917; 2,2 1918; 5,770' in 1919. Measured reserves are large and sufficient to

reduction plants for many years. Broken ore in stopes amounts to ,886 tons, a year's supply for the mills. A new ventilating system for lower levels recently installed includes two large electrically-driven fans.

Ore treatment: the metallurgical equipment at the Homestake is one of most modern and efficient in the country, and has been fully described in technical press. The treatment problem is simple, the ore crushes well, aging 4.7 tons per stamp daily. Amalgamation in battery and on plates llowed by cyanidation of sands and slimes separately. There are 1,020 ps employed in six different mills, the pre-war cost being 26c per ton.

Mills: at the south side—3 stamp-mills (660 stamps) with 36.356 sq. f amalgam plates; 1 regrinding plant, with independent cone system, 540 sq. ft. of amalgam plates; 4 batteries of cones for classification; 3 fying tank houses; 1 sand plant. The mills are the Amicus, Golden , Homestake and Pocahontas. In 1915 the Pocahontas mill was com- ly rebuilt. The Amicus mill was remodeled in 1917.

At the north side—2 stamp-mills (300 stamps), the Monroe mill and eral Point mill; 2 tank-houses; 2 cone-houses; 1 sand plant. Ore sup- l to these mills is usually drawn from the upper levels of the mine, and rtly oxidized.

A 5-stamp crushing and concentrating mill was built, 1916, for treating sten ores. It contains an amalgamation plate, cone classifiers, two Deis- nd one Wilfley tables for cone products, two small ball-mills for grind- middlings, and another Deister table to concentrate the ground pro- Tailing passes to the cyanide plants. This mill has operated con- ously on ore averaging 2% WO_3, yielding concentrate carrying 54%. sales of wolframite were $229,916 in 1916; $226,535 in 1917; $167,468 in : $6,515 in 1919.

At Deadwood—A slime plant, treats the slime from both south and h side mills. At all the mills the stamps weigh 1,000 lb. and drop 10", ng 88 drops per minute Homestake order of drop is 1-3-5-2-4 or -5-3. A 25-h. p. back-geared motor drives each 10 stamps. Ratio of r to ore is large being 10 or 12 tons of water to one of ore. A minimum bout 50,000 tons of water per day is used, most of it from Spearfish k and its tributarties, being conveyed over 20 miles in ditches and ied clay pipe, and costing 10c per ton of ore stamped.

Inside amalgamation is practiced, quicksilver being fed to the mortar. k-blocks are cleaned in rotation, at intervals of about 2 weeks; outside s, except those of the fourth row, are cleaned and dressed daily. th row plates are dressed at 2-day intervals. Amalgam is retorted times each month. Oil-fired retorts are used, the resulting bullion melted in coke-fired furnaces.

A ball-mill is being tested for reduction of Homestake ore.

Regrinding is done in tube-mills. In cyaniding the usual methods are ly conformed to. A recovery is made of about 94% of the value in the 72% by amalgamation and 22% by cyanidation.

Power and equipment: company has hydro-electric plants at Spearfish Englewood. Power equipment includes a steam-driven electric gener- station at Lead, maximum capacity, 4,000 k. v. a. The company ites its own machine shops, carpenter shops and foundry. Power used out 1.15 k. w. hr. per ton of ore treated.

The Homestake Mining Co. has long been known for the way ich it has looked after the welfare of its 1,630 employees. In 1914, it leted a recreation building, containing a theatre with seating capacity 00, library, swimming pool, gymnasium, bowling alleys, billiard and ement rooms. Wages are from $4 to $5 per day underground and from on the surface.

Production: to Jan. 1, 1920, $164,023,965, exclusive of wolframite. Re- production has been:

Year	Ore milled tons	Recovered per ton	Total cost per ton
1919	1,192,588	$3.6443	$3.330
1918	1,628,630	3.633	2.700
1917	1,677,623	3.946	2.900
1916	1,600,220	4.0813	3.110
1915	1,573,822	4.0848	2.6561
1914	1,587,774	3.8797	2.9155
1913	1,540,961	4.0148	2.7258

At the end of 1918 the mines and mills were operated at only 77 per cent capacity. Production continued steadily during 1919, until September 25, when a fire was discovered on the 800' level, and it was found necessary to flood the mine to the 600' level. During October and November operations were necessarily curtailed, but they were resumed December 1.

In our opinion the Homestake is the greatest gold mine in the world, judging by its past performance, present condition, and possibilities. Management says little, but produces the gold and dividends.

IMPERIAL COPPER CO. SOUTH DAKOTA

Idle. Property in Custer Peak district. Described in Vol. XIII.

LAUREL GROUP SOUTH DAKOTA

Owners: August Peterson, Nemo, S. D. E. A. Skalinder, Joe Kelly, Deadwood, S. D.

Property: 4 unpatented claims, 60 acres, in Greenwood mining district, Lawrence county, developed by 495' tunnel and 90' shaft, said to contain free milling gold and silver, assaying $2.40 to $10 per ton. Expended $12,000 during 1918. No shipments made.

MALONEY-BLUE LEAD COPPER M. & S. CO. SOUTH DAKOTA

Address: 215 Ry. Exchange Bldg., Chicago, Ill., and Hill City, S. D.

Officers: M. T. McCaskey, pres.-mgr.; F. A. Poor, v. p.; J. G. Thomas, sec.; R. N. Baylies, treas.

Inc. 1899, in South Dakota. Cap., $750,000; $1 par; 670,000 outstanding.

Property: 23 patented claims, 340 acres, near Keystone, Pennington county, shows copper ore in limited amount.

Worked by lessees in 1918, who are reported to have shipped 580 tons to the Omaha smelter, averaging 4.46% copper and 1.38 oz. silver, valued at $8,202.

MOGUL MINING CO. SOUTH DAKOTA

Address: Terry, S. D.

Inc. 1905, to take over holdings of the Horseshoe Mining Co. Company treated ore from its own mine and other companies, and operated the mine of the Ofer Mng. Co. at Trojan, Lawrence county. A 1,200' tunnel on the Ofer mine was completed in 1918 and 33,750 tons of ore shipped to the Mogul plant returned $169,974.

Equipment: includes 1,600' aerial tramway.

Production: treated 59,384 tons in 1912, valued at $242,567; 5,593 tons in 1913, valued at $44,117; 21,770 tons, in 1914, valued at $141,298; 37,[illegible] tons in 1915, valued at $161,605; 38,671 tons in 1916, valued at $19[illegible] 35,980 tons in 1917, valued at $187,317 and 33,750 tons in 1918, valued at $169,975. All work was suspended October, 1919.

MONTEZUMA & THE WHIZZERS MINE SOUTH DAKOTA

Address: J. T. Milliken, Deadwood, S. D.

Property: 150 acres, on the divide between Deadwood and White[illegible] Cañon, and on [illegible] Creek and West Gold Run, near Lead City, S. D. Property shows [illegible] schists, slates and quartzite, and carries a [illegible] vein, of 45° [illegible] ar width traceable 3,000'. Principal claims [illegible] Emanuel S[illegible] Whizzers, and Brownie No. 3 [illegible] called [illegible] The first named has chalcopy[illegible] carrying 0.5 to 1.5% copper [illegible]

[illegible] ing, and has produced the

0 tons of low-grade fluxing ore, sent to smelters at Deadwood and Rapid until the latter was closed down. A 22′ winze, below the water-level, gave d samples, assaying $16.80 gold per ton.

The Montezuma claim, near West Gold Run, has 2 short tunnels, showing assaying up to 1 oz. silver and $53.70 gold per ton. Though low in average e, the property is considered promising, because of the enormous tonnage red, but needs big capital to develop. Examined and reported favorably on eo. Huston, of Mullan, Idaho, and Nicholas Treweek, of Salt Lake City. Property acquired in 1917 by J. T. Milliken, of St. Louis, Mo., who is loping the Oro Hondo nearby. Mine was unwatered and diamond drilling rway since 1917.

TIONAL TIN CORPORATION **SOUTH DAKOTA**

Address: 61 Broadway, New York City.

Officers: Simon Lederer, pres.; Henry E. Vaughan, v. p.; Fred A. is, treas.

Inc. March, 1919, in Delaware. **Cap.**, $1,000,000; 50c par; amount outling not divulged. Stock listed on New York Curb and quoted at $7.50 ctober, 1919, and at $13 in January, 1920. Security Transfer & Registrar registrar and transfer agents. Company has a 20-year lease on the mines mill of the American Tin & Tungsten Co., the latter company to receive of the net profits.

Property: the old Harney Peak Tin Co. property, 6 claims and a mill-on the Keystone branch of the Ch. B. & Quincy R. R. at Keystone, Penton county.

Ore: occurs as scattered grains of mineral in quartz veins and pegte dikes, the tungsten as wolframite and ferberite, the tin as cassiterite. In Cowboy mine the cassiterite occurs in lenticular quartz mica veins, 12"-2' , with strike N. 54° W. and dip of 67° N. E. Stoping operations between 00 and 250′ levels claimed to have broken 6,000 tons of 1.98% ore. The awk mine is developed by a 100′ shaft, said to show a 3′ lense of 2% ore at epth.

Development: by vertical shaft being sunk to depth of 500′. **Equip-:** an old, but recently remodeled, 125-ton concentrating mill, cyanide electric power plant, compressor, 60 h. p. hoist.

Property reported on 1917 by E. F. Schramm. Company expects to start ents in 1920.

Company has been financed and its shares are active on the New York . It is thought that if property is economically handled, it can be made to fair profits.

GOLDEN WEST MINES CO. **SOUTH DAKOTA**

Mine near Rochford, Pennington county, S. D. Described in Vol. XIII.

PURITAN MINING CO. **SOUTH DAKOTA**

Address: Lead, South Dakota.

Officers: Wm. J. McGoffin, pres, and mgr.; L. Herseth, v. p.; P. A. irst, sec.; W. C. Nissen, treas., with S. Ruud, W. Worth, and A. Randirectors.

nc. 1915, as a reorganization of the Puritan Mining Co. **Cap.**, $1,500,-hares; $1 par; non-assessable; 200,000 shares issued. Annual meeting in

roperty: 60 patented acres, in Whitewood mining district, Lawrence , shows an orebody, 28′ thick in quartzite, carrying gold ore said to assay per ton. Developed by several shafts to depth of 190′.

quipment: includes steam hoist, 6-drill compressor, pump, and a 250-ncentrating mill with cyanide unit.

roperty has been idle for several years, owing to litigation, and as mill ave to be remodeled at a cost of $25,000, and company has no funds, the k is not bright.

RELIANCE GOLD MINING CO. **SOUTH DAKOTA.**

Office: 218 Tribune Annex Bldg., Minneapolis, Minn.. **Mine**

office: Trojan, Lawrence county, South Dakota. F. C. Bowman, gen ... C. O. Veker, sec.

Property: the Reliance mine, at Trojan, shows gold ore in quartz ... **formation. Orebody said to have** average width of 8' over a distance of ... **and to assay $4 per ton.**

Equipment: includes a 30-stamp mill, treating slime by the cyanide ... decantation, counter current system, drills and air compressor. During ... mill treated 13,524 tons of ore, yielding $49,893.

Work was suspended in November, 1916, due to low value of ore.

NEW SILVER QUEEN MINING CO. SOUTH DAKOTA

Address: Galena, S. D.

Property: in Galena district, Lawrence county, under development ... 1917. Shipped 144 tons of lead-silver ore valued at $1,995 in 1917, and 57 ... valued at $2,093 in 1918.

NORTH HOMESTAKE MINING CO. SOUTH DAKOTA

Address: A. Maitland, Negaunee, Mich., pres and controlling owner; A. F. Maitland, v. p.; T. C. Jates, sec.

Inc. in South Dakota. **Cap.**, $6,000,000; $5 par; 1,000,370 shares ... standing.

Property: 77 patented claims, 1,100 acres at Maitland, Lawrence county, ... shows veins of quartz and sulphide ore, carrying gold and silver values.

Development: by 750' vertical shaft and 600' drift on the 600' level ... crosscuts E. and W. for 200' and 100', respectively.

Equipment: includes 125-ton cyanide mill, electric power, 4 electric **pumps, 2 compressors and hoist.** Mine is credited with a production of $1,5... **000 under former management.** Development work carried on intermittently **during past 5 years has so far failed to disclose new orebodies of commercial grade.**

Work suspended in September, 1916, but mine was being kept dry, at ... accounts.

OFER MINING CO. SOUTH DAKOTA

Property: in Bald Mtn. district, near Trojan, Lawrence county, ... ated by Mogul Mining Co., which see.

OLAF SEIM MINE SOUTH DAKOTA

Olaf Seim, owner.

Property: 1 mile from Deadwood, Lawrence county, adjoining ... Montezuma and the Whizzers on the north, carries pyritic ore high in sulphur. Operated during part of 1918.

Production: 1,150 tons averaging 38% sulphur. During 1918, 916 tons **shipped returned $7,200.**

ORO HONDO MINE SOUTH DAKOTA

Address: E. W. Talbot, supt., Deadwood, So. Dakota.

Property: at Deadwood, So. Dakota, is said to show replacement ... posits in schist.

Development: by 2,200' vertical shaft. Did about 2 miles of diamond drilling, 1916, presumably in search of southerly extension of the Homestake orebodies.

Management does not furnish or publish details of its operations, but is reported developing in 1919.

PURITAN MINING CO. SOUTH DAKOTA

Address: Deadwood, So. Dakota. Described in Volume XIII.

See New Puritan Mining Co.

RARE METALS CO. SOUTH DAKOTA

Address: Hot Springs, S. D.

Officers: Frank Hitch, pres.; W. N. Hunter, v. p.; Chas. Eastman, ... treas. Jos. R. Bland, chief engr.

Operates a small concentrating mill at Custer, Custer county, equipped ... **treatment of tin, tungsten and vanadium-bearing ores and the recovery of ... mica ore.**

TTLESNAKE JACK MINING & MILLING CO. SOUTH DAKOTA
Galena, Lawrence county, S. D. Owned by C. B. Harris, of Galena, and liam Sansome, of New York.
Property: several claims, including the Rattlesnake Jack mine near na, said to show gold ore assaying $15 to $20 per ton.
Development: 200′ shaft and tunnels. A 10-stamp mill and cyanide t, completed in August, 1915, ran for several months, when a shutdown was e to build a tailing dam; resumed operations in January, 1916, only to close n in April, due to a disagreement between the owners.
Reported that 1,670 tons of ore treated in 1916, yielded $14,270. Daily ton- treated averaged 60 tons when the mill was running. Idle since 1916.

)KANE LEAD CO. SOUTH DAKOTA
Address: Custer, S. D.
Property: at Custer, Custer county, 7½ miles S. of Keystone, developed epth of 200′ with levels at 60′, 100′ and 200′.
Ore: silver-lead. **Equipment:** includes 100-ton concentrator, installed l. Mine worked intermittently.
Production: in 1918, 102 tons of concentrate, containing 13.25 oz. silver 35.74% lead per ton, and valued at $4,428.

)JAN MINING CO. SOUTH DAKOTA
Office: Deadwood, S. D. **Mine office:** Trojan, S. D.
Officers: H. W. Seamon, pres.; C. M. Curtis, v. p.; A. G. Smith, treas.; l. Clark, sec.; H. S. Vincent, mgr.; above are the directors. C. E. Daw- asst. mgr. and purch. agt. H. Slaughter, mine supt.; N. B. Goodrich, mill

Inc. 1911, in South Dakota. **Cap.**, $3,000,000; par $1; outstanding 1,000,- Annual meeting in June.
The company publishes no financial reports.
Property: 166 patented claims, 1,550 acres in Bald Mtn. district, Law- e county. Ore-bodies are flat deposits and verticals between porphyry shale quartzite carrying refractory values in gold and silver.
Development: by Portland, Decorah, Empire and Eagle adits, the Port- being main outlet.
Equipment: 5 electric hoists, 300-h. p., 17,000-lb. capacity; 600 cu. ft. pressors and 2 gasoline locomotives. Mill equipment is for cyaniding. acity 400 tons daily. Crushing is by Chilian and tube mills, filtration by er machines.
Production: Total to Jan. 1, 1919, 634,000 tons ore mined, 631,540 tons ed, including 10,060 tons custom ore; also 13,420 tons shipped to smelter; value, $2,777,455. The 1918 production was 107,373 tons, valued at $530,642, ompared with 113,121 tons, valued at $471,268 in 1917.

SP No. 2 MINING CO. SOUTH DAKOTA
Address: D. A. McPherson, pres., First National Bank, Deadwood, So. ota; H. H. Stewart, sec., Lead, S. D. A close corporation, most of the k still held by original 14 stockholders.
Inc. November, 1901, in South Dakota. **Cap.**, 500,000 shares, $1 par; ssued. Original purchase of land paid for from sales of ore. Voluntary ssment of $50,000 paid in 1911 to replace mill destroyed by fire. To October, , dividends paid, totaled $451,966. In 1916, 20%, or $100,000, was distributed, was over double that paid in 1915.
Property: includes the Alma Fraction and Wasp claims at Flatiron, famous for low cost mining and milling of low-grade ore, which occurs in Cambrian formation above the quartzite. Wolframite occurs along fissures at Cambrian quartzite.
Development: by open cuts, steam shovels stripping 20′ of waste which lies an ore bed 20′ thick. The total mining cost was $1.661 per ton. In -17 a decided change was apparent in the ore extracted from the workings, the mill was dismantled and sold for scrap along with all surface equip- t.
Equipment: included a 500-ton plant, in which the ore was crushed

coarsely and cyanided direct at a cost of 59.1c per ton. In 1916 a 25-ton pl was erected for concentrating low-grade tungsten ore, crushing to ⅛" by sc re-crushing by smaller rolls, grinding by ball mill and treating coarse in je sand on Wilfleys and slime on canvas tables. Three grades of concentr were produced, 65%, 45% and 35% tungstic acid.

Production: in 1914, 176,140 tons ore, average value $2.015 gold a 28.7c silver per ton, returned $1.533, at a cost of $1.287 per ton. In 1915, co increased and operations were curtailed until shipping and milling of tungst ores added new profits.

From May, 1915, to March, 1916, company shipped 184 tons ore, averag 45% tungstic acid. In 1916, 50,035 tons of gold ore averaged $1.79 per ton; a 36 tons of tungsten concentrate were sold for $97,869. Total value in 19 was $187,775. In 1917 a final cleanup was made, netting $4,493. Tungsten co centrate amounting to 12 tons returned $19,561.

TENNESSEE

AMERICAN BALLAST CO. TENNESSE

A subsidiary of the Amer. Z., L. & Sm. Co., and described under th title.

AMERICAN ZINC CO. OF TENNESSEE TENNESSE

A subsidiary of the Amer. Z., L. & Sm. Co., and described under th title.

CHATTANOOGA COPPER CO. TENNESSE

Bought by the Ocoee Copper Co., which see.

COPPER PYRITES CORPORATION TENNESSE

Office: 17 Madison Ave., New York City. **Mine office:** Copper Tennessee.

Officers: Wm. Young Westervelt, pres.; Roger L. Wensley, v. p.; J Bailey, sec.-treas.

Inc. March 17, 1919, in New York. **Cap.,** $203,000, in 20,000 pref and 300 common shares; par $10; all outstanding. To end of June, 1919, co pany had spent over $200,000 for a 25-year lease from June 29, 1916, a development of the School property.

Property: Sec. 16, comprising 640 acres of School land, in Duck mining district, Polk county, showing ¾ of a mile of gossan outcrop. Dia

ing of the southern end gives assurance of approximately 1,500,000 tons of averaging over 45% iron, 29% sulphur and 1% copper. Management antici- s 12,000,000 to 13,000,000 tons of this grade ore.

Development: shaft A had been sunk 250', to October, 1919, and 1,200' of k done on two levels.

Equipment: includes steam hoist, air-compressor and ½ mile broad- ge railway, connecting with the L. & N. R. R. at McHarg Siding. Company s erecting a differential flotation mill to make 18% copper concentrate and a oppered pyrrhotite concentrate. Tests show latter will contain between 90 95% sulphide of iron, which can be used in the production of sulphuric acid, a sintered material for iron furnaces.

CKTOWN SULPHUR, COPPER & IRON CO., LTD. TENNESSEE

Office: 1 Gresham House, Old Broad St., London, E. C., Eng. **Mine** e: Isabella, Polk county, Tenn.

Officers: J. G. Gordon, chairman and managing director; L. G. Morti- managing director: preceding, with Col. J. Le G. Daniell, H. G. Palmer, ard Dexter and Col. H. B. Mortimer, directors; J. W. Felstead, sec.; Wil- Young Westervelt, 17 Madison Ave., New York, cons. engr. Executives e mine: W. F. Lamoreaux, gen. mgr.; J. H. Taylor, asst. gen. mgr.

Inc. in Great Britain, Feb. 16, 1891. **Cap.**, £75,000; shares £1 par, in 800 ordinary shares and 200 founders' shares. Increased 1907, to £200,000 s, increase subscribed to by the old stockholders at par, except £48,799 iary shares sold to the public at 25s. Stock is fully issued and fully paid. ts are divisible on the basis of 7%, plus one-half of the net remaining ts, to ordinary shares, balance of profits going to founders' shares. £83,900 mortgage, 6½%, debentures outstanding, July 1, 1919, against which a al reserve fund of £55,000 has been accumulated.

Recent Dividends:

	Shares Ordinary	Shares Founders' £ s d		Shares Ordinary	Shares Founders' £ s d
.....	82½%	249 3	1912.....	10%	29 19 5
.....	55%	108 18	1913.....	12½%	54 18 11
.....	10%	16 0 8	1914.....	12½%	54 18 11
.....	10%	21 17	1915.....	13¾%	9 9 10
.....	10%	28 4 5	1916.....	20%	129 17 3

otal dividends paid to all classes of shares, £558,063. Of this, £363,547, nting to 375 5/6% on shares outstanding at the times of payment, was paid e ordinary shares, and £194,506, amounting to 97,253% was paid to the ers' shares, the latter constituting the world's record for profitable copper g investment. On the 74,800 ordinary shares, from 1895 to 1907, inclusive, , or £229,636, was paid.

roperty: nearly 7,000 acres, bought for £68,057, includes the Mary, **Tennessee** and **Isabella** mines, which are active, and the Calloway and **kee** mines, which are idle. Country rocks consist largely of very tough metamorphosed, silicified mica schists, of ancient origin. The ores are ively sulphide, averaging about 2½% copper and containing minute quan- of gold and silver, sufficient, however, to be appreciable in the matte.

he **Mary** mine, which is the principal producer, has three shafts, the m 1,180' deep being now the main working shaft. The richest ore in ine is on the lower levels The workings blocked out 1,500,000 tons, ging 1.8% copper and 16% sulphur with an additional amount of ted ore of similar grade making a total of 3,000,000 tons.

he **East Tennessee** mine did not commence to produce until 1910. The ft, or operating shaft, 700' deep, has 2 compartments and yields about 30 ns per diem of ore containing 3% to 5% copper and 8% sulphur. Reserves ed through old mine, between 5,000 and 10,000 tons contain at least

2.5% copper and 8% sulphur, and there are prospects of considerable furth developments of rich ore.

The **Calloway** mine, now idle, contains between 10,000 and 20,000 to of 2% copper ore immediately below the third level, with possibility of furth developments in depth.

The **Cherokee** mine shows extensive outcrop on the continuation of th orebody of the School property and it is anticipated that it will yield fr million to five million tons of ore averaging 1% copper, 29% sulphur and 45% iro

The **Isabella** mine has thus far yielded but a few thousand tons of m a year. The ore, averaging about 0.8% copper and 29% sulphur, has as y been used for little else than experimental purposes. 5,600' of systematic di mond-drilling, however, has already revealed over 2,500,000 tons of average o with like amount anticipated making 5,000,000 tons in all, so that doubtless t property will, eventually, be worked on a considerable scale for acid and ir manufacture.

Smelter: the companys' smelter, and headquarters are located at Is bella, on the company's private, standard-gauge railway, about 2½ mi from the Mary mine. The plant contains two 500-ton, sectional water-j blast furnaces, operated by induction motor Connersville blowers of 30 ft. per revolution aggregate capacity, charged by a Freeland patent elec charger and served by an electrical traveling crane for the matte and bucket elevators for the granulated slag. Since 1902, when heap-roasting a abandoned, semi-pyritic smelting, introduced into this country from Tasmania this company, has been employed. The first fusion gives a matte containing 12-15% copper and disposes of the bulk of the non-valuable material of the o in a slag containing from 0.2 to 0.3% copper. This coarse matte is then ra to 45% copper content by a second fusion in the same furnace, usually undertak once a week. A small percentage of coke, with cold blast of from 20 to 30 pressure is used in both fusions. The 45% matte is sold to the American Me Co., of New York, and treated for them at the Laurel Hill, L. I., or the Carte N. J., smelters.

A 300-ton differential flotation plant finished 1920, produces an 18% co concentrate and a nearly pure pyrrhotite product.

In 1905, investigations were undertaken to determine the possibility of ma ing sulphuric acid from the smelter fumes. In 1906, an experimental con plant was erected, but proved unsuccessful, and in 1908, work on the pres chamber acid plant was commenced. This plant, which cost over $600,000 put into operation in less than a year from the time of breaking the ground its erection, and has since been producing from 40 to 50 thousand t per annum of 60° Beaume sulphuric acid. It was the first acid plant to cessfully convert sulphuric gases from pyritic smelting into concentrated

The credit for the successful development of the company is due pri to the chairman and managing director, Mr. Gordon, himself a technical m the consulting mining engineer, Mr. Westervelt, who developed the mine to the former manager, Mr. W. H. Freeland, who developed the pyritic sm process employed.

Production:

Year	Pounds Copper	Tons 60° Sulphuric
1919	5,290,000	*17,40
1918	5,252,000	35,00
1917	5,593,000	32,90
1916	5,129,000	†41,00
1915	5,500,000	41,00
1914	5,862,000	46,90
1913	5,811,000	48,50
1912	5,213,000	46,80
1911	5,040,000	45,00
1910	4,409,000	36,80

* Six months. † 11,000 tons contained 95% to 97% acid.

Company is managed with commendable financial probity, technical ability a high order, and is heartily endorsed as worthy of confidence and invest- it.

ST TENNESSEE MINING & DEVELOPMENT CO. TENNESSEE

See Southern Zinc & Mng. Co., Inc.

ST TENNESSEE ZINC CO. TENNESSEE

Inc. in New Jersey, and registered in Tennessee. All stock owned by C. Hinn. M. Casewell Heine, atty., 1 Liberty St., New York.

Property: 173 acres, 2 miles from Newmarket, on the Southern rail- , reported to show zinc blende ore occurring in joint planes and fractures imestone beds.

Development: by drilling claimed to have proven about 6,722,000 tons ore. Work on the property includes an open quarry pit 75′ deep with 5 tun- running from it.

Equipment: includes 100-ton concentrator, 540′ cable tram and 25-h. p. it.

ENOR MANGANESE CO. TENNESSEE

R. B. Hayes, pres., Masontown, Pa.

Inc. 1919. **Cap.**, $15,000.

Property: at Butler, Johnson county, to be developed and equipped.

X MINING CO. TENNESSEE

Braemer, Tenn.

Prospecting for manganese on Little mountain, Carter county, where 15% is found that shows manganese minerals in grains and lumps in a clay bed.

OEE COPPER CO. TENNESSEE

Address: J. I. Carter, Chattanooga, Tenn.

Officers: J. I. Carter, pres.; John Stagmaier, 1st v. p.; G. H. Miller, v. p.; S. E. Whitaker, sec.; P. B. Carter, treas., with R. B. Davenport, W. S. ner, J. C. Vance and W. H. Weatherford, directors

Inc. 1917, in Tennessee. **Cap.**, $1,250,000; shares $10 par; 70,000 shares reasury to be sold to secure capital for development; 55,000 shares paid to ttanooga Copper Co. for its holdings. Practically a reorganization of that pany, the officers and directors remaining the same.

Property: 120 acres in northern part of Ducktown copper district, Polk surrounded on 3 sides by the holdings of the Tennessee Copper Co., and the ktown Copper, Sulphur & Iron Co., adjoins the East Tennessee mine on the owned by the last named company. Several diamond-drill holes prove that ore deposits of that mine extend downward on their dip beneath the land of Ocoee Copper Co., and that the ore is identical in character, mineral as- ation and occurrence with that of the East Tennessee mine. Ore was found ie drill holes at depths of 685 to 1,050′. Ownership of surface carries owner- of all beneath the surface, as Tennessee does not have an apex law. Dia- d drill records indicate an orebody 290′ long, 415′ in depth and 30′ thick, l to about 241,000 tons, allowing ⅓ for waste. Development might add to figure.

Development: by 6x14′ shaft, 427′ deep, June, 1919, being sunk to depth 1000′.

The property has attractive possibilities, which warrant a well-planned drill- campaign, in addition to the shaft work and development now underway.

OOL MINE TENNESSEE

Operated under lease by Copper Pyrites Corporation, which see.

THERN AGRICULTURAL CHEMICAL CORP. TENNESSEE

Subsidiary of Tennessee Copper & Chemical Corp'n.

Office: 61 Broadway, New York City.

Inc. August, 1919, in Virginia. **Cap.**, $1,000,000.

Company handles the entire output of sulphuric acid and phosphate fertilizer ufactured by the T. C. & C. Corp'n.

SOUTHERN MANGANESE CORPORATION **TENNESSEE**

Operates several manganese mines and is the largest producer of manganese ore in Eastern Tennessee.

Ore: occurs between limestone and decomposed quartzite and is mined by open pit method.

Equipment: includes complete treatment plant and electric smelting furnaces at Anniston, Ala.

Production: (1918) 140 tons of 26% Mn. ore from Scotia Valley; 300 tons of 22-52% Mn. ore from the Doe Valley mine; 550 tons of 25-45% Mn. ore from Taylors Valley; 550 tons of 25-26% Mn. ore from Shady Valley, and 63 tons of 49% Mn. ore from the Neely mine.

SOUTHERN ZINC & MINING CO., INC. **TENNESSEE-VIRGINIA**

John H. Caldwell, receiver, Bristol, Tenn.

Officers: E. L. Patton, pres.; Geo. F. Reynolds, v. p.; J. E. Kingsland, sec.-treas., with S. V. Fulkerson, Horace D. Fry, Kirby Thomas and H. G. Peters, directors.

Inc. in Delaware. **Cap.,** $1,600,000, in $600,000 7% cum. pfd. and $1,000,000 common stock; shares $10 par; full paid; non-assessable.

Property: mineral rights of Fall Branch and Arcadia mines, 1,125 acres: the Fall Branch property, 225 acres, is in the S. W. corner of Sullivan county, Tenn., 7 miles S. W. of Fordtown; the Arcadia property is in Sullivan county, Tenn. ,and Scott county, Va., about 12 miles N. of the Fall Branch property.

Ore: carries zinc in Knox dolomitic limestone; said to be in the same ore-bearing zone as the Mascot and Bertha mines. Prospecting has shown 4 parallel veins. No. 1 vein is opened by a system of open cuts and a 127' incline shaft that has exposed the ore for 300' along the strike. The greater part of this work was done under lease by the East Tennessee Min. & Dev. Co., which built a mill prematurely and exhausted its funds. A rough estimate of ore in No. 1 vein gives 188,000 tons of 4% zinc ore above the 100' level. Veins 4, 5 and 6 parallel No. 1, but have had no systematic development.

Mill: 100-ton capacity, equipped with "Clifford" dry process system. J. H. Banks states in his report: "I consider this a very promising zinc property and can unhesitatingly recommend its further development." No work done in recent years owing to litigation with general creditors.

TENNESSEE COPPER & CHEMICAL CORP'N. **TENNESSEE**

General office: 61 Broadway, New York. **Corporate office:** Millbrook, New York.

Officers: Adolph Lewisohn, pres.; Sam A. Lewisohn, v. p.; E. H. Westlake, v. p.; F. M. Loper, sec.; E. H. Westlake, treas.

Directors: Jules S. Bache, J. Parke Channing, Wm. B. Joyce, H. K. Kilborn, Adolph Lewisohn, Sam A. Lewisohn, S. S. Rosenstamm, J. H. Susman, Richard Sutro, Martin Vogel and E. H. Westlake. Annual meeting, fourth Thursday in April.

Inc. Oct. 11, 1916, in New York, to re-finance and take over control of Tennessee Copper Co. (which see), through stock ownership. Stockholders of old company were given privilege of converting stock share for share, and of subscribing for an equal additional amount of the new stock at $16 per share.

In August, 1919, company organized the Southern Agricultural Chemical Corp. (which see) to handle its acid and fertilizer business.

Capital: 800,000 shares; no par value; increased May 29, 1919, from 400,000 to provide funds for the fertilizer manufacturing business. Holders of voting-trust certificates were given right to subscribe for 100% of their holdings at rate of $12.50 per share, the stock subscribed for to be issued to the voting trustees, who will issue additional certificates under the agreement of October 30, 1916. The issue was underwritten by J. S. Bache & Co. and Adolph Lewisohn & Sons at $1.50 a share. By this issue about $4,400,000 additional capital was secured. Columbia Trust Co., New York, transfer agent; Empire Trust Co., New York, registrar. Listed on New York Stock Exchange.

Balance sheet of T. C. & C. Corp. and Tenn Copper Co., years ending December 31:

Assets.

ear	Prop. & Plant	Orig. & Bond Expense	Invest. Insur. etc.	Cash & Llb. Bonds	Acid, Cop. ore, etc.	Accts. Rec. etc.	Total
.....	$9,019,154	$436,902	$229,329	$1,194,644	$1,386,586	$88,021	$12,274,036
.....	9,248,690	493,118	405,651	1,171,815	1,556,171	415,663	13,286,108

Liabilities.

	Net Bond Indebt. & Reserves	Accts. Payable	Accrued Sink. Fund	Accr'd Exp., Taxes, etc.	Total
.....	$1,453,392	$364,596	$161,732	$115,835	$2,095,555*
.....	2,639,282†	173,944	184,901	123,592	3,121,719

* Assets and liabilities do not agree on account of capital stock having no value. † Includes $1,140,000 as reserve for possible liability under Russian act in dispute, which was paid in November, 1918.

ncome account of Tenn. C. & C. Corp.

	Dividends Tenn. C. Co.	Int. on Invest., etc.	Total Income	Gen'l. Expense	Dividends Paid	Balance incl. prev.
.....	$385,634	$153,904	$539,538	$62,026	$392,817	$153,673
.....	.....	128,533	128,533	59,555	.....	68,978

Tennessee Copper Co., Tennessee.

ubsidiary of Tenn. Copper & Chemical Corp. Same directorate.

)ffice: 61 Broadway, N. Y. Mine at Copperhill, Polk county, Tenn.

)perating officials: A. L. Tuttle, gen. mgr.; M. A. Caine, asst.

nc. April 24, 1899, in New Jersey. **Cap.**, $6,875,000; shares $25 par;),000 issued. State Street Trust Co., Boston, and Equitable Trust Co., York, registrars; Old Colony Trust Co., Boston, and National City Bank w York, transfer agents. Annual meeting, fourth Thursday in April.

uthorized bond issue, 1915, $3,000,000; first mortgage 6% 10-year con-le sinking fund gold bonds; $1,488,000 outstanding. This issue enabled the ıny to retire the $800,000 outstanding bonds of the first issue, December 5.

inancial results:

	Profit	Dividend	Surplus		Profit	Dividend
.....	$356,571	$400,000	$1,905,409	1910.....	$445,387	$300,000
.....	911,150	.....	1,895,402	1909.....	339,406	250,000
.....	387,657	150,000	1,717,883	1908.....	324,768	500,000
.....	1,242,693	600,000	.....	1907.....	800,634	650,000
.....	751,892	600,000	.....	1906.....	824,231	250,000
.....	1,087,503	750,000	.....	1905.....	452,106	218,750
.....	1,095,875	500,000	.....	1904.....	186,966	218,750
.....	367,049	.....	.....	1903.....	417,565	218,750

roperty: 12,640 acres of mineral and timber lands, in the Ducktown t. Ore was discovered and mining first begun in 1850, and the mines were ed regularly by a New York company previous to the Civil War, and dur- earlier part of the war, under compulsion by the Confederate Government ply copper for munitions. Company owns the Burra Burra, London, and ureka mines. Company also holds under lease 270 acres, including the ounty mine. The Eureka was formerly operated under lease for iron ore Virginia Iron, Coal & Coke Co.

eology: property shows pre-Cambrian metamorphosed mica-schist, ıg several lines of mineralization with lenticular orebodies. Four deposits, development, show extensive gossans, originally having a little rich sooty ore under the gossan, which was mined out many years ago. The lenses 30 to 150 in width, 500 to 2,000′ in length, and are of unknown depth. The ısists of a massive mixture of pyrite and pyrrhotite, with a little chalcopy- a gangue of various metamorphic minerals and quartz, ore ranging from 3% copper, 40% iron, 27% sulphur and 15% silica, with minute quantities l and silver. The ore is excellently adapted to smelting, giving very clean

Development: the mines are extensively developed; new work is shown in the following tables, with reserves:

Year	All Mines	Cost p. ft.	Drilling	Cost p. ft.	Ore Reserves Tons
1918.....	2,858′	$0.202	3,579′	$2.539	3,480,911
1917.....	3,107′	0.139	3,351′	2.310	3,485,713
1916.....	2,991′	0.187	4,090′	2.000	3,372,305

The **Burra Burra mine,** which is the principal property, is operated through a 1,600′ main central shaft, sunk at 75° in the footwall, having its first level 170′ below the collar, with succeeding levels at 100′ intervals, the mine ending 1918 with 10 producing levels, with No. 12 under development. The entire output in 1918 came from back stopes in the mine and 134,910 tons of broken ore was in the stopes January 1, 1918.

The main orebody of the Burra Burra is 1,200′ long and averages 60′ wide on the third level. The McPherson orebody farther north is developed by a drift from the third level of the main shaft, connecting with the McPherson shaft, now down to the eighth level. This shaft is 2,200′ N. E. of the main shaft and facilitates working the McPherson orebody, which is about 900′ long with an average width of 25′. The Hiwassee shaft, 900′ S. W. of the main Burra **Burra shaft, is sunk to the third level,** showing a comparatively small orebody of about 200′ length and 12′ average width. Haulage underground is by electric locomotives, and loading of skips in shafts is done from two pockets. During 1918 a total of 2,231′ of underground development work was done. Burra Burra produced 297,083 tons of ore in 1918.

The **London mine** has an 850′ shaft, sunk at at incline of 75°, with 3 levels opened, developing an orebody of 25 to 75′ width and about 600′ length, ranging 2 to 4% in copper tenor. A total of 378′ of underground work was done in 1918, consisting mainly of raises and drifts. The London produced 70,534 tons of ore in 1918.

The **Polk County mine** has a 485′ vertical shaft, with 5 levels opened, developing an orebody of very irregular shape, up to 120′ maximum width, of about 2% average copper tenor. The Polk mine is held under lease. To January 1, 1919, about 248′ of drifting had been done. Production of this mine **was 22,726 tons of ore in 1918.** In 1919 it supplied the smelter with a silica **flux.**

The Eureka mine, idle since 1912, has a shaft 165′ deep, at which point the first level will be opened. Diamond-drill borings have shown an ore-body of 20 to 165′ width, about 1,000′ length, and it is estimated that this mine has 2,500,000 tons of ore developed that average 44% iron, 30% sulphur and about 1% copper. This ore will be treated for its iron and sulphur, as experiments indicate that it will make a good non-phosphorous iron ore.

Equipment: at McPherson shaft includes electric hoists, 400-h. p. motor and engine good for 1,200′, 3 Rogler type electrically-driven (450 h. p. motors) 2,500-cu. ft. compressors, a combination shaft-house and crusher building. Crushing plant includes 18x36″ crusher, feeding to a 36″x33′ Robins belt conveyor used as a picking belt, which discharges into storage bins of about 2,500 tons capacity. As far as possible all barren rock is removed from the crushed ore by hand picking, plant having a daily crushing and assorting capacity of 1,[illegible] tons, ore being reduced to 4″ size. There are similar shaft houses at the London and Polk County mines. Electricity is obtained from the Tenn. Power Co.

The new power and compressor plant at the McPherson shaft has supplied air for the Burra and London mines. The hoist at the latter is driven by a [illegible]. During 1917 a new steel head-frame and crusher-house was erected at the Burra shaft, and the old steam plant shut down. A brick change house for 300 men was erected in 1918.

The company's private railway connects the mines with the works and has connection at Copperhill with the Louisville & Nashville railway. The track is of standard gauge, with 80 and 90 lb. rails, with 7½ miles of main line and 8 miles of sidings and spurs. Equipment includes four 105,000 lb. Sch[illegible]

y locomotives, eighty-five 65-ton steel tank cars, 74 standard gauge gondolas
l 13 flat cars, and 57 hopper bottom ore cars. The company has a repair shop
locomotives and cars, equipped for making all repairs and capable of com-
tely rebuilding when necessary.

Smelter: at Copperhill, 1 to 5 miles from the mines of the company,
s designed and built by J. Parke Channing. On the upper level are the ore
s, having storage capacity for 10,000 tons of ore, 800 tons of coke, and neces-
y fluxes and furnace products requiring re-treatment. Charges are drawn
m the bins into cars of 44 cu. ft. capacity, hauled by electric locomotives over
racks that run under the bins and circle around the furnaces, so that a train
ded on any track may go to any furnace and return to the bins. A sampling
nt was built in 1917 and a smelter laboratory in 1918.

The furnace building of steel has space for 7 blast-furnaces, but only 5 are
use, each having an oval settler lined with firebrick. Slags skim into pots of
cu. ft. capacity, which are hauled by the electric lomomotives. Considerable
g is used for railway ballast.

Coal dust pulverizing and firing equipment was erected in 1918, and tests
far indicate a considerable saving in fuel in the blast-furnaces.

The converter department has two 40-ton electric traveling cranes taking
tte from the settlers to the converters. Two 12′ basic lined converters of the
eat Falls type were installed in 1916 to replace the old ones, also a copper-
ting machine.

Hot converter slag is poured into the blast furnace settlers, by reason of
ich the only converter slags requiring re-smelting are the skulls forming in the
lles. Converter bars average 99.4% copper. Copper is cast in 210-lb. pigs
d sent to the Baltimore Copper Smelting & Rolling Co. for electrolytic refin-
g, which affects the saving of the very small gold and silver values contained.
e finished electrolytic copper is marketed through the American Smelting &
fining Co.

Leaching of flue-dust is being tried, mainly with the idea of securing data
r subsequent treatment of ore in the Eureka mine.

The smelter power house includes two 250 k. w. 500-volt d. c. Westinghouse
nerators, direct-connected to 2 Nordberg tandem-compound Corliss engines,
d one 400 k. w. 500-volt d. c. Crocker-Wheeler generator, driven by a Bates
ndem-compound Corliss engine, all 3 engines running non-condensing, with
haust steam going to a feedwater heater. Furnace blast is supplied by 3 Nord-
rg piston blowing engines, each of 20,000 cu. ft. capacity per minute, and 3
rdberg duplex cross-compound piston blowing engines, each 30,000 cu. ft.
pacity per minute, supplying blast at 50 oz. pressure to a common blast-main,
ove the charge floor. A motor-driven blower was put in during 1919. Con-
rter blast is furnished by 2 Nordberg duplex cross-compound air compressors,
pplying 10,000 cu. ft. per minute each, at 12 lbs. initial pressure. An Ingersoll
nd air-compressor furnishes air at 100 lb. pressure for operating the chipping
ors and sundry pneumatic tools. The electric plant includes a 1
eystone generator, direct-connected to a Ball tandem-compou
g current for electric light, and there is a motor-generator
g a 500-volt current to 220-volt current for electric light
wer plant.

The smelter boiler house has four 512- h. p. Altman &
oilers, with Murphy automatic stokers and Foster superheater
175 lb. pressure, with 150° superheat. Coal and ashes are ha
a bucket and chain conveyor, an 800-ton steel coal bunke
ed automatically to the boilers. A brick transformer house
ant in 1915.

Water is pumped from the Ocoee river by three 10″ 2-s
mps, belt-driven by motors, each with capacity of 2,800 ga
rge storage tanks above the smelter. A 4,000,000-gal. reserv
vel of the furnace floor receives the flow from the water-jacke

The company operates a quartz quarry at Austral, Tenn.

Copperhill, on the Louisville & Nashville railway. Equipment of the quarry consists of a boiler, air-compressor and rock drills.

The smoke damage situation is complicated by the location of the works which are in the extreme S. E. corner of Tennessee, winds carrying the bulk of the fumes into the State of Georgia, by reason of which the State authorities of Georgia brought suit against the Tennessee Copper Co. and the Ducktown Sulphur Copper & Iron Co. in the Federal courts, and the latter decided that the smelters must cease operations or stop the fumes by using them for a sulphuric acid plant. This undertaking proved much more difficult than was anticipated by reason of the intermittent and varying nature of the gas supply from the blast furnace tops.

The No. 1 acid plant cost about $1,600,000 and was put into full operation early in 1908, with a rated capacity of 120,000 tons yearly of 60° Beaume chamber acid. With the completion of the No. 2 acid plant in July, 1916, the company had 2 large lead chamber plants for the manufacture of 60% acid, with an estimated capacity of 300,000 tons per year. No. 1 was overhauled by July, 1917, while considerable improvements were made in 1918. There are also plants for concentration of sulphuric acid to 66° and 97½%, and for manufacture of nitric acid.

As the furnace gases contain sulphur dioxide, sulphur trioxide, carbon dioxide, oxygen and nitrogen in considerably varying percentages, new methods of control were found necessary to maintain the volume of sulphurous gases suitable for making sulphuric acid by the chamber process. After some experimentation the problem was solved by equipping one of the smaller and three of the large blast furnaces with tight tops, above the charge floor, to exclude atmospheric air, these being connected with a dust chamber, where most of the solid matter is precipitated from the gas, the dust chamber being so constructed as to conserve the heat of the gases sufficiently to concentrate the acid in the Glover towers. There are 2 octagonal Glover towers of 30′ diameter and 50′ height with suitable nitre plants at the foot of each. After passing through the towers the gases are conducted through very large lead flues of 200 sq. ft. sectional area, which deliver the fumes to the chamber system containing 4,600,000 cu. ft. of chamber space. In a general way the chamber plant is of conventional design, yet the enormous quantities of fume received and acid produced have brought about developments that were new to the industry, among the most notable being the size of gas connections, acid lines, acid coolers and fans, which are all on a scale never before known. The discharge from the chamber plant is conducted into 11 Gay-Lussac towers, which are of a gigantic size, the three latest and largest being octagonal of 36′ diameter and 65′ height. The company has contracted for the sale of its entire production of sulphuric acid to the International Agricultural Corporation, at a price understood to be $4.81 per ton, the contract expiring on December 31, 1920. This acid plant is the largest and most complete in existence.

On May 29, 1919, the company issued the following statement:

"The Tennessee Copper Co. has a capacity of approximately 360,000 tons per year of 50° Baume sulphuric acid, and under the terms of a contract entered into several years ago it has delivered its entire production of acid to the International Agricultural Corporation at a price much below the current market. Under the heavy increases in wages and supplies in the past few years, this contract has proved a handicap to the company. The contract, however, expires by limitation on December 31, 1920, and plans are now being made by the Tennessee company for the construction of a number of large acid-phosphate plants at strategic points throughout the South. These plants will be of the latest construction and will be equipped with the most modern machinery, with a view to reducing the labor cost to the lowest possible minimum. Work on these plants will be started as soon as the necessary preliminary arrangements have been completed. The company also has under contract a large deposit of phosphate rock in Florida, and plans are now under consideration for its early development. In addition to the above, the company has secured options on and is prospecting additional high-grade deposits. W. D. Huntington will direct the development

he fertilizer enterprise. He is president of the National Fertilizer Associa-, and is recognized as being one of the leading authorities in the fertilizer . While a large part of the tonnage of acid produced at Copperhill will be erted into acid-phosphate at the various plants, the company will have a of its output available at all times to supply to fertilizer manufacturers and rs, and it is expected that the prices received for this acid will average much er than in the past."

Production:

r	Ore smelted, tons	Copper, per ton ore, lb.	Oper. cost per ton	Production Acid, tons	Copper, lbs.	Cost per lb.,c	Received per lb.,c.
.....	.....	....	....	266,627	10.414,815	....	.....
.....	402,071	24.25	$4.50	283,092	9,750,008	20.59	24.800
.....	457,902	23.04	3.43	262,858	10.547,708	16.59	26.238
.....	385,188	24.41	3.51	181,637	9,404,295	14.36	23.663
.....	475,301	26.83	2.82	210,666	12,750,418	10.53	16.274
.....	485,051	26.54	3.14	210,163	12,871,113	11.84	13.706
.....	470,135	28.70	3.25	197,713	13,493,140	11.34	15.748
.....	444,289	29.80	3.27	192,084	13,252,634	11.00	.....
.....	436,285	31.65	3.44	.....	13,808,940	10.88	.....

Low-grade copper ores are treated profitably at other points, but in nearly ther cases, they contain considerable gold and silver, which are lacking in the of the Tennessee. This company has shown both courage and ability in installation of its acid plant, by virtue of which a very serious handicap has turned into a permanent source of large revenue.

NNESSEE MANGANESE CO. **TENNESSEE**

Address: D. C. Campbell, pres., Knoxville, Tenn.

Cap., $20,000; increased 1918 to $200,000.

Property: mines at Sevierville, Sevier county, and Knoxville, Knox ity. A 25-ton electric steel furnace to be installed for the production of ferro-ganese.

TEXAS

Under this head, mining companies are arranged alphabetically. Apart from great sulphur and oil deposits, the mineral production of the State is small; r is the principal metal produced and nearly all comes from the Presidio . Some of the copper deposits (red beds) are said to be worth exploitation. duction for 1919 was 540,000 oz. silver. Small shipments of copper, gold, and zinc ore were made from the Van Horn and Sierra Blanca districts.

ERICAN SULPHUR ROYALTY CO. **TEXAS**

Address: Houston, Texas.

Has a royalty share in the production of the Freeport Sulphur Co., which

ISOS MINING CO. **TEXAS**

Howard E. Perry, pres.-gen. mgr., Terlingua, Brewster county, Texas. Prop- is at Terlingua, 108 miles S. E. of Marfa on the S. P. R. R. Cinnabar ore rs as replacement deposits in limestone and shale. In the lower limestones ores are generally in nearly vertical calcite veins, or in lodes of friction cia. For geology, see Texas Bull. 405, 1909.

Development: by shafts. The mine, which is the biggest producer in district, had a record-breaking year in 1915, producing 1,200 flasks of mercury tember and December. Yearly output not available. Produced 500 flasks in 1918, with a smaller output in 1919.

ment: includes an 18-ton shaft furnace.

T-TIGNER QUICKSILVER MINE **TEXAS**

in Brewster county. Idle several years.

CONSOLIDATED KANSAS CITY SM. & REF. CO. TEXAS

Owns the El Paso smelter at El Paso, Texas, described under that title.

ELLIS MINE 34 TEXAS

Address: W. K. Ellis, treas., McKinney Springs, Tex. W. R. Wyatt supt.

Property: 5 patented quicksilver claims, 103 acres, in Brewster county 100 miles S. of Marathon, Texas.

Development: by 250' shaft and 200' tunnel. **Equipment:** includes 15 ton retort furnace.

Production: 41,400 lb. quicksilver in 1918.

EL PASO SMELTER TEXAS

Address: Kuno Doerr, gen. mgr.; J. Heggie, supt., El Paso, Texas.

Owned by the Cons. Kansas City Sm. & Ref. Co.

Is a subsidiary of the American Smelting & Refining Co., which see.

The smelter proper occupies 43 acres out of an 1,100-acre tract of land which is traversed by the Sante Fe, El Paso & Southwestern and the Southern Pacific railways.

The monthly average of cars of ore that is brought to the smelter from the surrounding mines has never been less than 1,600. Often it has run as high as 2,300 cars per month and in a few instances even larger amounts of ore have been handled in a month.

Three Godfrey lead roasters and 12 mechanical roasters average from 1,200 to 1,500 tons daily. There are four reverberatory copper smelting furnaces that in practice actually smelt 1,500 tons of copper ore in a working day.

The constant increase in the tonnage of copper smelted at the El Paso smelter has made it necessary to replace the two 10' diameter, 30' long Pierce-Smith converters which have been in use by 2 new converters of the same type, each of which is 30' in length and 13' in diameter.

A 12' Great Falls type converter converts in connection with the others 2,500 tons of blister copper per day and is not the least important item in the equipment. From 1,500 to 2,000 tons of lead are smelted each month.

An interesting mechanical feature is the 90' craneway span over which two 60-ton cranes are operated. The new converter stack is 300' in height, is 16' diameter and was built of concrete. The smoke and escaping gases reach the stack through a steel "Balloon type" flue 4,400' long.

In 1918, ore worth $2,500,000 a month and over $30,000,000 a year was smelted in the plant, which covers 43 acres of ground.

The El Paso smelter is a city within itself, with stores, fire station, church, an electric light plant that could light a city of 50,000; parks, water works and office buildings. A portion of the grounds were used during 1916 and 1917 by United States troops as a military post. The hospital has a number of cots ready beds and a resident physician. The smelter owns and operates a complete railway system, and more than 7,000 people who live in El Paso look to it for support.

FREEPORT SULPHUR CO. TEXAS

Address: 61 Broadway, New York City, and Freeport, Tex.

Is a subsidiary of the Freeport Texas Co., a holding company owning the entire capital stock, $200,000.

Property: 8,677 acres of real estate, including 500 acres of sulphur deposits, near the mouth of Brazos river, Brazoria county.

Geology: sulphur occurs in pockets, cavities, and as streaks impregnating gypsum, or a formation in which gypsum predominates. The bed is about 1,000' from the surface.

Development: by wells drilled to the sulphur bearing formation.

Process: the sulphur is extracted from the rock by the well-known Frasch process. Steam is made in boilers and used in water-heaters, each capable of heating 1,000 gals. of water a minute and from 60 to 336° F. under a pressure of 100 lbs. This superheated water is forced down the wells to the formation, the sulphur melts, and rises to surface, where it cools. Sulphur is pure and

ıtly used in the paper pulp industry, the remainder being used for sulphuric l manufacture.

Equipment: includes 4 plants aggregating 23,800 h. p., complete with oil ·age, 4½-mile oil pipe line, canal from river, pumping plant, water purifica- plant, compressors, and large battery of boilers.

Production: about 2,000 tons of sulphur daily.

ZEL MINING & MILLING CO. **TEXAS**

Officers: at last accounts. John V. Hughes, Dallas, Tex., pres.; G. G. ight, v. p.; C. F. Freeman, Dallas, Tex., sec.; R. B. Stichter, treas. **ectors:** J. V. Hughes, T. J. Oliver, G. H. Cox, C. A. Culters, C. F. Free- ı, Milton Parks and G. G. Wright.

Property: the Hazel Silver mine, in Diablo mountains, 15 miles N. E. Van Horn, Culberson county, shows a fissure vein that yields chalcocite ore ı barite gangue. Shipping ore said to average 10% copper and 50 oz. silver ton.

Development: includes 700′ shaft and extensive workings at various ·ls. Mine was worked for 10 years by H. G. Clifford, of El Paso, and A. C. river, of San Antonio, producing $500,000, but was shut down in 1895. A dry centrator was erected to treat the old dumps, said to contain about 100,000 ; of $15 copper-silver ore, but was unsatisfactory and has been converted into et concentrator.

Reported that the Sutton Steele & Steele Co., of Dallas, had taken over mine and would install a cyanide mill. O. W. Steele, mgr.

ıRIPOSA MINING CO. **TEXAS**

Terlingua, Tex.

F. M. Dancy, pres., Philadelphia, Pa.

Property: adjoins the Terlingua mine. **Ore:** occurs in fissure veins :ropping over a wide area. The mine, at one time the largest producer in the ntry, is being developed at depth. Past production has been practically from surface.

Equipment: two 10-ton Scott furnaces, with a capacity of 100 flasks :ksilver per month and the 50-ton Terlingua furnace held under lease. Dumps l to have 32,000 tons containing $241,000 in mercury, April, 1918. Estimated put, 250-300 flasks per month.

COS MINING CO. **TEXAS**

Idle. J. Y. Canon and James Dougherty, of Van Horn, Tex., principal share- ders.

Property: the Pecos mine, 3 miles N. E. of the Hazel silver mine in El ·o county, 19 miles from Van Horn, shows a N. E.-S. W. vein in brown igneous s, traceable 2 miles across the mountains to the Red Maverick mine.

Development: by a 105′ shaft with a level at 90′, showing seams a few ıes thick of copper-silver ore, said to assay 70% copper; the seams in places regate 2′ in thickness. The mine was first operated in 1888, abandoned after king and relocated 1903, by George Briggs and T. R. Owen, forfeited by tech- dity of Land Commission and located by J. Y. Canon.

ESIDIO MINING CO. TEXAS

Office: 406 Balboa Bldg., San Francisco, Cal. **Mine office:** Shafter, Tex.

Officers: W. S. Noyes, v. p. and gen. mgr.; F. C. Handy, supt.

Cap., $150,000; shares $1 par; all issued.

Property: the Shafter or Presidio mine, at Shafter, Presidio county, has roduction record of over $7,000,000 since 1883. **Ore:** carries silver mainly oloride. The mine was once known as the Bullis, and has an interesting ory.

Development: by about 20 miles of workings.

Equipment: includes 1 mile aerial tram, a 15-stamp 100-ton mill and a ide plant. The mill is equipped with 2 tube mills, filter, Pachuca tanks, Dorr ener and 250-h. p. oil engine.

Production: figures are not available, but the State of Texas has yield the following quantities of silver, most of which is from the Shafter mine: 540,000 oz. in 1919; 612,000 oz. in 1918; 588,000 oz. in 1917; 600,000 oz. 1916, and 12,417,882 oz. from 1885 to 1915, inclusive.

Little information is available concerning operations, but it is probable good profits are made.

RAINBOW MINING CO. TEXA

Address: Terlingua, Tex.

Property: a prospect adjoining the Chisos mine, under develop

SHAFTER SILVER MINE TEXA

Owned by the Presidio Mining Co., which see.

SHERIDAN MINING CO. TEXA

Inc. in Texas. **Cap.**, $200,000.

Owns a copper-molybdenite property in the Llano district, Burnet co

STUDY BUTTE MINING CO. TEXA

W. D. Burcham, mgr., Terlingua, Texas.

Property: a lease on the Big Bend quicksilver mine, 5 miles E. of T lingua, Brewster county. Ore occurs in fissures filled with calcite and cinn and occasional impregnations, in a flat lying rhyolitic intrusion 500' thick cov by 50' of limestone shale.

Equipment: includes power plant, 20-ton furnace and oil-engine. O put in 1918 showed a large falling off. Additional depth necessary to ma past production.

TAMA SILVER MINING CO. TEXA

Was reported developing a group of claims in the Quitman district, El Pa county. The ore is silver-lead and occurs in replacement deposits in lime

Adjacent properties include the Thunderbolt group on the lead and z bearing Bonanza lode, owned by Geo. H. Stokes, which is developed by two t nels. Love Bros. are also working similar silver-lead deposits at the head Quitman canyon, 9 miles S. E. of Sierra Blanca.

TEXAS ALMADEN MINING CO. TEXA

Terlingua, Texas.

Property: Texas Almaden quicksilver mine, unwatered and under velopment, 1918. Equipped with 50-ton furnace.

TEXAS COPPER & REFINING CO. TEXA

Address: 527 Cooper Bldg., Denver, Colo.

Officers: W. P. Dietz, pres.-treas.; Wm. Shubert, Jr., v. p.; K. M. Sh hert, sec.

Property: reported to own 1,200 acres of copper-bearing land in Hu man county.

TEXAS DEVELOPMENT & MINING CO. TEXA

Reported to own a copper mine at Nacogdoches, Tex.

TEXAS GULF SULPHUR CO. TEXA

Office: 50 East 42nd St., New York, and Gulf, Texas.

Officers: W. H. Aldridge, pres.; T. Schulze, v.-p.; H. F. J. Knoblock, s treas., with C. F. Ayer, E. C. Bacon, H. B. Baruch, J. A. Black, and T. Cochr directors. F. V. Munster, asst. sec.-treas. Charles Biesel, gen. mgr.

Inc. Dec. 23, 1909, in Texas. **Cap.**, $7,600,000; increased in 1919 to $5,000,000. Was originally $3,000,000. Shares $10 par; issued $5,100,000; s scribed and 50% paid, $2,500,000. No funded debt. Annual meeting, fir Tuesday in November.

Property: sulphur-bearing land near Matagorda, Matagorda co Texas. Drilling in 1918 and 1919 revealed over 10,000,000 tons of sulphur-be ing rock.

Equipment: entire works cost over $3,500,000, including 6-mile rail spur, and 10,000 h. p. steam boiler plant for the Frasch process.

Production: since March, 1919, at the rate of 1,500 tons of sulphur da

UTAH

The descriptions of the mining companies of the State are grouped in five tions, the first including all mines outside of the four big mining districts, ile the mines of the Alta-Cottonwood, American-Fork, Bingham, Park City l Tintic-Eureka-Ophir districts, are described under these separate headings. t Lake City is the actual business center for each of these districts and most the operating companies have offices there.

In 1919, the metal production of Utah had a value of $45,439,000, or nearly million less than in 1918, the decrease being one of both price and quantity. e gold output was $2,070,000, compared with $2,949,170 in 1918, more than half it from Bingham. The 1919 output of the silver mines of the State was 569,000 oz., compared with 13,455,597 oz. in 1918, the Chief Consolidated at reka being the largest producer, with the Tintic Standard a close second; igham and Park City mines were also large producers. The copper output in 9 was 123,626,000 lb., compared with 227,169,630 lb. in 1918, the Utah Copper contributing 9,000,000 lb. monthly. The lead output was 121,249,000 lb., com- ed with 167,008,224 lb. in 1918, and the zinc production 4,467,000 lb., compared h 18,399,417 lb. in 1918, decreasing 77%.

)AH COPPER CO. **UTAH**

Address: St. George, Washington county, Utah.

A. H. Dahle, pres., at last accounts.

Inc. 1916, in Utah. **Cap.,** 600,000 shares; 2c par.

Property: the Burg mine, in Harrisburg district, Washington county, miles E. of St. George, said to be a regular shipper of copper-gold-silver ore. nagement planned erecting a 40-ton leaching plant in 1917. No recent re- ns.

.UMINUM POTASH CO. OF AMERICA **UTAH**

Address: 514 Templeton Bldg., Salt Lake City, Utah.

Officers: G. M. Winkelman, pres.; J. Stokes, Jr., v. p.; H. O. Pack, sec.; mer McCarty, treas., with G. C. Shipp, Geo. H. Blood, and W. P. Hauerbach, ectors.

Inc. March 24, 1919. **Cap.,** $3,000,000; $100 par. Operating expenses re- ted $30,000 for 3 months in 1919.

Property: 15 acres in Marysvale district, Piute county, said to have one the best alunite deposits in the state. Company claims reserves of 60,000,000 s of ore assaying 10% potash, and 37% alumina. Reported in May, 1919, that 00-ton mill was being erected.

IERICAN COPPER MINING & MILLING CO. **UTAH**

Office: Lehi City, Utah. J. N. Butt, pres.; Charles Anderson, v. p.; O. Slade, treas.; preceding officers, Howard Murdock and Chas. Herron, di- tors; William Asher, sec.

Inc. Aug., 1912. **Cap.,** $100,000; shares 10c par. An assessment of 1 l called March, 1914. Property is in Tooele county, but as officers do not ly to letters, no details of the company's holdings are available.

IERICAN EAGLE COPPER MNG. CO. **UTAH**

Officers: F. R. Meadows, American Falls, Idaho, pres.; S. H. Cotterel, .; H. P. Huey, sec., with Henry Miller and Mr. Sparks, directors.

Property: 10 claims, about 200 acres, 2 miles E. of Farmington and 15 es N. of Salt Lake. The ore carries copper, silver and gold.

Development: by 130′ tunnel.

IERICAN STANDARD COALITION MINING CO. **UTAH**

Controlled by Lorin Hall, Salt Lake City; Willard Scowcroft, and John wcroft, Ogden, Utah.

Property: ½ mile N. of Siegel mine in Schell range, said to have a vein wide on surface, and traceable for 600′. Values are mainly in silver.

TELOPE STAR CONSOLIDATED MINES **UTAH**

Inc. March, 1917, in Utah. **Cap.,** $300,000; shares 10c par. Is a consoli- ion of several properties in Mineral Mountain range, 9 miles S. E. of Black

Rock, Millard county. Is said to be a reorganization of the Antelope Star Mining Co.

The incorporators are: Leo Neilson, Logan; Darby Crandall, New York; W. R. Hensleigh; V. L. Arnold and Chas. M. Morris.

ANTELOPE STAR MINING CO. UTAH

Office: 618 Newhouse Bldg., Salt Lake City, Utah.

Officers: Chas. M. Norris, pres.; H. L. Parker, v. p. and mgr.; V. L. Arnold, sec.; L. J. Brattager, asst. sec., with W. N. Williams, B. L. Rich, and L. Nielsen, directors.

Inc. in Utah. **Cap.,** $250,000; 25c par; 50,000 shares in treasury. Stock listed on Salt Lake Exchange.

Property: 9 claims and a millsite, about 200 acres, 20 miles N. E. of Milford, in Millard county, said to have a 5′ fissure vein of milling ore, assaying 8-10% lead. The orebody is leached at surface and contains barium, lead, silver, copper and iron.

Development: by 373′ tunnel, 65′ shaft and about 800′ of drifting and raises. Promoted by Woolley Bros., Salt Lake City.

ARROWHEAD MINES CO. UTAH

Officers: H. D. Chase, pres., 76 G St., Salt Lake City, Utah; Chas. Root, v. p.; G. Alma Gardner, sec.-treas.; A. J. Hoban, managing director, with J. A. Reeder, H. Mann, R. M. Usher, Chas. Anderson and W. J. Allen, directors. J. H. Nelson, supt.

Cap., $10,000; shares 10c par; assessable; 261,953 shares in treasury. Stock listed on Salt Lake Exchange.

Property: the General Connor mine, 9 claims, 1 patented, near Marysvale, Piute county, said to show a 15′ fissure vein of free milling ore, with 16″ streak averaging $18-$20 in gold and silver.

Development: by 95′ shaft, 225′ tunnel, winzes and crosscuts. Ore reserves estimated at $275,000. Five men employed. Management plans sinking from tunnel level and erecting a mill. No recent information.

BEAVER-BUTTE COPPER CO. UTAH

Office and mine: Beaver, Beaver county, Utah. Sherman McCoy, supt.

Inc. 1909, in Utah. **Cap.,** $50,000; shares 10c par; assessable. Property idle from 1912-1914, owing to lack of capital, but development work was resumed in summer of 1914, and property reported under lease to Senator A. B. Lewis, representing Eastern capitalists, 1916.

Property: 15 claims, unpatented, in the Newton district, 8 miles from railroad, show gold-silver ore and are believed to carry the continuation of the Sheep Rock ledge.

Development: by a 150′ two-compartment shaft, crosscuts and drifts. Company claims to have 2′ of $10 ore on surface and 19′ of $8 ore on the 150′ level with 1′ of $18 ore along the footwall side. Planned installing an electric hoist and drifting on the 150′ level. See Beaver Gold Mines Corp. and remember Majestic Mines. No returns, 1917-1919.

BEAVER COPPER CO. UTAH

Office: 609 Newhouse Bldg., Salt Lake City, Utah. Mine at Milford, Beaver county, Utah.

Officers: W. J. Dooley, pres.; S. S. Pond, sec.; A. J. McMullen, v. p., with Chas. A. Weaver, A. R. Bain, Blaine Grey, and W. C. Lockington, directors.

Inc. 1907, in Utah. **Cap.,** $100,000; 10c par; assessable; all issued. Annual meeting, third Monday in March. Listed on Salt Lake Exchange.

In 1919 the company absorbed the Beaver Lake Metals Co. and the Utah United Copper Co. All machinery and other equipment has been moved to the Utah United property because the officers believe that group offers the best chance to develop a producing mine with the limited funds on hand.

Property: 31 claims, 600 acres, in the Beaver Lake district, showing fissure veins in monzonite, contact deposits between monzonite and limestone and replacement orebodies in lime. The ore is complex, containing copper, and

ıides with gold-silver values. Plan on mining an orebody 225′ long said to ıin 10,000 tons of 2% copper ore blocked out.

Development: by a 470′ incline shaft with about 1,000′ of workings. in 1919 the east drift on 470′ level cut 6″ of ore containing 6% of zinc, of lead, and 19 oz. silver per ton.

Equipment: includes hoists, compressor, and pump. Total output to 1919, was 4 cars copper ore and 2 cars lead ore. Assays were 4% copper, lead, and 17 oz. silver.

The consolidation of the three properties and new plans for development ır to be an honest effort on the part of the management to make a producing

VER GOLD MINES CORP. **UTAH**

Officers: A. B. Lewis, pres.; E. C. McGary, v. p.; M. P. Braffet, sec.- .. with B. F. Caffey, W. L. Cook, W. H. Stephens and S. Glazier, directors. . Blainey, mgr.

Inc. in 1914. **Cap.,** $3,500.000; shares $1 par.

Property: claims covering the Sheep Rock gold vein in the Newton ict in eastern Beaver county, 12 miles N. E. of Beaver City, Utah.

Development: by 100′ shaft. Company claimed to have cut a vein of ıg ore, 15′ wide on the 60′ level, and 18′ wide on the 100′ level. In January, the company was reported to have obtained a bond, $240,000, on the old p Rock mine, a former high-grade producer, developed to the 300′ level and ıped with a 5-stamp mill. Promotion methods caused much comment. No ıt report; probably idle.

VER HORSESHOE GOLD MNG. CO. **UTAH**

.etters returned unclaimed. Probably closed down.

Officers: H. B. Ward, Mina, Nev., pres.; John Waldis, Tonopah, v. p.; . Bunker, Salt Lake City, sec.-treas., with Fred Zimmerman, J. W. Kelley F. E. Becker, directors.

Inc. in May, 1915. **Cap.,** $250,000.

Property: 19 claims located on south Fork of Beaver river, 14 miles of Beaver City. Surface samples are said to assay $24.60 in gold.

VER LAKE METALS CO. **UTAH**

Described in Volume XIII.

Merged with Beaver Copper Co., which see.

VER MINES CO. **UTAH**

Office: 222-23 Continental Bank Bldg., Salt Lake City, Utah. **Mine ess:** Marysvale, Piute county, Utah.

Officers: A. H. Cutright, pres. and mgr.; Geo. R. Raymond, v. p.; W. E. ırn, treas.; A. Maxwell, sec., and Alex. Beckstead, directors.

Inc. Dec. 17, 1910, in Utah. **Cap.,** 1,000,000 shares, 1c each; issued 859,000 s. Annual meeting, second Saturday in January.

Property: 11 claims, 220 acres, in the Ohio district, 5 miles from D. & R. Claims carry copper-bearing gold-silver ores in fissure veins in andesitic ıyry. There are 7 veins, 2 developed by crosscut tunnels, 725′ and 72′ long. had only a prospecting outfit. No recent report; presumably idle.

VER RANGE MINE CO. **UTAH**

Address: Black Rock, Millard county, Utah.

Officers: John B. Taylor, pres. and gen. mgr.; W. W. Moody, v. p. and R. B. Graff, sec.-treas.

Inc. July, 1916, in Utah. **Cap.,** $100,000; shares 10c par.

Property: 10 claims, in the Mineral Mountain range, 10 miles S. E. lack Rock on the Salt Lake R. R. Claims are in limestone near quartzite aid to carry copper and lead ore, in three prominent N. S. fissures.

Development: over 1,500′ of tunnel and shaft work. Main Chicago ıl is over 300′ and expected to cut the shoots which show lead ore on the ıe. No recent report. One of the many Utah companies which appear to ıaid to answer letters of inquiry.

BEE BEE MINING CO. UTAH

Office: 409 Kearns Bldg., Salt Lake City, Utah. **Mine office:** Gold strike, Washington county, Utah.

Officers: H. G. Snyder, pres.; John A. Bryson, v. p.; Robt. L. Judd sec.-treas., with E. J. Lund and Thos. Marioneaux, directors; S. F. Snyder, supt.

Inc. April 13, 1915. **Cap.,** $100,000; shares 10c par, issued $70,000. Assessment of 4/10c per share levied, August, 1916.

Property: 3 claims, unpatented, in the Goldstrike mining district, Washington county, claimed to show 20,000 tons of $10 to $35 free milling ore in fissure vein. No recent report. Probably idle.

BIG INDIAN COPPER CO. UTAH

Office: Provo, Utah. Col. C. E. Loose, pres.-gen. mgr.; J. T. Farrer, v. p.; P. G. Peterson, sec.-treas. and supt.; Niels C. Christensen, metallurgist. Col. Loose and Senator Smoot are the principal owners.

Inc. in Utah. **Cap.,** $10,000; shares 1c par; 185,000 taken by insiders; 700,000 issued for property; 100,000 shares offered the public in 1917 at $1. Increased, 1918, to $750,000; shares, 50c par.

Property: 21 claims, 11 patented, about 350 acres, 38 miles S. E. of Moab and 60 miles from the D. & R. G. railway at Crescent, San Juan county, Utah. Claims are said to show copper ore occurring disseminated through sandstone with sulphides appearing at 100′ depth.

Company started operating a 300-ton leaching plant to use the sulphur dioxide process to treat a large tonnage of 3% ore, in November, 1917. Water piped from La Sal ranch, 7 miles distant.

Reported in 1919 that property had been leased for 3 years to the Metallurgical Improvement Association.

BIPONT SILVER MINING CO. UTAH

C. A. Phillips, pres., Spokane, Wash.; J .B. Randall, sec., Oakley, Utah.

Company was organized in 1918, to take a $250,000 bond and lease on 9 claims, including the Bipont mine, 20 miles from Oakley and 2 miles from the Idaho-Nevada line. Reported that over 100,000 tons of rich silver-lead ore is available and company would build a mill.

BLACK JACK CONSOLIDATED MINING CO. UTAH

Merged, 1917, with Empire Mines Co., which see.

BLACK ROCK COPPER MINING & MILLING CO. UTAH

Address: Black Rock, Millard Co., Utah. Walter James, gen. mgr.

Property: 11 claims, 17 miles S. W. of Black Rock, developed by 35′ shaft and a drift on the 180′ level, exposing a vein in limestone, said to show copper values. Working in 1918; no later report.

BLUE RIBBON GOLD MINING CO. UTAH

Address: Minersville, Utah.

Officers: W. B. Seymour, pres.; L. Shaw, v. p.; Fred R. Pryor, sec.-treas., with J. H. McOmie and Clara D. Smith, directors, at last accounts.

Inc. Feb., 1915, in Utah. **Cap.,** $100,000; shares 10c par; issued $60,000.

Property: 8 claims in Jarloose mining district, miles E. of Minersville, Beaver county, Utah.

Ore: gold in shoots in vein 6′ to 12′ wide, between well-defined walls of rhyolite. Average assay said to be $9.40 per ton.

Development: by 50′ shaft. Plan the addition of 25-h. p. gasoline hoist and sinking shaft of 500′ depth. Is only a prospect.

BREWER GOLD & COPPER MINING CO. UTAH

Office: 212 Utah Savings & Trust Co. Bldg., Salt Lake City, Utah. **Mine office:** Ibapah, Tooele county, Utah.

Officers: J. P. Gardner, pres.; S. W. Morrison, v. p.-treas.; H. B. Wessor, sec.; John Mortimer, asst. sec.

Inc. Feb. 16, 1907, in Utah. **Cap.,** $50,000; shares 10c par; assessable. 4 assessments have been levied.

Property: 11 claims, 6 patented, on Dutch mountain, in the Clifton district, less than 5 miles to loading station on the Deep Creek railroad. In operation, May, 1917. No later information.

ENA VISTA CO. **UTAH**
Address: 4 E. 43rd St., New York.
Officers: Jos. E. Barlow, pres.; C. C. Nolfle, v. p.-treas. and mgr., care Indian Mine, Moab, Utah; A. M. Cheney, sec., with N. C. Christensen, and . Dowell, directors.
Inc. 1918, in Utah. **Cap.,** $1,000,000; $1 par; 600,000 outstanding. An- meeting, first Tuesday of December.
The company was organized to buy, or lease, and operate mining properties, irticular properties, where it is possible to use the processes owned by the llurgical Improvement Corporation, 101 Park Ave., New York. A lease been acquired on the Big Indian Mine in San Juan county, Utah, with the al object of making a commercial demonstration of the Christensen Lixivia- process. The mill was expected to be in operation in October, 1919, with a capacity of 8,000 lb. of copper.

L VALLEY GOLD MINES CO. **UTAH**
Office: 410 Felt Bldg., Salt Lake City, Utah.
Officers: M. R. Evans, pres.; Williard Scowcroft, v. p.; N. A. Robert- sec.-treas., with M. P. Braffet and R. G. McQuarrie, directors.
Inc. 1913. **Cap.,** $100,000; shares 10c par.
Property: 16 patented lode claims, 295 acres, 1 millsite, and one placer t 35 acres in Goldstrike district, near Enterprise, about 40 miles from Mo- on Salt Lake Route.
Ore: free milling gold quartz found in fissure veins, 3' wide, along hyry dike in lime, quartz, andesite and rhyolite formation, said to run as as $50 per ton.
Development: several thousand feet of workings, including 2 tunnels, and 705' long, at last accounts. **Ore reserves:** estimated at 10,000 tons ng ore in sight, valued at $20 per ton. **Equipment:** 3-stamp, 10-ton mill.
Production: consisted of several high-grade shipments in 1915. Com- does not reply to requests for information.

L VALLEY HASSIAMPIE GOLD MINING CO. **UTAH**
Address: Goldstrike, Washington county, Utah.
Officers: J. D. Alsop, pres.; Ren Bryson, v. p. and supt.; J. A. Bryson, reas., with H. J. Burgess, A. B. Hemenway, A. F. Miles, W. E. Ayer, tors.
nc. July 28, 1913, in Utah. **Cap.,** $100,000; shares 10c par; outstanding, 0. Annual meeting, first Monday in July.
roperty: 3 claims, 60 acres, unpatented, adjoining Bull Valley Gold s Co., in the Goldstrike mining district, covers a large belt of por- y and quartzite. **Ore:** gold in fissure vein, 17' wide, with 80° dip, said ay from $1.20 to $14.60 per ton.
evelopment: several tunnels and shallow shafts.
roperty is still in the development stage. This is one of the many Utah anies who shun publicity—in this book.

GOMASTER ORE CO. **UTAH**
ddress: Zenith, North Dakota.
roperty: 120 acres, south of Atlas mine in the Star district, Beaver y, said to show silver ore. Developed by shaft to depth of several hundred Plans early resumption of work.

DO MINING CO. **UTAH**
ddress: J. M. Callow, pres., care General Engineering Co., Salt Lake Utah.
mpany had a lease on the dump of the Horn Silver mine at Frisco, Beaver y, Utah, said to contain 200,000 tons of silver, lead, zinc tailings, and oper- 200-ton flotation mill. Operations on the Horn Silver dump have been ed and the company is inactive.

UMET MINING CO. **UTAH**
ddress: Lund, Iron county, Utah.
roperty: 19 claims, 30 miles N. W. of Lund, developed during 1917, ment estimated 2,000 tons of 30% lead and 2 oz. silver ore available above

75′ level. Shipments in August, 1917, yielded $3,000. Production to Septembe 1917, was about 700 tons. No recent returns.

CAPITOL MINING CO. UTA

Address: Charles Smith, supt., Milford, Utah.

Property: 2 claims, 3½ miles S. W. of Milford, Utah. Being develope by shaft, 225′ deep in June, 1919. Crosscutting and drifting was to begin on 2 level.

Ore: carrying silver, lead and gold occurs in limestone and porphyry

CARBONATE KING MINING CO. UTA

Officers: M. J. Dooley, pres.; J. F. Free, v. p.; F. E. Harding, sec treas., of Salt Lake City.

Cap., 1,000,000 shares; 10c par; 400,000 in treasury.

Property: the Hetty Green, Schindler, Ethelwin and Pinky claims, Ophir camp, near Hidden Treasure mine.

Development: 200′ inclined shaft on Hetty Green vein. Property is st in prospective state. No recent report.

CEDAR RIDGE MINING CO. UTA

Owns 5 claims, about 65 acres, adjoining the Lake View mine on N. Promontory Point, Boxelder county, Utah. Mail returned, 1919, from Promon tory Point.

Samples had good zinc values for length of 1,500′, the ore showing 11% zinc for 60 samples cut at regular intervals along workings.

CEDAR TALISMAN CONS. MINES CO. UTA

Offices: 515 Newhouse Bldg., Salt Lake City and Milford, Beave county, Utah.

Officers: S. S. Pond, pres. and mgr.; F. B. Sherwood, v. p.; Ge Baglin, sec.-treas., with H. M. Chamberlain, Geo. Lynch and G. L. Bemis, d rectors.

Inc. March, 1909, in Utah, as a merger of the Cedar Mining Co. a the Talisman Mining Co.; latter company described in The Copper Han book, Vol. XI. **Cap.,** $500,000; shares 50c par; assessable. The 10th assess ment was levied on March 15, 1917, of 1c a share. All outstanding. Stock tra ferred at company office. Listed in Salt Lake City.

Financial statement, January 1 to April 30, 1916, showed profit of $2 At this time management changed and in report, May 1 to September 16, operating loss was given of $8,193 on this period, or net loss of $5,341. Mana ment has been changed again and reports are not available.

Property: 13 claims, 8 patented, 250 acres, in the Star mining distri Beaver county, Utah. **Ore:** carbonate of lead, copper, and zinc, contain gold and silver.

Development: several thousand feet of shafts and underground wo ings, the lowest on the 1,000′ level of the incline, or main working shaft. 300′ level drift is out 267′ and will be driven 200′ further. Previous to the c solidation the two properties are said to have had a total net production of $1 000, but for years they have not shown a production of any importance. Co pany claimed 50,000 tons mill ore on dump and blocked out, that will ave 8% lead, 14% zinc, 7 oz. silver. In July, 1917, the property was leased f years to H. S. Joseph, who started shipping 12% lead and 10 oz. silver o August. Shipments for 1918 totaled 200 tons. Company operations to be sumed in 1920.

CHRISTMAS MINING CO., INC. UTA

Address: 802 S. 2nd West St., Salt Lake City, Utah.

Officers: Thos. H. Hazel, pres.-treas.; C. F. Kabisius, v. p.; J. H. S der, sec., with A. Johnson, and C. F. Adams, Jr., directors.

Inc. April 21, 1891, in Utah. **Cap.,** $10,000; 5c par; outstanding, shares; assessable. Last assessment, No. 18, ½c a share, was called Marc 1919.

Property: 12 patented claims, 4 miles from Gold Hill, Tooele co said to show fissure veins in limestone and porphyry, with gold, silver and lead ore.

Development: 150′ vertical shaft with 100′ of workings. The president letter to the stockholders, says: "We have a mint in the Christmas prop- only the majority of you don't know it." He also says: "We are just bud- into shippers." This is a prospect handicapped by "lack of funds," a not mmon malady.

Y ROCKS MINING CO. **UTAH**

Office: Houghton, Mich.

Officers: N. W. Haire, pres,; John Edwards, v. p.; Jas. P. Edwards, sec.- .; L. M. Cleaves Byers and Jos. Busch, directors.

Inc. 1906, in Utah. **Cap.,** $1,000,000; $5 par. Property consists of holdings in the Michigan-Utah Mining Co., received for lands sold in 1912.

FF MINING CO. **UTAH**

Former address: First Nat'l Bank, Milwaukee, Wis. **Operating office:** Judge Bldg., Salt Lake City, Utah. **Mine office:** Ophir, Tooele county, t.

Officers: A. G. Kern, pres.; Grant Snyder, v. p.-mgr.; J. A. Stewart, treas., with A. D. Thompson, Frank Adams, Geo. Swift and E. McVicker, tors. A. H. Williams, supt.

Inc. May 31, 1906, in Maine. **Cap.,** $3,000,000; $10 par; all outstanding.

Dividends: to 1916, $90,000.

Property: in the Ophir district, contains silver-lead-zinc ore as replace- deposits in limestone.

Development: by tunnels, with several miles of workings.

Equipment: includes electric power and one-mile aerial tram.

Does not reply to requests for information.

PPER MINING CO. **UTAH**

Successor to Mohawk Mining Co.

Inc. July, 1916, by T. J. Yates, J. S. Barlow, John Russon, Dr. G. N. is and J. A. Dalton, all of Salt Lake City.

Property: 7 claims, near Tecoma, Boxelder county, Utah, shows 2 veins sed throughout property, carrying silver-lead and zinc ores.

Development: by an 80′ shaft with 100′ of drifting. Is a prospect only. No recent report.

IMONWEALTH MINES CO. **UTAH**

Office: 420 Herald Bldg., Salt Lake City. **Mine office:** Newhouse, er county, Utah.

Officers: Wm. M. Bradley, v. p.; W. T. Allen, sec.-treas.; Newton A. on, gen. mgr., with C. H. Strevell and Jas. H. Paterson, directors.

Inc. Nov., 1906, in Wyoming. **Cap.,** $600,000; $1 par.

Property: the Commonwealth mine, 7 claims, in the Star district, ad- ig Lady Bryan and Progressive mines. Claims show Topache limestone intrusive sheets of altered green porphyry, cut by fissures, with more or mineralization along fissures and outward along certain limestone beds. ore was produced from surface workings and the Nellie claim has copper ides in its bottom workings.

Development: by a 1,400′ tunnel, with back of about 300′. Said to have d ore assaying up to 4% copper, 20% lead and 60 oz. silver per ton.

Equipment: includes gasoline power and an air compressor. Develop- shows but little ore, mostly low-grade, and claims are not especially promis- according to geological reports. No recent information; probably idle.

SOLIDATED ORES CO. **UTAH**

Owns vanadium-uranium claims in Brumley ridge district, near Moab. Re- d, October, 1919, that work would be started; J. W. Stephen, in charge.

PER BUTTE MINING CO. **UTAH**

Office: Richfield, Sevier county, Utah. Wm. Johnston, pres.; Bird, sec.-treas.

is a copper prospect on Gold mountain, in the Kimberly dis- nty, Utah.

by a short tunnel, showing a 6′ vein of low-grade silver-

bearing copper ore. Company claims to own a large deposit of alunite, a pot ore.

COPPER MOUNTAIN MINE UTA

Owned by Samuel Newhouse, Newhouse Bldg., Salt Lake City, Utah. Lea to A. J. McMullen, Milford, Utah.

Property: 7 patented claims, 125 acres, in Beaver Lake mining distr Beaver county, Utah.

Geology: ores containing gold, silver, iron and copper occur as co tact deposits in E.-W. shoots with a dip of 70° to the north between a marm foot wall and a limestone hanging wall. Ore carries copper oxide with lime a iron, the average of carload shipments being 4%.

Development: by a shaft 100' vertical, then 150' incline and 60' drifts. Mine is worked by overhead stoping.

Equipment: 15-h. p. gas hoist.

Production: 60 to 70 tons for 1916. Ore reserves were estimated 10,000 tons.

COPPEROPOLIS MINING CO. UTA

Address: N. A. Dunyon, mgr., Tooele county, Utah.

Property: 65 claims in Deep Creek district. Shipments of selected in October, 1917, reported to have returned 60% copper, 65 oz. silver and gold per ton. In February, 1918, a car of ore was shipped assaying about copper.

Developments: by tunnels.

COPPER QUEEN MIDLAND MINING CO UTA

Address: Grantsville, Utah.

Officers: John P. Anderson, pres.; E. T. Woolley, v. p.; Mrs Hil Erickson, sec.-treas., with Gustave Anderson, and O. W. Anderson, directors

Inc. June, 1907, in Utah. **Cap.**, $125,000; 25c par; issued 380,000 sha

Property: 15 claims, unpatented, in Clifton mining district. Too county, and 6 miles S. E. of Gold Hill; said to show several promising vein gold-silver values in lead and copper ore.

Development: 6 incline shafts from 50' to 205' deep, two tunnels, and 125' in length. Total workings about 1,850' are mainly result of assess work. About 30 tons of $50 ore was shipped in 1918.

COPPER RANCH CONS. MINING CO. UTA

Office: 130 South, on West Temple, Salt Lake City, Utah.

Officers: D. L. Evans, pres., Malad, Ida.; Jos. Pingree, sec.-treas.; A McCulley, v. p.; D. E. Kirk, and E. V. Kessler, directors.

Inc. Sept., 1917, in Utah.

Property: the Copper Ranch mine, 10 claims, located next to Mil Copper Co. ground, 7½ miles west of Milford. Mine operated during 19 17 by lessees who produced 100 cars of ore netting $32,368 smelter ret Orebodies in sight reported sufficient for regular shipments for seve years.

Development: by 300' incline shaft with drifts and crosscuts on ore

Equipment: motors, hoist and compressor.

COPPER RANCH MINING CO. UTA

Presumably dissolved.

Former officers: M Thatcher, former pres.; C. L. Rood, v. p. Inc. in Utah. **Cap** 000; shares 50c par.

Property: a mine Milford, sold Aug., 1917, for $57,000 to D. Malad City, gree and A. S. McCully, of Milford, Ut ed to 13c p Copper Ranch stock. (See Copper Ra The own its property are described in The Co XL 191

CO UTA

T. H r p. and supt

In

Property: 8 unpatented claims, near Newcastle, said to show copper, er-lead ore. Developed by a tunnel that was 600′ long at last report. a prospect.

EEDMOOR MINES CORPORATION **UTAH**

Address: Palladio Bldg., Duluth, Minn.

Officers: W. D. Williams, pres.; J. A. Keyes, v. p.; R. A. Casson, treas.; . Bonner, sec.; with Lloyd Davie, Milford, Utah, directors.

Inc. Aug., 1915, in Utah. **Cap.,** 1,000,000 shares; 500,000 outstanding.

Property: 7 claims, 120 acres, in Star district, Beaver county, Utah, said how silver-lead ore.

Development: open-cuts and shallow shafts. Some ore shipped from e under former ownership.

EOLE COPPER MINES CO. **UTAH**

Address: Atlas Bldg., Salt Lake City, Utah.

Officers: H. A. Pederson, pres.; H. Brellean, sec.; B. H. Goddard, mgr.

Inc. 1917. **Cap.,** $250,000; shares, 15c par.

Property: 10 claims, 6 patented, 75 acres in Lincoln mining district, ver county, shows gold-silver-copper-lead ore in a contact deposit ween granite and limestone. Deposit has an E. W. course and dips E. Average assays said to be 12% copper, 5% lead, 17 oz. silver and $1 to old per ton.

Development: 400′ incline shaft and 200′ tunnel, with total workings t 2,500′. Management claims to have large bodies of ore blocked out shipping when copper prices warrant.

Equipment: includes compressor and hoist.

EOLE MINING CO. **UTAH**

Was a leasing company. Fully described in Vol. XIII.

OFF MINING CO. **UTAH**

Officers: R. R. Tanner, supt., Beaver, Utah; G. P. Norton, sec.

Cap., $1,000,000; shares $1 par; 295,000 shares and $7,354 in treasury, uary, 1916. Listed in Salt Lake City.

Property: 5 patented claims, in Lincoln mining district, 12 miles east Milford, Beaver county, Utah. Ore is found along the contact of lime e hanging-wall and limestone foot-wall and varies in width from 6″ to It is said to carry silver, lead, copper and gold.

Development: by 240′ incline shaft, also 665′ of tunnels and drifts. Have ven ore shoot on 150′ level.

Three carloads of ore shipped, 1917, assayed 13% lead, 6 oz. silver and) gold per ton.

Equipment: includes a gasoline hoist and air-compressor. No recent ort.

PRIC MINES CO. **UTAH**

Mail returned from former office at 17 Battery Place, New York, and from 206 Templeton Bldg., Salt Lake City, Utah. F. A. Bishop, sec.; . Morris, mgr.

Inc. May 11, 1908, in New York. **Cap.,** $1,000,000; $1 par; assessable; d, $500,000. Is affiliated in finances and is managed by the Horn Sil- Mining Co.

Property: the Cupric, or Iron Devil mine, 16 claims, unpatented, in the co district, Beaver county, adjoining the Peacock mine, at the east of White mountain and 2 miles S. E. of Newhouse. The mine is near gneous contact, dikes and tongues of monzonite invading the limestone; e are numerous mineralized fissures carrying chalcopyrite, pyrite, specu- rite and magnetite with garnet, tremolite, muscovite, etc.

opment: by 2 old incline shafts and 425′ two-compartment ver- sunk near the main tunnel of the Cactus mine. Equipped with ist. Property has good ore, but not, it is believed, in large ity to make mine profitable.

DEEP CREEK COPPER KING CO. UTAH

Mail returned, 1919 from former address, Gold Hill, Tooele county, Utah.

Property: 10 claims in Deep Creek district, extending south from the Western Utah Copper claims.

Development: by 100' shaft said to be sunk on copper-silver-lead ore. Probably idle.

DEEP CREEK COPPER M. & M. CO. UTAH

Office: 501 Boyd Park Bldg., Salt Lake City, Utah.

Officers: R. C. Naylor, pres.; J. Pingree, treas.; A. L. Thomas, Jr., sec., with A. Winzell, L. Housekeeper, I. A. Powell and W. T. Smith, directors.

Property: 10 claims, in the Deep Creek district, Tooele county, said to show lead-silver-copper ore.

Development: by shallow shaft on the Moonlight claim which is to be sunk 100' on a 2½' vein.

Company reported raising funds for development work by stock sales at last account.

DEER TRAIL MINING CO. UTAH

O. J. Salisbury, pres., 574 E. First St., Salt Lake City, ; G. A. McCaskill, gen. mgr. Company operates the Deer Trail mine, near Marysvale. The ore contains gold, silver and lead.

Development: by tunnels, one over 2,200' in length. Early in 1918 a 100-ton mill with flotation unit was completed. Shipments in 1918-'19 averaged 10 to 12 carloads a month. About fifty men employed.

DELSA MINING CO. UTAH

Property about 6 miles from Santaquin, reported operated under lease by G. M. McLean in 1917. Ore occurs in veins, 1-2' wide, carrying silver, lead-zinc. Developed by tunnel, 500' long at vertical depth of 300'. Probably idle.

DETROIT COPPER MINING CO. UTAH

Samuel A. King, pres.; Judge Bldg., Salt Lake City, Utah.

Inc. Jan., 1916, in Utah. **Cap.**, $1,000,000; shares $1 par; 400,000 in treasury. Held 5-year $100,000 bond and lease, from November 24, 1915, on 40 claims, locally known as Ibex mine, and owned by Ibex Gold Mng. Co.

Company described in Vol. XIII. Property is now held under bond and lease by the Monarch Cons. Mines Co. and described under that name.

DEWEY SILVER AND COPPER CO. UTAH

Mail returned, 1918, from former address, Lorin Hall, Brigham City, Utah.

Property: 5 claims, 5 miles N. of Brigham City, Boxelder county.

Development: by tunnels, ore occurring in limestone. Surface ore said to contain up to 60% lead with some silver and copper. Probably idle.

DRY CANYON CONSOLIDATED MINING CO. UTAH

Address: Gisborn, Tooele county, Utah.

Officers: C. J. Garber, pres.-treas.; L. L. Travis, v. p.; J. E. Dare, sec., with V. C. Anderson and Violet S. Scribner, directors.

Inc. 1900, in Utah. **Cap.**, $100,000; shares 5c par; assessable; 1,800,000 shares outstanding. Annual meeting January 15.

Property: 29 claims, 12 patented, 400 acres, in Dry Canyon, Ophir mining district, Tooele county, said to show a complex ore containing gold, silver, copper, lead and zinc.

Development: by tunnels with a total of over 8,000' of workings.

Production: during 1918 produced steadily, smelter returns paying expense of development work.

DUGWAY COPPER MINING & SMELTING CO. UTAH

Office: 54 East 4th South St., Salt Lake City, Utah **Mine office:** Gisborn, Tooele county, Utah.

Officers: O. F. Peterson, pres.-treas.-gen. mgr.; P. C. Kittle, v. p.; A. F. Peterson, sec., with A. F. H. Peterson and H. B. Windsor, directors.

Inc. June 13, 1902, in Utah. **Cap.**, $30,000; shares 10c par; assessable; ed, $22,506. Annual meeting, third Tuesday in July.

Property: 6 claims, patented, 118 acres, in the Dugway district, 43 :s from a railroad. Shows an ore zone, reported by company, to be long on the 200′ level, containing a number of orebodies that carry copyrite, bornite and argentiferous galena, giving assays of 1 to 15% per, up to 30% lead, up to 7% zinc, up to 66 oz. silver, and $1.60 gold ton.

Development: by a 333′ incline shaft, with about 1,000′ of workings, wing considerable ore. Idle for several years.

GWAY SMELTING CO. **UTAH**

Office: 203 Atlas Block, Salt Lake City, Utah.

Officers: A. L. Thomas, Jr., pres.; K. D. Kuhre, v. p.; C. S. Goddard, -treas., with E. R. Hardy, and C. G. Adams directors.

Early in 1918, this company was arranging to construct a 100-ton lter at Dugway, Tooele county, with the idea of refining the ores from Dugway district, and the advertising matter sent out stated "This will : the Dugway Smelting Co. a profit in excess of $1,000 a day with 100 s daily capacity, and with increased capacity the profits will be more ı proportionately larger. As a rule, the public is not cognizant of the :e profits in smelting, as the returns are so large and sure that the public never been given a chance to invest, all the capital being furnished by :e corporations." Nothing has been heard of the proposed company for r a year, so presumably the public has lost another chance to get either fit or experience.

LUTH & UTAH DEVELOPMENT CO. **UTAH**

Property sold to Bullion Coalition, and proceeds distributed. Company sumably dissolved. Fully described in Vol. XIII.

GLE COPPER MINING CO. **UTAH**

Mine office: Santaquin, Utah county, Utah.

Officers: Armon Cravens, pres.; S. W. Higginson, v. p.; C. E. Snell, -treas.; L. F. Peterson, supt.

Inc. May, 1907, in Utah. **Cap.**, $1,000,000; shares 10c par. Last assess- ıt of ½c delinquent, April 11, 1914.

Mine on Mount Nebo, east of Santaquin, has shipped a little high-grade l and copper ore. Developing with a small force at last accounts. No :nt information.

ST ANTELOPE MINING CO. **UTAH**

Address: 135 E. Broadway, Salt Lake City, Utah.

Officers: John Matson, pres. and mgr.; John W. Chase, v. p.; H. E. rs, sec.-treas.; with N. P. Hansen, and A. C. Nebeker, directors. C. W. tit, supt.

Cap., $100,000; 10c par; assessable; last assessment, ½c a share, delin- nt September 15, 1919. Listed on Salt Lake Exchange.

Property: 11 claims, unpatented, on Mineral Mountain, Millard county, ›ins Keno and Antelope Star mines.

Development: by 400′ tunnel with drift on limestone quartzite contact; of work in 1916-17, showed excellent ore in small amount in west drift. ed down during 1918, but reopened in March, 1919.

DORADO GOLD MINING & MILLING CO. **UTAH**

Address: Don Maguire, mgr. and principal owner, Ogden, Utah.

Property: 900 acres, said to show silver-lead-zinc ore in limestone- rtzite contact. Copper ores occur in granite. Shipments in 1912 ran lead, 10 oz. silver and $2 gold. Mine is said to show 40,000 tons % zinc ore and 100,000 tons of silver-lead ore.

Development: includes 1,400′ tunnel. Planned mine development and allation of a new tramway. No recent report. Probably idle.

ERALD MINING CO. **UTAH**

Mine office: Mammoth, Juab county, Utah. J. E. Oglesby, pres.; J. L. dt, gen. mgr.

Inc. 1896, in Utah. **Cap.**, $300,000; shares $1 par; assessable, fully i sued. Listed on Salt Lake Exchange.

Property: 4 claims, and additional land bought, 1910.

Development: 1,100′ shaft, with about 4,000′ of workings, on a narr but rich vein, carrying copper, silver and lead ores. A 4′ vein between w defined walls, showing heavy iron mineralization and sugar quartz w opened in a 700′ winze.

Company has levied assessment for years and been regarded as t "wildest of wildcats," but is now in favor and may repay stockholders their blind faith and yearly contributions.

Reported June, 1919, to look promising on 1,000′ level.

EUREKA OPHIR MINE UTA

At Dry Canyon camp, via Stockton, in Rush Valley district, To county, Utah, on the S. P. L. A. & S. L. R. R.

Property shows veins with replacement orebodies in Paleozoic li stones at and near dike contact and shipped 50 tons a month from the 2 and 375′ levels, averaging 8% copper, 15 oz. silver, 10% lead, in 1913.

Property: operated under bond and lease by Mineral Development C some years ago, and shipped $26.92 ore from the 200′ level. Planned sinki main shaft to 400′ level. No recent returns.

FALK MINING CO. UTA

Address: Midvale, Utah.

Officers: K. H. P. Nordberg, pres.; Alma E. Malstrom, v. p.; Hy A. Nordberg, sec.-treas.; with Alma Francom, and Kristina Nordbe directors.

Inc. 1913, in Utah. **Cap.**, $100,000; shares 10c par.

Property: 8 patented claims, 160 acres, in North Willow Can Tooele county, 8 miles S. W. of Grantsville, said to show veins with le silver, gold, copper ore.

Development: by several tunnels and 120′ shaft. Property is a prosp idle for some time, but management attempting to sell stock to en company to resume work.

FEDERAL MINING & MILLING CO. UTA

Out of business. Former address: Stateline, Iron county, Utah. J Clark, mgr. See Vol. XIII.

FERBER COPPER CO. UTA

Dead. See Vol. XIII of this work.

FLORENCE MNG. & MLG. CO. UTA

Address: Marysvale, Utah. J. A. Fitzpatrick, gen. mgr.; W. A. F patrick, sec.-treas. Operates a 100-ton potash plant, built in 1918. mine supplies alunite from which the potash is derived.

FORTUNA GOLD QUEEN MINING CO. UTA

Office: B. F. Capper, pres., at last accounts, 333 Judge Bldg., Salt L City, Utah.

Property: 3 claims at Fortuna, Beaver county, said to show free in 8′ quartz vein in limestone and porphyry. Opened by tunnels an shaft. Equipped with gasoline hoist. Closed down. No recent returns.

FORTUNA INDEPENDENCE MINES CO. UTA

Inactive. **Address:** E. C. McGarry, pres., 1388 S. 9th E. St., Salt L City, Utah.

Property: 8 claims in Fortuna district, Beaver county, and 2 cla Grand county, held under bond and lease. Ore occurs in intrusive porphyry and trachyte predominating. Mine is developed by 165′ and 400′ adit, said to show an oreshoot 18″ wide and exposed for 135′ ing assays of $20 gold and 3-5 oz. silver. Management planned ext the adit to 800′ in 1917. Five-stamp mill built in 1917, at company's mountain property, 85 miles S. of Green River station. No recent retur

GALENA PARK MINING CO. UT

Address: Ogden, Utah.

ficers: F. W. Thackwell, pres.; W. J. Critchlow, v. p.; S. C. Powell, . E. Beesan, treas.
c. Sept., 1919, in Utah. **Cap.,** $125,000; par 10c.
etails of property not available.

IELD CHEMICAL MANUFACTURING CORP'N. **UTAH**
bsidiary of the American Smelting & Refining Co.
dress: Garfield, Utah.
ficers: C. W. Whitley, pres.; C. M. McNeil, v. p.; R. C. Gemmell, J. M. Bidwell, sec.-treas.; E. L. Newhouse, mgr., with J. M. Hays, rs.
eats concentrate from the Utah Copper Co. and custom ores from ed points in Utah. To supply sulphuric acid for leaching copper ore her purposes, a 150-ton acid plant costing nearly $500,000 was erected 1916. Fumes from the smelter supply the sulphur.
quipment: two 20′ Herreshoff roasting furnaces of 50-ton capacity brick-lined steel flue, pyrite burners, Glover tower, lead-lined acid ers, and two Gay-Lussac towers. Both 66° and 98° B. acid are Leaching and flotation plants nearby will consume most of the

IELD SMELTING CO. **UTAH**
ffice: 120 Broadway, New York. **Operating office:** 714 McCornick Salt Lake City, Utah. **Works office:** Garfield, Salt Lake county, Utah. capital stock owned by American Smelters Securities Co. The smel- s cost, complete, about $7,000,000. Fully described Vol. X.
apacity has been almost trebled by additions and metallurgical im- ments in last few years.

RISON-MONSTER MINING CO. **UTAH**
ffice: Utah Sav. & Trust Co., Salt Lake City, Utah. Mine near Gold ooele county, Utah.
fficers: J. P. Gardner, pres.; J. S. Garrison, v. p.; H. B. Windsor, S. W. Morrison, treas.
ic. June, 1906, in Nevada. **Cap.,** $1,000,000; $1 par; assessable. As- ent No. 9, ½c per share levied in September, 1918. Is a merger of arrison G. & C. Mng. Co. and the Monster Mng. Co.
roperty: 26 claims, patented, on Dutch mountain, in the Deep Creek t, 40 miles from Wendover, on Western Pacific railroad. A branch o the district was completed in 1917, reducing transportation costs ially. The Garrison Monster company built a loading station at Garri- tation on its spur from the Deep Creek line. Mine has over 3,500′ rkings and is said to show considerable bodies of silver-lead ore. was resumed in 1917. A few carloads of ore were shipped early in

RAL EXPLORATION CO. **UTAH**
dress: Providence Bldg., Duluth, Minn.
cers: Hansen Evesmith, pres.; Wm. O. Pealer, v. p.; M. W. Eve- ec., with E. I. Bricker, U. L. Yynott, and E. J. Hansen, directors.
July 21, 1903, in Minnesota. **Cap.,** $100,000; $50,000 in preferred, 000 in common stock; outstanding, $50,000, and $300 preferred.
mpany is an exploration and holding company interested in the St. nd other companies in Star and South Star districts, Beaver county.

N LEROY UNITED MINES CO. **UTAH**
ce: 517 Atlas Blk., Salt Lake City, Utah.
ers: A. S. Fowler, pres. and treas.; Jas. Moffat, sec., with Given nd Loris Pratt, directors.
, $1,000,000; $1 par; 750,000 issued. Paid a dividend of 1c per share, er, 1913.
erty: in Silver Island district, Tooele county, 15 miles north of **r. Company has made several shipments of silver ore, but ran out y and leased mine; lessees are said to have shipped 500 sacks of ary, 1916.**

Property reported sold in August, 1917, to satisfy a judgment for $[illegible] in favor of E. Hanson. No later information.

GINZA COPPER CO. UTAH

Idle. Mine near Kelton, Boxelder county, Utah. Operations stopped [illegible] 1915 after considerable prospecting had failed to locate ore of commercial grade. Described Vol. XI, Copper Handbook.

GLEN ALLEN MINING CO. UTAH

Address: Box 88, Park City, Utah.

Officers: Jas. B. Allen, pres.; E. K. Stallo, v. p.; Emer Murdock, sec.-treas.; with A. C. Hatch, Jos. Hatch, A. C. Miller, S. A. King, J. W. Poe, Leon Nash, and W. R. Ridgely, directors.

Inc. May, 1918, in Utah. **Cap.**, $2,000,000; $1 par; issued 1,500,000 shares. Annual meeting in May.

Property: 36 claims, 15 patented, in Glencoe Canyon, 3 miles S. E. of Park City, includes the old Glencoe mine, a silver-lead producer.

Development: 200′ vertical shaft and a 2,250′ tunnel, with total workings of 3,500′. Management claims 50,000 tons ore blocked out with average assays of 10% lead, 10 oz. silver, 16% zinc, and ½% copper.

Equipment: includes a 50-h. p. hoist, and 6-drill compressor. A 250-ton flotation mill has recently been built.

GOLD BOND MINING & MILLING CO. UTAH

Idle. **Last address:** 27 Latimer Block, Salt Lake City, Utah.

Officers: A. A. Crome, pres.; Walter Crome, v. p.; Wm. Crome, sec.-treas., with W. C. Howe and C. F. Stanley, directors.

Inc. 1898, in Utah. **Cap.**, $25,000; 5c par; assessable; 200,000 shares outstanding.

Property: 2 unpatented claims, 4 miles from a railroad, Tooele county, shows a contact fissure vein, traceable on surface and carrying streaks of copper, gold, silver ore in limestone formation. Assays average 4% copper. Is merely a prospect reported to have good showings. Developed by a shallow shaft and 120′ tunnel, with about 300′ of workings. No recent information; probably idle.

GOLD CROWN MINING & MILLING CO. UTAH

Address: Milford, Beaver county, Utah.

Officers: A. L. Cullimore, pres.; C. G. Johnson, v. p.; S. L. Swan, sec.-treas.; James Kirk, mgr.; W. E. Yardley, asst. mgr.

Cap., $10,000; shares $1 par.

Property: 7 claims and lease on another in Star district, Beaver county. Some rich lead-silver ore opened. Reported in May, 1919, that nine cars of ore had been shipped, mainly from 300′ level, said to assay 20-25% lead and 45 oz. silver.

GOLDEN EMMA MINING CO. UTAH

Geo. F. Busch, pres. and mgr., 426 Vermont Bldg., Salt Lake City.

Cap., $1,000,000; shares $1 par.

Property: 30 claims, under development in 1918. No recent report.

GOLDEN REEF CONS. MNG. & DEV. CO. UTAH

Address: 22 Keith Emporium Bldg., Salt Lake City, Utah.

Officers: D. P. Rohlfing, pres. and mgr.; Leon Sweet, v. p.; H. S. Young, sec.-treas., with L. Simons, J. Rosenberg, C. B. Stewart and David Spence, directors.

Cap., $100,000; shares 10c par; 800,000 shares outstanding.

Property: about 750 acres, in Beaver county, about 5 miles N. of the Horn Silver mines, developed by a 2,000′ tunnel and a 450′ double-compartment shaft with four levels.

Work was resumed in November, 1919, after a shutdown of several months.

GOLDEN RELIEF MINING CO. UTAH

Address: Provo, Utah. Ben. H. Bullock, mgr.

Property: located in Santaquin district, was under development in the Fall of 1919.

OLDSTRIKE BONANZA MINING CO. **UTAH**

Probably dead, see Goldstrike Con. Both companies described in Vol. III.

OLDSTRIKE CONSOLIDATED MINING CO. **UTAH**

Dead. Mail sent Rollo E. Clapp, pres., returned, from former office, 603 ewhouse Bldg., Salt Lake City. Described in Vol. XIII.

OLDSTRIKE MINING & LEASING CO. **UTAH**

Mail returned, 1919, from former address, 603 Newhouse Bldg., Salt ake City, Utah.

Officers: H. G. Snyder, pres.; E. J. Lund, v. p.; Rolla E. Clapp, sec.-eas., with Clyde McQuarrie, Louis R. Lund and H. A. McQuarrie, direc-rs. **Inc.** April 16, 1915. **Cap.**, $100,000; shares 10c par.

Property: lease Nos. 1 and 2 on Hamburg claim of Bull Valley Gold ines Co., 3 claims of the Herd Girl group, Last Chance and Cripple reek groups in Goldstrike district, Washington county, Utah. Said to show old ore occurring in fissure vein, 4′ wide and averaging from $7 to $20 r ton.

Development: 500′ adit, at depth of 300′ with several winzes, drifts and raises.

Equipment: two 3-stamp mills of 20 tons daily capacity, 20-h. p. engine d compressor.

Ore reserves: 10,000 tons blocked out, according to published reports.

No recent report, probably idle. The Goldstrike district had a boom veral years ago, but is at present inactive.

RAND RIVER PLACER CO. **UTAH**

Office: 201 Felt Bldg., Salt Lake City, Utah.

Officers: O. W. Kumrow, pres.; Leo Erdman, v. p.; W. H. Penner, sec.-eas., mgr.

Inc. 1918, in Utah. **Cap.**, $100,000; shares 10c par; 300,000 shares issued; 0,000 in treasury. Annual meeting, first Monday in July.

Property: 3,000 acres of placer ground, at Grand River, Grand county, tah. Gravel runs from 80 cents to $7 per cu. yd. Equipped with a Mitchell malgamator of 35 tons capacity. Expended $6,000 in 1918. No production ported.

RANITE COPPER CO. **UTAH**

Address: Beaver, Beaver county, Utah.

Officers: A. L. Fotheringham, pres. and mgr.; Jos. McEwen, v. p.; F. Tolton, sec.-treas., at last accounts.

Cap., $1,000,000. shares $1 par.

Property: the King of the Hills mine in the Mineral range between Mil-rd and Beaver, has a 2′ vein, carrying high-grade silver-lead ore with some pper.

Opened by a 250′ shaft and 1,100′ tunnel. About $25,000 has been spent on e mine. No recent report, probably idle.

RANITE MINING & MILLING CO. **UTAH**

Address: Santaquin, Utah.

Officers: E. O. Bylund, pres.; Jos. Tietjen, v. p.; Jas. Goodall, sec.; C. Lindstrom, treas.-supt., with T. B. Heelis, R. J. Armstrong and Jos. Crook, rectors.

Property: 12 claims, unpatented, near Santaqu[illegible] Granite ne. Claims show limestone with ore-bearing fis[illegible] posits of copper and silver-lead ore developed [illegible] port, probably idle.

REEN MOUNTAIN MINING & MILLING

Probably idle. No 1917-19 returns secured.

Officers: Dr. R. S. Millbee, Marshfield, Wis[illegible] p.; A. E. Goodell, sec.; S. Amberson, treas., with

Inc. 1915, in Utah. **Cap.**, 1,500,000 shares; 10[illegible]

Property: Green Mountain group in Miners Ba[illegible]

35 miles S. E. of Cisco, on the D. & R. G. R. R., formerly owned by the Green Mtn. G. & C. Mng. Co. and fully described in Vol. XI, Copper Handbook.

Ore: gold, silver and copper, low-grade ore said to average about $8 per ton; also said to show some high-grade ore. Developed by Dewey crosscut tunnel.

Equipment: 30-h. p. gasoline engine, 2 sets of power drills, compressor and pumps.

HANAUER SMELTING WORKS UTAH

At Salt Lake City, Utah. Controlled through stock ownership by American Smelting & Refining Co.

HINMAN MINING CO. UTAH

H. W. Hinman, pres., Garfield, Utah; F. G. Morse, sec., 639 Sixth Ave., Salt Lake City, Utah.

Property: the old Pocahontas lead-silver mine, 6 claims, located 6 miles from Gold Hill. A tunnel was driven to get under the ore disclosed in the 130′ incline shaft above, and some ore was shipped in 1918.

HOMESTAKE T. & C. CO. UTAH

Recently merged with the Great Divide Mines Co.; controlled by John B. Taylor, v. p., 678 E. S. Temple St., Salt Lake City; J. H. Hurd, pres.; Walter A. Cook, sec.-treas.

Inc. 1906, in Utah. **Cap.**, $100,000; shares $5 par; assessable; fully issued. Is a close corporation, with only 5 stockholders.

Property: 30 claims, in Pine Canyon, West Mountain section, Tooele county, with water rights, tunnel rights and franchise for a deep tunnel from Pine Canyon into the Bingham district; also several hundred acres of bench lands, and an 800-acre smelter site, 4 miles from the International smelter. Claims show bedded veins with lead and copper ores.

HOPE OF ISRAEL MINING CO. UTAH

Ben H. Bullock, pres., Provo, Utah; Nora A. Bullock, sec.-treas.

Inc. 1918, in Utah. **Cap.**, $50,000; shares 1c par.

Property: at Santaquin, being developed by tunnel said to have opened up low-grade lead-silver-copper ore.

HORN SILVER MINES CO. UTAH

Office: 27 Cedar St., New York. **Operating office:** McCornick Bldg., Salt Lake City, Utah. **Mine office:** Frisco, Beaver county, Utah.

Officers: Jacob Neadle, pres.; Alexander B. Simonds, v. p.; M. S. Hirschberg, sec.; Harvey N. Wadham, treas., with E. B. Critchlow, A. B. Simonds, Jacob Neadle, W. R. Britton, Chas. Brenneman, Wm. J. Barrette, S. T. Perrin, H. N. Wadham, and H. S. Young, directors; Benjamin B. Lawrence, cons. engr.; Wm. H. Hendrickson, mgr.

Is a reorganization of the Horn Silver Mining Co., which was incoporated in 1879 in Utah, with capital of $10,000,000; shares $25 par. Stock in old company exchangeable for stock in the new on an equal basis.

Inc. Oct. 17, 1917. **Cap.**, $400,000; $1 par; 348,000 issued. Listed on New York Curb.

Dividends: old company paid $5,642,000 in dividends up to 1907. Three dividends of 5c. each were paid in 1916, two by the former company and one by the present. Two 5c. dividends were paid in 1917, and one of same amount in 1918.

Statement for 1918 shows receipts from ore shipments, $181,235; misc. income, $4,513; operating expenses, $147,864; general expenses, $20,383; net profits, $8,434, compared with $27,283 in 1917, and $62,798 in 1916.

Property: 19 claims, 9 patented. The mine is extensively developed and has been a large producer of zinc, lead, silver and gold, with some copper as a by-product. The old bonanza ores extended down to depth of about 800′ with silver ores on the footwall, and copper ore on the hanging.

Main orebody was lost at 900′ and present company's main object is to find its extension below that level. Shaft has been deepened to 1,200′ and considerable work done on the lower levels. The north 900′ and 1,000′ levels now show

ping ore. In addition the low-grade ores and tailings are estimated at 000 tons.

Production: in 1916, 16,567 tons or ore were shipped, made up of 8,504 lead-silver ore, 3,986 tons zinc-lead, 102 tons zinc, 1,237 tons copper and 9 tons old slag. In 1917, output was 11,736 tons of ore, consisting of 10,507 of lead ore; 131 tons zinc ore, and 1,098 tons copper ore. In 1918, output 12,528 tons, consisting of 11,712 tons lead ore, 170 tons copper ore and 646 lead concentrates. In 1919, company employed about 75 men and produced 0 to 2,000 tons a month, including concentrates. Most of the ore came from re the 600′ level.

RN SILVER MINING CO. **UTAH**

Reorganized, 1916, as Horn Silver Mines Co., which see.

IPAH GOLD MINING CO. **UTAH**

Property: the Queen of Sheba mine, in the south end of the Deep ek country, Beaver county, Utah, an old gold mine credited with a production 80,000. Mine shows vein 5-18′ wide. Pay ore occurs in shoots assaying from $13 per ton.

Development: by a 1,187′ main tunnel, several short tunnels and a 376′ e.

Equipment: includes a small mill.

Worked under a 3-year lease from 1914 by C. E. Johnson. No later infor- ion.

PERIAL LEAD MINING CO. **UTAH**

J. H. Turner, mgr.; Frank Jardine, supt.

Property: located in southeastern part of Tooele county, said to show vein of lead-silver ore, assaying 40% lead and 10 oz. silver. Under develop- it in 1919.

DIAN QUEEN CONSOLIDATED MINING CO. **UTAH**

Office: Provo, Utah. **Mine office:** near Newhouse, Beaver county, Utah.

Officers: Jesse Knight, pres.; L. N. Morrison, v. p.; W. L. Mangum, -treas.; K. S. Jordan, gen. mgr.; J. W. Knight, directors.

Inc. 1907, in Utah. **Cap.**, $150,000; shares 10c par. Listed on Salt e Stock Exchange.

Property: 39 patented claims in Newhouse district.

Development: by 3 tunnels, 4,700′, 300′ and 200′ long, respectively; also spect tunnels and shafts.

Equipment: includes compressor, drills, blower and electric power. t of the mine has been worked by lessees.

Y HAWKES MINING CO. **UTAH**

Mail returned, 1919, from former address, Ogden, Utah.

Property: 6 claims in Little Valley, on Promontory Point, in Great Lake, near the Lake View mine. Ore carries galena with silver. About 00 was expended sinking an incline shaft and open cut work.

NNETTE COPPER MINING & MILLING CO. **UTAH**

Address: via Vernal, Utah.

Officers: J. T. Fitch, pres.; F. B. Hammond, v. p.; C. R. Jones, sec.- s., with G. A. Storrs and W. H. Griffin, Jr., directors.

Cap., $200,000; shares 20c par.

Property: 34 unpatented claims in the Uintah basin, Utah, 55 miles S. Rock Springs, Wyo.

Development: by 1,000′ of tunnels and shafts, costing $10,000. Ore ains up to 20% copper and good gold and silver contents. Shipments were le in 1916. The long haul prevents shipping ore at a profit, and a plant was ned at last accounts. Probably idle.

NO M. & M. CO. **UTAH**

Controlled by Knight Investment Co., Provo, Utah. **Mine office:** co, Utah.

Officers: Jesse Knight, pres.; W. Lester Mangum, sec.-treas.; Knight r Jordan, gen. mgr.; R. S. Andrew, supt.

Inc. March, 1907. **Cap.,** 500,000 shares; 10c par. Stock listed on Sal Lake Exchange.

Property: located in the Antelope mining district, Millard county. in the development stage.

KENTUCKY-DOUGLAS MINING CO. UTA

Mail returned, 1918, from former address, care Roger Traweek, sec., 62 w 3d St. N., Salt Lake City.

Officers: E. S. Holt, pres.-treas.; Thos. E. Brooks, v. p.; with T. S Fowler, directors.

Inc. 1916, in Utah. **Cap.,** $1,000,000; $1 par; 600,000 paid for property 400,000 in treasury.

Property: 10 claims, in Silver mining district, western Tooele county said to show silver-lead ore in veins and deposits in limestone, at and nea porphyry contacts.

Development: 150′ crosscut tunnel, expected to cut vein at 250′. I a prospect. Presumably idle.

KING COPPER MINING CO. UTA

Controlled by the Baileys of Salt Lake City. Property, located on th divide between Emigration and Red Butte canyon, 12 miles E. of Salt Lake City shows 6′ vein of copper carbonates on contact between quartzite and blue lime stone. Is developed by 300′ tunnel, principally in sandstone. Ore said to carr $14 in gold, copper and silver.

KING DAVID MINING CO. UTA

Address: Provo, Utah. **Mine office:** Frisco, Beaver county.

Officers: Jesse Knight, pres.; David Evans, v. p.; W. L. Mangum, sec treas.; K. S. Jordan, gen. mgr.

Inc. 1908, in Utah. **Cap.,** $500,000; shares 50c par; assessable; 67,00 issued. Shares listed on Salt Lake City Exchange. Sales at 2c. in 1919.

Property: 63 claims, patented, 940 acres, adjoining the Horn Silve mine, and supposed to carry the extension of the Horn Silver vein. Claim are well mineralized. **Ore:** mainly silver-lead bearing, with small quan tities of zinc and copper. **Development:** by 800′ 3-compartment shaft an several prospect tunnels and shafts. Present work consists of drifting, sinki and diamond-drilling.

Equipment: includes two 80-h. p. boilers, a double-drum hoist, 5-dr air compressor, 14 machine drills, generator, blower and steel head-fra Inactive in 1919.

KING OF THE HILLS MINE UTA

Address: Milford, Beaver county, Utah. Mine in Granite district, 2 miles N. E. of Milford, reported to have a 14 to 18′ contact metamorphic ve of copper-lead ore in limestone, cut by porphyry.

Development: by tunnels. Equipped with concentrating mill, maki a product carrying 10% copper, 42% lead and 10 oz. silver. Developing at l accounts.

LAKEVIEW MINING CO. UTA

Office: Ogden, Utah. **Mine office:** Promontory Point, Utah.

Officers: W. H. Wattis, pres.; L. F. Farr, sec.-treas., with C. Farr and Jas. Wotherspoon, directors.

Inc. March 9, 1915, in Utah. **Cap.,** $50,000; shares 5c par; assessa all issued to officers of the company. Annual meeting, March 9.

Dividends: to May, 1916, amounted to $124,000.

Property: 15 claims, unpatented, 235 acres, at Promontory Point, Box elder county, 3 miles E. of Saline on the S. P. R. R., shows zinc-lead ore in contact deposit between limestone foot and shale hanging-wall. The ore-b runs 35° W. and dips 35° N. E. Pay shoots are from 1′-20′ wide and fro 52′-250′ along the strike. Assays reported to average 32% zinc, 5% lead, 2 iron, 16% insoluble.

Development: to 1,000′ below the outcrop by 5 adits, from 250 long. Zinc ore as shipped averaged 32%, and lead ore 26%.

Equipment: includes 600′ tram and oil-driven Chicago Pneumatic comssor of 187 cu. ft. capacity.

Production: to July 1, 1917, 279 cars realized $352,471, mostly from zinc bonate ore.

The mine made quite a remarkable record. Located January 27, 1915, work s commenced March 9, with a small force and by December, 1915, all debts e paid, the mine was developed, equipped and shipping, a $70,000 dividend paid stockholders and a cash surplus remained in the treasury. Mine developed a lead property with depth, sulphides replacing oxidized ore. Property mined and sampled by Pierre Peugot, July, 1917.

In July, 1919, mine was again being operated in a small way under manageit of W. H. Wattis; company had approximately $20,000 in the treasury.

VORE GOLD MINES CO. **UTAH**

Idle and probably dead. Address: W. Scowcroft, Ogden, Utah. Mine is r St. George, Utah.

Officers: Willard Scowcroft, pres.; R. G. McQuarrie, v. p.; D. H. Morsec.-treas., with Irvine McQuarrie and Herrick McQuarrie, directors.

Inc. 1915, in Utah. **Cap.,** $100,000; shares 10c par; 60,000 issued.

Property: 10 claims in the Goldstrike district, Washington county, said show a vein 11′ wide, averaging $5 gold per ton.

ONORA MINING & MILLING CO. **UTAH**

Office: 18-20 E. First South St., Salt Lake City, Utah. **Mine office:** lford, Beaver county, Utah.

Officers: John Matson, pres.-mgr.; J. W. Chase, v. p.; C. D. Brown, -treas., with L. H. Stohr and N. P. Hansen, directors; S. Molin, supt.

Inc. Dec. 19, 1903, in Utah. **Cap.,** $100,000; shares 10c par; assessable; ued 950,000 shares. Listed on Salt Lake Exchange. Sales vary from ¼ to 2c., 9.

Property: 13 claims, in the North Star district, near Milford, shows ures in limestone carrying replacement deposits of gold, silver, zinc and l ores.

Development: by tunnels of 1,500′, 500′ and 300′ and 7 shallow shafts of to 100′ depth.

Company spent $9,000 on development work in 1917 and 1918, and has cut ie promising looking veins. Expects to be shipping soon.

Equipment: includes electric hoist and air compressor.

TTLE VALLEY MINING CO. **UTAH**

Owned 9 claims in compact group N. and E. of the Lakeview property, Protory Point, Boxelder county, Utah. Mail returned, 1919, and company bably idle.

WLAND TUNNEL WATER & TRANSPORTATION CO. **UTAH**

Mail returned, 1919, from former address, 819 Newhouse Bldg., Salt ce City. **Mine office:** Starr, Utah.

Officers: Louis Fugal, v. p.-mgr.; C. L. Whitney, sec.-treas., with Geo. Wasson and D. H. Livingston, directors.

Inc. Nov., 1912, in Utah. **Cap.,** 1,000,000 shares; 1c par; 350,000 issued.

Property: 36 unpatented claims, 700 acres, in Nebo mining district, Juab nty, said to carry gold-silver-lead-copper-zinc-iron ore. Formation is rtzite, lime and granite.

Ore: occurs as a contact deposit and in fissure veins, running N.-S. h dip of from 40-90°.

Company was organized to drive a 10,000′ drainage and transportation tunnel the Mt. Nebo mineral belt to serve 11 companies operating in that district to develop its own mineralized ground. The tunnel was in 600′, January 1, 7. No later information.

CIN COPPER CO. **UTAH**

Address: 908 Kearns Bldg., Salt Lake City.

Officers: R. W. Powers, pres.; D. J. Wheeler, v. p.; G. S. Norris, sec.-s., with F. Riter, P. K. Flynn, and V. Ergmaga, directors.

Property: near Lucin, Boxelder County, said to have a promis... as be... ing of ore. In December, 1918, property was being operated unde... re wa... D. J. Wheeler.

LUCKY BOY MINING & MILLING CO.

E. E. Lowry, pres.; Ira Griffiths, sec.-treas.

Inc. April 20, 1916. **Cap.**, $50,000; shares 10c par; assessab... ot, shares outstanding. Listed in Salt Lake City.

Property: 6 claims, in Clear Creek mining district, Boxelde... on-I... said to show copper-silver-gold ore. No recent information.

LUCKY STAR COPPER MINING CO.

Address: N. J. Nielson, sec.-treas., Dugway, Tooele county, ... 30 ...

Officers: G. N. Strike, pres.; J. T. Aydelotte, v. p., with Israe... and Peter Sacos, directors.

Cap., $500,000; shares 10c par; 275,000 in treasury.

Property: Lucky Star mine in Dugway district, 45 miles f... at Faust.

Development: by 260′ incline shaft with drifts on ore 5′ th... length of drift, said to assay 9% copper and 15 oz. silver per ton. ... was doing development work in 1918; no later report.

MAJESTIC COPPER MINING & SMELTING CO.

Office: 53 State St., Boston, Mass. John M. Dick, president. ... practical intents and purposes this company was succeeded, 1904, by ... Copper Co., which was suceeded, 1908, by Majestic Mines Co. Majestic ... M. & S. Co., however, is still in existence, though practically the enti... issue, and a large majority of the bonds, are owned by the Majestic M... Very fully described in Vol. IV, of the Copper Handbook.

MAJESTIC MINES CO.

Office: 342 Exchange Bldg., Boston, Mass. **Mine office:** ... Beaver county, Utah.

Officers: John M. Dick, pres.; H. M. Inman, v. p.; D. J. Fl... sec.-treas.; J. A. Bailey, G. F. Kellogg, John Muller, R. H. Phillip, E. M. ... worth and John Freeland, directors; Alex. D. Moffat, mine mgr.

Inc. May 18, 1908, in Maine, practically as successor of Majestic ... Co. and Majestic Copper Mining & Smelting Co. **Cap.**, $5,000,000; ... $5 par; assessable; issued, 808,795 shares.

Stocks of both companies were exchanged share for share for st... the Majestic Mines Co. on payment of 15c. a share; bonds of the M... Copper Mining & Smelting Co. were exchanged for stock of the Majestic ... Co., giving 900 shares of new stock for each $1,000 bond.

The result of the reorganization was as follows: all floating indebt... of the operating company has been liquidated; $868,500 of the $1,000,000 ou... ing bonds have been purchased and are now owned by the Majestic Mines ... practically 87%—which gives the Majestic Mines Co. control of the situ... Assessments of present company have been as follows: 15c. in 1908; 5c. in ... 1910; 10c. in April, 1911. Last assessment, 10c. per share, was payable Ap... 1919. Shares listed on Salt Lake Stock Exchange, Boston and New York C... Federal Trust Co., transfer agent; State Street Trust Co., registrar, Bo... Mass. Annual meeting, third Tuesday in March.

Property: 120 claims, 2,450 acres, in 8 groups, also an 80-acre sme... site, and 800 acres miscellaneous lands. The groups, located in 5 different ... tricts of Beaver county are the O. K., Old Hickory, Harrington-Hickory, V... burg, Hoosier Boy, Southern States, Larkspur, Copperfield and Treasurer, ... to have about 100 orebodies, carrying copper, gold, silver, platinum, lead, co... bismuth, vanadium and uranium. The company has platted the town sit... Lewisville, where the smelter was located, and the property is served by the ... Lake Route.

Development: there are 18 shafts, 100 to 600′ deep, with a total of ... miles of workings. The Old Hickory and O. K. mines yield copper ores ... others silver-lead ores.

has been on the Old Hickory group of 9 claims, and in July, ore was reported on the 400′ level.

mine, 7 claims, formerly the principal producer, has a 500′ ient shaft, with a vein up to 20′ in width, development being e 300′ and 400′ levels. This mine had over 500,000 tons of low- ocked out, in what apparently was a stockwerk, up to 250′ in width, ringers of high-grade ore.

Harrington-Hickory group of 27 claims, partly fractional, shows ous fissure veins, intersected by cross veins, both approximately vertical, n addition, has a series of bedded veins, presumably following bedding s, dipping at 30 to 35°, giving 3 separate intersecting systems of orebodies. lopment is by a 600′ two-compartment vertical main working shaft, with s on the 500′ level, where there is a body of high-grade ore, assays from h have given 1% copper, 37 to 55% lead, 18 to 22 oz. silver, and about $1 per ton.

The **Vicksburg** group of 4 claims, a lead-silver mine, formerly worked gold, has 3 practically vertical fissures, of 2 to 20′ width, with mineralized s-fissures, developed by a 200′ 2-compartment working shaft, a 150′ incline t and numerous shallow shafts and pits. It is said that high-grade ore has encountered at a depth of 150′ in this mine. Worked by lessee and 20% lty paid to company on gross proceeds.

The **Hoosier Boy**, a silver-lead mine is about 3 miles from the Horn er mine. An 800′ shaft has been sunk and considerable work done at 200′, 600′ and 800′ depth.

Equipment: includes 6 gasoline and 1 steam hoist. Electric power, for ting and pumping, is taken from the Beaver River Power Co.

Mines closed down from August, 1914, to May, 1915.

Production: in 1916 was about 6,500 tons of ore, yielding 350,065 lb. er, 294,678 lb. lead, 257,476 lb. zinc, and 18,680 oz. silver. Produced about tons per month, 1917. Management has not furnished later production res.

MMOTH COPPER MINING CO. **UTAH**

Office: 219 Judge Bldg., Salt Lake City, Utah. Edward Bardsley, pres.;). Lyon, sec.-treas.

Inc. in Utah. **Cap.**, $10,000; issued, $6,000; shares 1c par; assessable. ed on Salt Lake Exchange.

Owns 240 acres in Millard county, 15 miles from Milford, said to show a of copper ore in monzonite. Development is surficial only, and property is a prospect. No recent returns.

STER KEY MINING CO. **UTAH**

Address: 1014 Boston Bldg., Salt Lake City, Utah.

Officers: A. G. Gutheil, pres.; C. W. Reese, v. p.; G. M. Sullivan, sec.- s., with A. J. Mooney and Henry Barney, directors.

Inc. Feb., 1915, in Utah. **Cap.**, 1,000,000 shares of no par value; as- able; 500,000 held by Trustee.

Property: 7 claims, 5 patented, 123 acres, 8 miles W. of Milford, Star ict, Beaver county.

Geology: ore occurs in bedding planes and fissures in limestone dip- N. E., the Mowitza shale-contact carrying the large orebodies, which extend g the bedding into the Red Warrior limestone. Company expected to cut horizon at depth of 250′. Hoosier Boy fissure intersects it. Is a prospect. recent report.

AL STATES MINING & MILLING CO. **UTAH**

Address: care Jesse F. Cannon, 743 S. 3 E. St., Salt Lake City, Utah.

Officers: Jesse F. Cannon, pres.; Henry Schepper, v. p.; E. S. Fisher,

19, in Utah. **Cap.**, $100.000. Company was organized to develop claims in the Dugway district, Utah.

MILFORD COPPER CO. OF UTAH UTAH

Office: Newhouse Bldg., Salt Lake City, Utah. **Mine office:** Milford, Utah.

Officers: Alfred Frank, pres.; C. W. Saacke, v. p.; H. A. Frank, sec.-treas., with J. E. Bergh, supt.; O. Brodbeek and F. Eckstein, directors.

Inc. Feb. 3, 1917, in Utah. **Cap.**, $500,000; $1 par; all issued. Transfer office 52 William St., New York. U. S. Corporation Co., New York, registrar. Stock listed on Salt Lake Exchange. Annual meeting, January 15. Earnings at rate of $100,000 per year.

Property: 18 patented claims, 300 acres, at Milford, Beaver county, Utah, known as the Montreal mine, being one of the properties developed extensively by the defunct Glasgow & Western Exploration Co. In February, 1916, mine was leased by Alfred Frank and others, who eventually organized the Milford company.

Geology: contact deposit in limestone and quartz-monzonite. Orebody 10 to 50′ wide, dips 45°, and has an irregular course. Ore is partly sulphide and averages 2.5% copper, 0.75 oz. silver, 0.01 oz. gold, 15% silica and 37% iron.

Development: by tunnels and shafts to 400′ depth, workings amount to 3,000′. Ore reserves estimated at 30,000 tons copper ore. In addition 200,000 tons of iron ore, with small values in silver and copper, has recently been opened up.

Equipment: 8x10″ air-hoist and 10-drill compressor.

Production: ships 100 tons daily to Garfield smelter, Utah, which desires the high iron-content of the ore.

MILFORD MAGNOLIA MINES CO. UTAH

Address: R. B. Garff, pres., 219 Colfax Ave., Salt Lake City; H. A. Smith, C. I. Goff, A. F. Judd, and John Clayton, directors.

Inc. 1919, in Utah. **Cap.**, $10,000; shares 1c par.

Property: the old Magnolia group of 9 claims, 12 miles S. W. of Milford, which contain lead-silver ore.

Development: by 125′ and 150′ shafts when the company acquired the property (1919). Company sank the 125′ shaft to the 200′ level on which exploration work exposed 4′ of high-grade lead-silver ore.

MILLER HILL MINING CO. UTAH

Office: care Knight Bros., Knight Block, Provo, Utah. **Mine office:** American Fork, Utah county, Utah.

Officers: Jesse Knight, pres.; J. Wm. Knight, v. p.; W. Lester Mangum, sec-treas.

Cap., $100,000; shares 10c par; assessable. Shares listed on Salt Lake Exchange. In September, 1917, 25,000 shares of stock were offered for sale at 50c. a share. Assessment of 2c. per share was called November 12, 1917. Shares sold from 2 to 15½c. in 1918, and 1½ to 4c. in 1919.

Property: 33 claims, 30 patented, adjoining the Mineral Flat mine, developed by 2,200′ tunnel with about 2,400′ of workings.

Property was worked in 1918, but is now idle.

MINERAL MOUNTAIN MINING CO. UTAH

Address: Tecoma, Nevada.

Officers: G. Austin, pres.; F. Litz, v. p.; E. B. Whipple, sec.; C. F. Whipple, treas.

Inc. March, 1908, in Utah. **Cap.**, $100,000; shares 10c par; 475,000 issued; assessable to 1c. yearly; assessment No. 4, levied July 2, 1919, 1c. a share.

Property: 13 unpatented claims, 250 acres, in Lucin district, Utah, 8 miles from Tecoma, Nevada. Developed to 350′ by incline shaft.

Geology: contact and fissure veins in limestone, quartzite and granite. Shoots are from 12 to 24″ wide. Ore carries lead carbonate, silver, and gold.

MINERALS PRODUCTS CORPORATION UTAH

Address: Marysvale, Utah. Controlled by Chicago capital. Howard F. Chappell, pres.; R. H. Knapp, gen. mgr.

Property: alunite bearing claims, 9 miles S. W. of Marysvale.

Equipment: includes aerial tram 6,200′ long, 600-h. p. steam plant and 1-ton mill to extract potash from the alunite, which is a hydrous sulphate of

l potassium. In October, 1918, reported as shipping 600 tons of ılphate per month.

_H CONS. MINES CO. **UTAH**

.ess: 631 Judge Bldg., Salt Lake City, Utah.

.icers: Joshua Greenwood, pres., 1150 Herbert Ave., Salt Lake City; . Goslen, v. p.; with M. K. Parsons, M. P. Broffet, J. M. Hayes, directors.

Inc. in Utah. **Cap.**, $2,000,000; shares $1 par; issued, 800,000 shares.

Company has a bond and lease on the property formerly held by the Detroit pper Mining Co.

Property: the Ibex mine (see Ibex Gold Mng. Co.), situated in Detroit trict, Millard county, 35 miles from Oasis, and 20 miles west of end of Delta nch line. Claims were located 35 years ago, work began 1894, and the Ibex was formed and smelter put up at Leamington, Millard county, Utah, treating tons daily. In winter of 1894-'95, company failed and property was idle till 6, when Jesse Knight took it up and reorganized the Ibex Co., patented the ims and sank two shafts. Worked until panic of 1907. Idle till 1915, when se and bond was taken from Mr. Knight by local farmers who organized Detroit C. M. Co. and shipped ore.

Claims cover two horizons of limestone; one blue and hard, the other light l soft, both cut by porphyry dikes and intrusives. Ore occurs in veins and lding offshoots, the veins being 25-100′ in width.

Ore: carries 2%-20% copper, with trace to 3 oz. per ton silver and to $20 per ton gold. Elevation of mine 5,500′ to 6,500′ above sea level.

Development: 600′ shaft on Keystone claim, a tunnel on Ibex, with 500′ tical depth at face and a 500′ shaft on E. P. H. claim. Good auto road from lta to Oasis; freight to Oasis $6 (to R. R. terminal $4); R. R. to Salt Lake, 60; smelter treatment, $4.

)NZONITE SILVER & COPPER CO. **UTAH**

Idle. **Officers:** S. S. Pond, pres. and gen. mgr.; D. Rigby, sec.; Geo. glin, treas.

Cap., $50,000; shares 5c par; assessable. In treasury, Jan., 1916, 400,000 res; bills receivable and cash, $2,500. Stock listed in Salt Lake City, but sales for 2 years.

Property: 7 unpatented claims, near Milford, Beaver county, 6 miles m the railroad, surrounded by the Leonora, Hoosier Boy and Paloma Exten- ı mines. Ore: silver and copper.

Development: 100′ shaft with 50′ of crosscutting. Is a prospect.

)RGAN ARGENTINE MINING CO. **UTAH**

Office: 22 E. Broadway, Salt Lake City, Utah. Mine near Peterson, rgan county, Utah.

Officers: Herbert Pembroke, pres.-gen. mgr.; A. B. Pembroke, sec.- ıs.

Inc. 1900, in Utah. **Cap.**, $5,000; shares 1c par.

Property: 15 claims, 9 patented, 280 acres, in Argenta district, shows ure veins in limestone carrying silver-lead and copper-gold ore.

Machinery was added, and development work started in 1917 and continued 1918.

)RGAN CRESCENT MINING CO. **UTAH**

Geo. T. Stenhouse, gen. mgr., Morgan City, Utah.

)RGAN-GALENA MINING CO. **UTAH**

Address: 417 Kearns Bldg., Salt Lake City, Utah.

Officers: J. W. Rozzelle, pres.-treas.; A. H. Levine, v. p.; J. H. Ritchie, . with F. H. Ashihira and Frank Troxler, directors.

Inc. Oct., 1916, in Utah. **Cap.**, $100,000; shares 10c par; 500,000 issued.

Property: 6 claims in Morgan county, Utah, said to contain fissure ıs in porphyry carrying 37% lead ore with some gold-silver values. Develop- ıt by shafts and tunnels. Is considered a good prospect. No recent report, bably idle.

MOSCOW MINING & MILLING CO. UTAH

Offices: 1020 Boston Bldg., Salt Lake City, and Moscow, Beaver county, Utah.

Officers: Matthew Cullen, pres.; J. L. Rawlins, v. p.; Athol Rawlins, sec.-treas.; G. S. Wilkins, supt.

Inc. May, 1907, in Utah. **Cap.**, $1,000,000; shares $1 par; assessable; issued, 900,000. Listed on Salt Lake Exchange.

Dividends: $108,000 to Sept., 1917, at rate of 2½c per share.

Property: 7 claims, including the Moscow mine in the Star district, 7 miles from a railroad, covers about one-half mile of the strike of an ore zone 50′ to 60′ wide. Ore mainly silver-lead, with some copper and zinc. The Moscow mine is one of the oldest in the district, having been worked over 30 years ago.

Development: tunnels and shaft to the 1,400′ level.

Shipments: have been fairly consistent, while the metal market was good. In June, 1917, output was 1,000 tons, averaging about $30 per ton, but company closed down later in the year.

NATIONAL RADIUM MINES CO. UTAH

Henry Schwartz, Denver, Colo., pres., at last accounts. **Inc.** in Colorado. **Cap.**, $400,000.

Property: in Green River district, Emery county, shows uranium and vanadium ore in a 5″ vein, said to run as high as 20% uranium. Developing in 1916. No recent returns, probably idle.

NEBO SILVER-LEAD MINING CO. UTAH

Company was operating a property near Mono, Utah, reported to show ore which assays about 60% lead and 8 oz. silver per ton.

NEW STOCKTON MINING CO. UTAH

Office: Mankato, S. D. Mine at Stockton, Utah.

Officers: F. M. Currier, pres.; R. A. Dunham, v. p.; W. Z. Harris, sec.-treas., Hess Bldg., Salt Lake City. W. A. Wilson, cons. engr., 406 Dooly Block, Salt Lake City; C. B. Kennedy, W. D. Kimball and M. M. Ferguson, directors.

Property: the old Ben Harrison mine at Stockton showing a vein with one to two feet of ore, which averages 10% to 45% lead, 5 to 40 oz. silver and 60c. to $7 gold per ton.

Development: by shaft with main work on 200′, 500′, 700′, and 800′ levels.

Production: $70,000 in 1913-1914. As shipped the ore has averaged $5 to $15 per ton with silver-gold-lead values.

In 1917 lessees shipped ore averaging 45% lead and 35 oz. silver per ton. No later production reported.

NORTH BECK MINING CO. OF SPANISH FORK UTAH

Officers: M. K. Nebo, pres.; S. N. Nelson, v. p.; H. A. Gardner, sec.-treas., 1134 Bueno Ave., Salt Lake City, with B. H. Brown, W. A. Jones, Edward Money, and R. H. Andrus, directors.

Inc. 1919, in Utah. **Cap.**, $10,000; 1c par.

Property: a group of silver-bearing claims in Spanish Fork section, Utah county.

O. K. EXTENSION MINING & REDUCTION CO. UTAH

Office: 222 D. F. Walker Bldg., Salt Lake City, Utah. **Mine office:** Milford, Beaver county, Utah.

Officers: A. J. McMullen, pres. and gen. mgr.; T. M. Farrell, v. p.; Chas. A. Weaver, sec.-treas., with R. H. Greenhalgh, directors.

Inc. Nov., 1899, in Utah. **Cap.**, 300,000 shares; 3c par; assessable; issued, 125,000; total assessments to date, $15,363. Annual meeting, second Tuesday in October.

Lands: 6 claims, 3 patented, 120 acres, near the Majestic mine in the Beaver Lake district, show monzonite and quartz-porphyry, carrying 2 fissure veins, of 5 to 24′ estimated average width, traceable 150′. Opened by 7 pits and shafts of 15 to 510′ depth, and a 150′ tunnel, with 1,045′ of workings, show-

copyrite estimated to average 2% copper. Inactive except for annual assess-t work.

L SILVER M. & M. CO. **UTAH**

David Keith, gen. mgr., Kearns Bldg., Salt Lake City, Utah. Thos. Kearns, ; W. G. Lamb, sec.-treas.

Inc. 1909, in Utah. **Cap.**, $100,000; shares 10c par; assessable; assess-t No. 17 of ½c per share levied August, 1918. Stock listed on Salt Lake hange.

Property: 33 claims in Erickson mining district, Indian Springs (near ic Jn.), Tooele county.

Development: by a 280′ incline shaft, reported all in ore running better 186 oz. silver and $4.70 gold per ton.

Production: in 1916, 5 cars of ore shipped netted $30,000. No recent rt.

PHAN BOY MINING CO. **UTAH**

Idle. **Milford, Utah.**

Officers: James R. Craig, pres.; W. D. Williams, v. p. and mgr.; Chas. oe, sec.-treas., with M. R. Williams and P. J. Evans, directors.

Property: in Star district, 20 miles S. W. of Milford, Beaver county, , shows limestone, cut by quartz monzonite, with ore in veins and replace-ts. There are 11 claims, adjoining the Red Warrior and Mowitza mines, loped by 500′ shaft with 1,200′ of tunnels and workings from which con-able high-grade ore has been shipped. Vein, though narrow, has bodies ead-carbonate ore carrying a little copper. Presumably doing only annual sment work.

.OMA EXTENSION MINING CO. **UTAH**

Office: 222 Judge Bldg., Salt Lake City, Utah. Lorin Hall, pres.; Wil-Scowcroft, v. p.; John W. Scowcroft, sec.-treas.

Inc. in Utah. **Cap.**, $50,000; shares 5c par; assessable; last assessment, share, delinquent, September 13, 1919; 700,000 shares outstanding. Listed alt Lake City. Shares sold at ½c. in 1919.

Property: 300 acres in Star mining district, Beaver county, shows N. ssures carrying silver-lead-copper ore. These fissures cross contacts between stone beds running N. and dipping E., quartzite that runs E. and dips N., and anite or quartz monzonite. Ore occurs where the contacts are crossed by the res.

.OMA GOLD AND SILVER MINING CO. **UTAH**

Office: Judge Bldg., Salt Lake City, Utah. **Mine and works:** Mos-Beaver county, Utah.

Officers: M. P. Braffet, pres.; H. W. Lane, v. p., with W. Scowcroft, . Cole and B. F. Caffey, directors; J. H. Braffet, sec.-treas.; C. J. Graff, supt.

Inc. in Utah. **Cap.**, $100,000; shares 10c par; assessable; last assess-: 1c. levied September 17, 1918. Stock is listed on the Salt Lake Exchange. es varied between ¼ and 3¼c. a share in 1918, and ½ to 3c. in 1919.

Property: 14 claims in Star district, near Moscow, said to cover 3,000′ g a limestone-monzonite contact intersected by 2 fissure veins, carrying silver, and copper ore.

Development: by 500′ of trenching and 900′ incline shaft, with develop-: work in progress on 900′ level in May, 1919.

IAMA MINING & MILLING CO. **UTAH**

Fred McCoy, mgr., Castleton, Grand county, Utah.

Property: 300 acres, 50 miles S. E. of Cisco and 6 miles from Utah-rado line, said to have a good showing of copper ore. In 1918, company ed a 2,400′ tunnel to cut veins at depth; this was 200′ long at last accounts.

INUVA COPPER CO. **UTAH**

Office 1160 S. 8th W. St., Salt Lake City, Utah.

Officers: J. R. Austin, pres.; G. D. O'Connor, v. p. and mgr.; W. R. herson, sec.-treas.; W. N. Beatty and F. L. Hummel, directors.

Inc. 1916, in Utah. **Cap.**, $25,000; shares 25c par; outstanding, $19,101;

assessable. In December, 1919, the State Securities Commission granted co pany permission to sell 68,000 treasury shares.

Property: 21 claims, unpatented, 385 acres, situated on Promont point, next to the Lakeview zinc mine and 2 miles from Salina on the S. P. R. The ground has not been thoroughly prospected, as it is covered by the bea gravels of Lake Bonneville (the ancient and larger Salt Lake).

Development: 200′ shaft on quartz shale bed showing bunches of ch copyrite ore assaying 20-30% copper; also 110′ drift on 60′ level. Work resumed on the 200′ level of the Redfield claim in December, 1919.

PLANETARY MNG. & MLG. CO. UTA

Inactive. **Address:** T. E. Weyher, sec., 210 Judge Bldg., Salt La City, Utah.

Cap., $10,000; shares 10c par; assessable; reduced from $500,000 November, 1917.

Property: claims near the old Century mine, N. W. of Kelton, Bo elder county, Utah. Development work is continued by assessments.

POLE STAR COPPER CO. UTA

Offices: Vandergrift Bldg., Pittsburgh, Pa., and Newhouse Bldg., S Lake City, Utah.

Officers: P. S. Chambers, pres.; D. A. Rees, v. p.; A. E. Custer, v. p.; F. A. Duerr, treas.

Inc. Nov., 1916, in Delaware. **Cap.,** $1,500,000; shares $1 par. Sta ment rendered March 20, 1917, showed cash on hand and accounts receiva $125,402.

Property: 15 claims, 5 patented, about 230 acres, in the Clifton or De Creek mining district, Tooele county, Utah, 167 miles S. W. of Salt Lake C Gold Hill is the post office address, about 2 miles south.

Geology: country rock is monzonite with prophyry intrusions. E and west veins traverse the claims and are in turn cut by N.-S. dikes, the m ore occurring at these contacts. Veins are said to be 4-12′ wide and ore average 5-7% copper, 49 oz. silver, $4.65 gold, with about 12½% bismuth.

Development: by 9 shafts, 5 tunnels, several drifts and open cuts. Ma vertical shaft is 336′ deep. In 1918 company was doing prospecting work the 336′ level; no later report.

Equipment: includes 2 gasoline hoists, compressor, etc.

Literature sent out from Pittsburg is suspiciously lurid, though mine m have merit and officers be reputable.

PROGRESSIVE MINING CO. UTA

Office: 229 South West Temple St., Salt Lake City, Utah. Mine nea Milford, Beaver county, Utah.

Officers: L. B. Bohn, pres.; I. Lessing, v. p. and mgr.; C. T. Mixe sec-treas. and cons. engr., Box 56, Salt Lake City; preceding, with F. J. Nichol C. C. Crimson and Jas. Barrett, directors.

Inc. Aug. 20, 1906, in Utah. **Cap.,** $250,000; shares 50c par; assessab fully issued. Total assessments to date, $10,000.

Property: 6 claims, 80 acres, patented, in the Star district, 8 miles fro a railway, carrying argentiferous copper and lead ores. The mine has a 2 incline shaft, with about 1,000′ of workings, developing a 3′ vein, said to carry ore assaying up to 8% copper, 35 oz. silver and $1 gold per ton. A few sm shipments have been made.

Mine was under lease in 1916, but presumably idle from 1917 up to present time.

PROMONTORY MINING CO. UTA

Described in Volume XIII. Name changed to United Promontory Mines Co., which see.

QUADMETAL MINES CO. UTA

Address: 41 Broad St., New York. Mine office: 414 Judge Bldg., Salt Lake City.

Officers: R. F. Robertson, pres.; H. A. Stoneham, v. p.-sec.-treas.; Chas. A. Stoneham, N. I. Snyder, and Grant Snyder (gen. mgr.), directors.

Cap., $1,000,000; $1 par; issued 600,000 shares; assessable.
Property: 8 claims, patented, near Frisco, Beaver county, said to show er-lead ore in fissure veins, dip 80° N. Orebodies said to vary in width from to 40′ and from 100′ to 200′ in length.
Development: by 700′ vertical shaft.
Equipment: includes a 50-h.p. electric hoist, compressor, and 150-ton ıtion mill.
The mine was worked for several years previous to 1884 and reported to e produced $960,000. The present management started operating its mill in 1918.

EEN OF SHEBA MINING CO. **UTAH**
Owned by J. W. Lawton, Chicago, Ill. W. D. Rawson, mgr.
Property: near Ibapah, in the Deep Creek district, about 29 miles S. W. Gold Hill, includes the old Queen of Sheba mine. Ore carries free milling d in a quartz vein said to be from 14-25′ wide.
Development: by 1,080′ tunnel and a 276′ raise, driven in 1914.
Equipment: includes 10-stamp mill and 1,700′ aerial tram. The mine is dited with past production of $150,000. Operated by lessees in 1917.

D WARRIOR MINING CO. **UTAH**
Office: Providence Bldg., Duluth, Minn. **Mine office:** Milford, Beaver nty, Utah
Officers: Leonidas Merritt, pres.; Alfred Merritt, v. p.; W. H. Borgen, .; E. R. Ribenack, treas., with Jas. T. Hale, John E. Merritt, Angus Buchanan l W. F. Acker, directors; Wilbur J. Merritt, supt.
Inc. Jan. 25, 1908, in Minnesota. Cap., $250,000; increased Jan., 1911, m $150,000, and again increased, January, 1917, to $600,000; $1 par; 210,000 ıed. Listed on Duluth Stock Exchange and New York Curb. Annual meet- , second Tuesday in January.
Property: a silver-lead mine, 8 claims, 1 patented, 95 acres, in the Star trict, eight miles from the Salt Lake Route. The claims show orebodies :urring along the bedding planes of limestone, one of which is 6′ thick, 50′ g, and proven for 600′ on dip; ore said to average 21% lead, 1% zinc, 18 oz. ver and 25c. gold per ton. In the deeper levels the mine has shown ore assay- ; 12% copper, 1% lead and 3 oz. silver per ton.
Development: by an 812′ vertical shaft with levels at 500′ and 675′ and 00′ winze sunk on the vein from the 500′ level. There are also numerous old llow shafts and tunnels, the mine having about 3,000′ of old and 4,000′ of w workings. These workings were estimated to show 20,000 tons of ore, with ut 10,000 tons blocked out for stoping by the former management. The mine s operated from 1870 until 1889 and was re-opened 1907, by this company. ork was concentrated on the 500′ level, 1917.
The property of the Mowitza Mining Co., adjoining the Red Warrior, was rchased early in 1917.
Equipment: includes a hoist good for 1,500′ and a 3-drill compressor.
Probably idle, as company's funds are low, and mine is not yet self-supporting.

EVENUE CONSOLIDATED MINING CO. **UTAH**
Frisco, Utah. **Address:** John B. Taylor, 678 E. S. Temple St., Salt ke City.
Property: 66 claims, 22 patented, 1,320 acres in Pine Grove district, 28 S. R. 16 W. on west side of Wah Wah Mtns., 20 miles S. W. of Frisco Newhouse, stations on Milford branch of Salt Lake Route. Elevation 7,500′ mine camp. Peaks 3,000′-4,000′ higher.
Geology: claims cover quartzite beds, overlain by 600′ of green shales, pped by 5,000′ of thickly bedded limestone, intruded by thin dikes and a boss yellowish decomposed porphyry. These beds dip eastward into the mountains, 20° to 40°, the west slope of the range being of similar structure, with igneous cks forming the east side. A strong E. W. fault runs through the center of e property, dislocating the beds 1,000′ to the east, on S. of fault, and ending in porphyry intrusion. Ores are lead and silver bearing and occur in fissure veins quartzite. Four parallel N. W.-S. E. veins north of Pine creek are 3′-6′ wide,

have smooth walls, quartz filling and carry galena of concentrating tenor, with occasional masses of shipping ore. There are several other undeveloped parallel veins, but all end at the shale belt. South of the fault a parallel 6'-20' vein represents the probable faulted continuation of the Cliff vein north of the fault.

Development: active in 1904-05; work was resumed 1913, but stopped 1914. It comprises the 500' Buckbee and 600' Southside tunnels, 125' Cliff shaft with 200' drift work, 130' Tasor shaft and various lesser openings. The Reveral tunnel is to crosscut all these veins in depth and supply the mill.

Equipment: includes 300 cu. ft. compressor, steam engine, etc. Property promising, but idle, pending financing.

ROB ROY MINING CO. UTAH

Address: P. T. Farnsworth, 164 E. S. Temple St., Salt Lake City.

Mine near Beaver City, Utah, at mouth of Indian Creek Canyon. T. P. Farnsworth, Salt Lake City, owner. Developed to depth of 300'. Mine has produced very rich gold ore, but was closed down several years ago when the vein was cut off by faulting. Tunnel was to be driven south in hopes of finding orebody. No recent report, probably inactive.

SACRAMENTO MINING CO. UTAH

In liquidation. Glenn R. Bothwell, pres.

Declared a dividend of 0.9c. a share, payable August 1, 1919.

Property: located in Mercur district, paid out $308,000 in dividends before closing down in 1912. At that time there remained $10,000 in the treasury and the 1919 dividend was paid from this fund.

ST. CROIX CONS. MINES UTAH

Organized in August, 1917, to continue work of St. Croix Mines Co.

Address: Duluth, Minn., and 261 Broadway, New York City. **Mine address:** Milford, Utah.

Officers: M. J. O'Brien, pres.; A. D. MacIntyre, v. p.; W. M. Evered, sec.-treas., with David Graham, L. Davis, M. J. Filiatrault, and H. G. Middaugh, directors.

Inc. 1917, in Utah. **Cap.,** $600,000; $1 par: outstanding, 500,000 shares. Listed on New York Curb; 120,700 shares traded in 1919 at 50c. to $1 a share.

Property: 6 claims, 1 patented, about 90 acres, in Star district, Beaver county, 4 miles from Milford, shows 5 contact deposits between porphyry and so-called white and blue lime. Copper-lead ore occurs as "chimneys," and shipments have run as high as $75 per ton.

Development: by 300' shaft and 400' tunnel, opening ground to depth of 500'. Workings total 1,500'.

Equipment: 35-h. p. gasoline hoist, and 4-drill compressor.

Production: intermittent since 1870: recent production about 250 tons annually.

ST. CROIX MINES CO. UTAH

Office: 601 Providence Bldg., Duluth, Minn. **Mine office:** Milford, Utah.

Officers: Hansen Evesmith, pres.

Inc. March 10, 1915, in Utah. **Cap.,** $1,000,000; 25c par; non-assessable. Is a holding company having part of stock of St. Croix Cons. Mines.

ST. MARY MINING CO. UTAH

Described in Volume XIII. Superseded by St. Croix Mines Co., which see.

SALT LAKE COPPER CO. UTAH

Office: 11 Broadway, New York. **Operating office:** McIntyre Bldg., Salt Lake City, Utah. Mine office: Lucin, Boxelder county, Utah.

Officers: Frederick Lewisohn, pres.; Walter Lewisohn, v. p.; E. C. Westervelt, treas.; other directors, S. W. Peck, E. H. Westlake, E. J. Macnamara, O. B. Van Sant and E. B. Corbet, mgr.

Inc. October 10, 1906, in Maine. **Cap.,** $2,200,000; shares $10 par.

Property: 108 claims, known as the Copper Mountain mine, at an elevation of 7,200' above sea level, in the Newfoundland district.

The Copper Mountain mine has a number of tunnels and shafts, the 1,500' main tunnel having a back of about 400'; a 500' tunnel planned to be driven 1,200', to enter the hoped-for sulphide zone, has not realized expectations. The

ıe has upwards of 2 miles of workings, and is estimated to have in sight and cked out, 75,306 tons of copper ore of 1.1% average tenor. For the last few rs the mine has been worked by lessees. Approximately 3,000 tons ore, assay- ½% copper and 45% excess iron were shipped in 1918.

NTA MARIA GOLD & COPPER MG. & REDUCTION CO. UTAH

Office: P. O. Box 517, Ogden, Utah. **Mine office:** Utah Hot Springs, xelder county, Utah. Don Maguire, pres. and mgr.

Inc. 1907, in Utah. **Cap.,** $500,000; shares $1 par.

Property: includes mill and smelter sites in the Sierra Madre district, ery rugged section of the Wasatch mountains. Land carries 7 fissure veins, ctically parallel, with a strong cross-fissure, and a contact deposit. The veins ge from 12 to 70′ in width, and ore contains chalcopyrite, associated with ite and occasional small amounts of galena, ore being mainly of concentrating de.

Development: by the 2,000′ Clara Belle tunnel, cutting 3 veins, and nned to cut 5 more, with backs of 200 to 1,800′. The mine has about a mile workings, showing ore developed regarded as sufficient to warrant a mill.

Equipment: includes a power house, air compressor, smithy and board- house. Idle several years.

NTAQUIN CHIEF MINING CO. UTAH

Reported merged with Santaquin King to form S. Cons. q. v. L. A. Martin, s.; C. E. Martin, sec.-treas., at last accounts.

Inc. April 29, 1911, in Utah. **Cap.,** $100,000; shares 10c par; assessable. treasury, April, 1916, 176,993 shares stock and $476 cash. Total debt reported $1,955. Formerly listed in Salt Lake City.

Property: 7 unpatented claims, in Santaquin mining district, 65 miles E. of Salt Lake City, several miles from a railroad, and adjoining its twin ıther, the Santaquin King on the south. Is said to show limestone cut by a ll-defined fissure vein carrying silver-lead ore containing zinc blende.

Development: consists chiefly of 250′ of tunnels with 225′ of winzes. e tunnel is said to show 3′ of lead-zinc ore. At last accounts a contract let extending the main tunnel 300′. Property is a prospect, but not in the "pre- red" class. Idle in 1918. See Santaquin Cons. Mines Co.

NTAQUIN CONS. MINES CO. UTAH

H. L. Pratt, sec., Boston Bldg., Salt Lake City. Presumably a consolidation the Santaquin Chief, and Santaquin King mining companies, whose properties in Juab county, Utah. An assessment of ¼c. was levied in May, 1919, to ıvide money for patenting the claims.

Inc. 1918, in Utah. **Cap.,** $1,000,000; 50c par; 1,585,978 issued. See titles ed above, for description of property.

NTAQUIN KING MINING CO. UTAH

Letters returned from former office Newhouse Bldg., Salt Lake City, Utah. B. Young, pres.; Ben C. Rich, sec.-treas., at last accounts. See Santaquin ns. Mines Co.

Inc. 1911, in Utah. **Cap.,** 1,000,000 shares; increased in 1912 to 2,000,000; cts. par. In treasury May, 1916, 242,065 shares stock and $344. Listed in lt Lake City.

Property: 9 unpatented claims, located in Santaquin mining district, 65 les S. E. of Salt Lake City, 7 miles from a railroad, adjoins the Santaquin ief on the north.

Ore: occurrence said to be similar to that of the Santaquin Chief.

Development: in May, 1916, consisted of 350′ of tunnels with total un- rground workings of 780′ estimated "1,500 tons of commercial ore in sight." e, 1918.

MINOLE COPPER CO. UTAH

Address: F. L. Wilson, Brooks Arcade Bldg., Salt Lake City, Utah.

Property: adjoining that of Western Utah Copper Co., near Gold ll, Deep Creek district, Tooele county. Ore deposits said to be numerous d varied in character; tungsten ore was opened to depth of 135′, and molybde-

nite was also developed. The 50-ton mill was enlarged in 1918. Operated intermittently.

SHEEP ROCK MINING & MILLING CO. UTAH

Office: W. A. Wilson, 406 Dooly Block, Salt Lake City, Utah.

Officers: W. A. Wilson, pres. and treas.; C. W. Morse, v. p.; C. Browne, sec., with W. B. and F. B. Eiseman and L. A. Jeffs, directors.

Inc. Sept. 4, 1893, in Utah. **Cap.,** $100,000; 10c par; 450,000 issued.

Property: 10 patented claims, 177 acres, in Newton district, Beaver county, said to show a fissure vein in rhyolite. Ore contains gold and silver with quartz and manganese gangue. Alunite is also found on the property.

Development by 300′ shaft and 1,000′ tunnel. **Equipment:** 25-h. p. electric hoist and compressor.

In development stage. No recent work done.

SILVER PEAK MINING CO. UTAH

Offices: J. R. Richards, mgr., Cedar City, Utah. R. B. Shepard, pres., 408 State St., Salt Lake City. T. F. Jennings, sec.-treas., Garfield, Utah.

Inc. July, 1915, in Utah. **Cap.,** $10,000; shares 1c par; 600,000 issued.

Property: the Blair mine, 6 claims, 120 acres, unpatented, near Pinto, in Pinto Iron mining district, Iron county, shows a contact deposit 8′-10′ wide carrying copper-lead ores with gold-silver values.

Development: 200′ shaft and 2 others. Dumps show 100 tons of $8 to $300 ore. Company doing assessment work only.

SILVER REEF CONS. MINES CO. UTAH

Inc. 1918, in Utah. Officers reported to be W. F. Snyder, Thos. Homer, R. L. Edwards, Alex. Colbath, and G. W. Snyder. An assessment of 1c a share was levied in April, 1919, for development.

Property: located in the old Silver Reef district near Toquerville in southern Utah.

SINCLAIR CONSOLIDATED SILVER, INC. UTAH

Address: C. S. Cresser & Co., fiscal agents, 83 Pine St., New York.

Inc. 1920, in Delaware. **Cap.,** $1,000,000; non-assessable. National Security & Transfer Co., New York, registrar and transfer agent. Shares offered at 20c. in March, 1920.

Officers: Salvatore Bonomolo, pres.; Col. Weatherly, v. p.; W. G. Stoddard, treas.; M. E. Schek, sec.; with Ronald Ridgway and B. J. Boemerwald, directors.

Property: 10 claims in the Pinto district of Iron county, Utah, at the mouth of Chloride canyon. The vein runs S. E.-N. W. and dips 85° S. Silver-lead ore from the outcrop shipped to the Silver Reef mill is said to have yielded $75 per ton. Examined by E. J. Eddards.

Company prospectus contains this literary gem: "The formation of Chloride Canyon belongs to the mociene and quartinary ages, with pelsoaic intermingle. The porphyry lies on the east and has been wholly undisturbed, while the rhyolite on the west seems to have had some heavy movements. The porphyry is magnifurious, granite porphyry."

Only surface work has been done so far; tunnels are to be driven.

SOFFE SILVER MINING CO. UTAH

Letters returned unclaimed in May, 1917. Probably dead.

Directors: J. C. Soffe, pres., W. R. Soffe, v. p.; J. W. McKinning, sec.-treas., with W. J. Soffe, mgr.; A. J. Shulson, at last accounts.

Inc. May 7, 1916, in Utah. **Cap.,** $10,000; shares 1c par.

Property: 12 claims, unpatented, in Erickson mining district, Tooele county, 30 miles west of Faust Station on Salt Lake Route. Claims show high grade silver-gold ore.

SOUTHERN PACIFIC GOLD & COPPER M. & M. CO. UTAH

Office: Walker Bank Bldg., Salt Lake City, Utah. Mine near Ogden, Weber county, Utah.

Officers: H. T. Strauss, pres. and gen. mgr.; W. C. Kellerman, sec.

Inc. July 20, 1903, in Utah. **Cap.,** $1,000,000; shares $1 par; assessable; issued 792,593. Shares are listed on the Salt Lake Stock Exchange.

Property: 12 claims, unpatented, 240 acres, 3 miles from a railway and
it 8 miles north of Ogden, in the Sierra Madre district, reported to carry
rebodies in contact deposits between quartzite and gneiss. The main vein of
it 50′ width, shows some oxidized ores, but mainly auriferous sulphides, in-
ing covellite, bornite and chalcopyrite, with some molybdenite, in a 6′ vein.
Development: by two incline shafts on the Wizard claim, and a main
el in 500′ in June, 1919, with about 1,000′ of workings, said to show ore
ying up to 15% copper, 37 oz. silver and $1.60 gold per ton. Company plans
ing the tunnel an additional 200′.

JTHERN SWANSEA MINING CO. **UTAH**

Mine office: Silver City, Juab county, Utah.

Officers: Geo. Jones, pres.; Geo. A. Shepard, v. p.; Richard B Shepard,
s.: Emma C. Shepard, sec., 408 S. State St., Salt Lake City. R. E. Jones, supt.
Inc. July 31, 1907, in Utah. **Cap.,** $10,000; shares 1c par; issued, $8,500;
ssable; last assessment, No. 8, one mill a share, levied November, 1919.
res are listed on the Salt Lake Stock Exchange.

Property: 12 claims, unpatented, south of the Swansea mine and sup-
d to carry an extension of the Swansea vein, showing porphyry, quartzite
lime, with a fissure vein of 12′ estimated average width, traceable 1 mile,
ying auriferous and argentiferous oxidized and sulphide ores of copper and
, developed by a 200′ shaft.

JTH STAR MINING CO. **UTAH**

Address: Chas. L. Alexander, pres.-mgr., Fergus Falls, Minn.

Officers: above with C. W. Cockroft, v. p.; L. C. Alexander, sec.-treas.,
L. Davie, directors.

Inc. July 15, 1915, in Utah. **Cap.,** $100,000; 25c par; issued 200,000.

Property: 7 unpatented claims, about 90 acres, in South Star district,
ver county, said to show copper, silver-lead ore in a contact deposit in lime-
e. Only surface development work has been done. Idle, except for assess-
t work.

JTH UTAH MINES & SMELTERS **UTAH**

Office: 165 Broadway, New York. **Mine office:** Newhouse, Beaver
ity, Utah.

Officers: Hugo Hoffstaedter, pres.; H. G. Robinson, sec.-treas., with
. Earle and Samuel Newhouse, directors; W. L. Heidenreich, gen. mgr.

Inc. Feb. 28, 1910, in Maine, as successor of Newhouse Mines & Smelt-
Cap., $5,000,000; shares $5 par; issued $4,300,000. **Debentures:** $919,000
%, 20-year income bonds, convertible into stock at par, remaining from a
00,000 bond issue put out by the Newhouse Mines & Smelters. Interest on
ds is said to be payable annually, but only if and when earned, and then out
et profits of the year's operations. The old company defaulted in interest
its bonds, and the property was bought for $500,000 under foreclosure, old
eholders being given stock, share for share, plus a payment of $1 per share
new stock. The reorganization brought about $600,000 into the treasury,
which all but about $200,000 was required to liquidate the floating debt of the
company. The annual report for year ended June 30, 1918, showed an
rating loss of $16,112, increasing a former deficit to $188,572, and gave current
ts as $83,060 and current liabilities as $7,650. No report has since been
ed.

Listed on Boston Stock Exchange and on New York Curb. Equitable Trust
New York, transfer agent; Windsor Trust Co., registrar. Annual meeting,
d Monday in October.

Property the Cactus mine, 13 claims, with miscellaneous holdings,
uding the Midvale placer, 168 acres, water rights at Wah Wah springs, mill,
n sites and grazing lands, total holdings of 7,882 acres.

; Cactus mine shows monzonite-porphyry country rock, near a limestone
tact, and ore is essentially an irregular mass of brecciated monzonite, carry-
copper impregnations, including some oxidized ores in the upper workings,
at depth mainly chalcopyrite, associated with pyrite. There is about 168,000
t of developed low-grade ore scattered about the mine that averages 1.30%

copper. Much of this ore will assay only 1.05%, while some of the small blocks consist of 1.75% ore. Such material can be profitably handled in the company's mill with flotation units, but as there seems to be no chance of finding additional orebodies it will not pay to reopen the mine and remodel the mill.

Development: by two working shafts of 600′ and 900′ depth, with levels at 100′ intervals, and connected on the 600′ level with a 6,300′ main haulage tunnel. The mine has upwards of 4 miles of workings.

Equipment: includes 200-h. p. steam plant, with a 150-h. p. hoist good for 600′, and a 40-drill air compressor, both operated electrically. There also is an auxiliary electric hoist on the second level.

The mine and mill are connected with the Salt Lake Route.

Mill: the 1,000-ton mill contains three 10x24″ crushers, 4 sets of rolls, Huntington mill, 22 Harz jigs, 58 tables, 8 slimers, 16 Callow tanks, settling tanks and classifiers.

The old tailings were treated by Utah Leasing Co. on a royalty basis. In 1914 a $175,000 flotation plant was built for this purpose. The tailings were exhausted in 1919, and the company plans treating their ore reserves in the mill. The untreated tailings contained less than 10 lb. copper per ton.

Production: from 1906 to mid-1914, amounted to 22,412,082 lb. copper; 146,148 oz. silver and 6,443 oz. gold. Mine will not be reopened, but the company is free from debt and has about $70,000 in the treasury, in addition to the mine and mill equipment at Newhouse. It is on the lookout for mining properties worthy of development.

STAMPEDE MINES CO. UTAH

Address: A. T. Burton, sec., Beaver City, Utah.

Officers: B. F. Caffey, pres.; Archie MacFarland, v. p.; A. T. Burton, sec.-treas., with Sam. Glaser and R. H. Strickland, directors.

Inc. 1916, in Utah. **Cap.**, $100,000; shares 10c par; assessable; 800,000 issued.

Property: 14 claims, 250 acres, in Lincoln or Jarloose district, Beaver county, Utah, said to show fissures in limestone, dipping 40° and pitching 70° E. Sulphide ore reported to contain 0.09 oz. gold, 25 oz. silver, 21.5% lead and 2.46% copper. Shoot occurs at junction of 2 fissures. Development: shaft down 235′ in November, 1918, cut ore whose persistence in depth is a favorable indication.

Equipment: 6-h. p. gasoline hoist, 140 cu. ft. compressor, etc. **Production:** 21 tons in 1916. A small mine with possibilities. Rail and smelting facilities nearby.

STOCKTON STANDARD MINING CO. UTAH

Address: W. N. Gundry, 523 Atlas Bldg., Salt Lake City, Utah.

Officers: C. F. Buehner, pres.; E. V. Anderson, v. p.; W. N. Gundry, sec.-treas., with F. Salzner, John Fetzer, A. P. Davidsen, and J. C. Fleming, directors.

Inc. May 16, 1916, in Utah. **Cap.**, $10,000; 1,000,000 shares 1c par; assessable, not more than 1c. per year; issued, 486,000 shares.

Property: 13 claims, 5 patented, 240 acres, in Rush Valley district, Tooele county, said to show a vein of silver-lead ore.

Development: by 200′ shaft, with 450′ drift in which a N.-S. fissure has been cut showing silver-lead ore for 60′. In 1918 $2,000 was spent by the company. In December, 1919, the shaft was being re-timbered, preliminary to resumption of development work.

SYNDICATE MINING CO. UTAH

Property and assets transferred, May, 1919, to Syndicate Mining and Milling Co., which see.

SYNDICATE MINING & MILLING CO. UTAH

In May, [illegible] property and assets of the Syndicate Mining Co. were transferred to the [illegible] stockholders received share for share in the deal.

Address: Utah co[illegible] Utah. B. H. Bullock, pres.

[illegible] 1,250,000 shares par 2c. Listed

t Lake City. Assessable; assessment No. 18, $2.50 per 1,000 shares levied May, 1919.

Property: 10 unpatented claims, near Santaquin, said to show a 20′ vein taining ore with gold, silver, and copper. The vein fissures are in limestone orebodies are expected at vein intersections. Developed by 1,600′ tunnel. perty is a prospect, in which ore in commercial amount has not yet been nd, though surface croppings are promising.

LISMAN CONSOLIDATED MINING CO. UTAH

Address: P. O. Box 1065, Salt Lake City. **Mine office:** W. W. Crone, t., Milford, Utah.

Officers: H. S. Joseph, pres.; S. S. Pond, v. p.; H. W. Brock, sec.; 3. McCornick, treas., with L. B. Merriman and M. J. Morris, directors.

Inc. July 7, 1917, in Utah. **Cap.,** $100,000; shares 10c par; assessable; 000 issued.

Property: 20 claims; also Cedar Talisman and Empire mines under e for 2 years, total 450 acres, in Star district, Beaver county, Utah.

Geology: fissures and contact deposits in limestone. Orebody is from) 5′ wide and ore said to assay 10% lead, 15 oz. silver, and 10% copper, with ıe zinc and gold.

Development: by incline shafts 200 and 1,000′ deep. Workings total 0′. Reserves consist of 1,000 tons of high-grade and 40,000 tons of low-grade the latter in the leased mines. No recent information, probably idle.

COMA CONS. MINING CO. UTAH

Address: 1407 Walker Bank Bldg., Salt Lake City. C. S. Woodward, ıager.

Cap., $100,000 common stock, 10c par; and $40,000 preferred stock, $1 Listed on Salt Lake Exchange.

Property: 8 claims in Lucin mining district, Boxelder county. Ores ry gold, silver, lead, copper and zinc. Mine is reported to have yielded 00,000 since the Seventies. Reported, November, 1919, that work would be ted shortly.

OELE GOLD HILL M. & M. CO. UTAH

Address: Peter Clegg, Tooele, Utah.

Officers: Peter Clegg, pres.; C. W. Bailey, v. p.; T. S. Marks, sec.-s., with W. Carder and J. Donovan, directors.

Inc. April 7, 1917, in Utah. **Cap.,** $50,000; shares 10c par; 222,500 issued.

Property: 6 claims, patented, 110 acres, in Clifton district (Deep Creek), ele county, said to have a contact deposit in granite and limestone. Ore ries gold, silver, copper and lead.

Prospecting in August, 1917, and no news received about company since t time.

EPHINE MINING CO. UTAH

A. P. Hanson and Robt. E. Mark, owners of majority of outstanding stock, ed a meeting of stockholders October 6, 1919, at 902 Kearns Bldg., Salt Lake y, to elect officers to wind up affairs of company. They claim that no annual eting has been held, nor officers elected since company was incorporated in 9. The charter and franchise of company were revoked by State in April, 0, for failure to pay annual license tax for 1909.

EVIDA GOLD MINING CO. UTAH

A. B. Lewis, pres.; W. S. McCornick, treas., 205 Center St., Salt Lake City; C. Ralston, Jr., sec.-mgr.

Inc. May 14, 1917, in Delaware. **Cap.,** $7,500,000; $1 par; non-assessable; 0,000 shares and $12,500 cash in treasury, October, 1918. Debts amounted 89,000.

Company controlled several miles of alluvial and gravel ground along Carson er in Nevada, from which it was proposed to recover the amalgam lost from old Comstock mills; also reported to have mining properties in Beaver nty, Utah, and in Idaho. Details of company, organization and operations obtainable, save in January, 1919, company brought suit against two former ectors and others, charging them with having induced owners of leases, under

which company operated, to cancel and transfer them to Comstock Lode Recovery Corp.

UNION CHIEF MINING CO. UTAH

Office: Newhouse Bldg., Salt Lake City, Utah.

Officers: G. L. Bemis, pres.-mgr., Santaquin, Utah; Geo. Baglin, sec.; A. W. Larson, supt.

Inc. 1903, in Utah. **Cap.,** 1,000,000 shares; par 10c; assessable; assessment No. 7, 1c. a share, levied in January, 1919. Listed on Salt Lake Exchange. Share sold ¾-4c. in 1918; and up to 8c. in 1919.

Annual report for 1918 shows total receipts of $14,273, mainly from assessment No. 6. Disbursements were $14,270, leaving cash on hand, $2.92.

Property: 18 claims, 6 patented, 370 acres, in Santaquin mining district, shows lead-silver ore in vein reported to be about 6′ wide.

Development: over 8,000′ of tunnels and drifts. Reported to have found high-grade ore at 550′ depth in 1916, but as only picked samples seem to have been assayed, no averages can be given. Equipped with electric power line and compressor.

In 1918, 806′ of development work was done at a cost of $9.27 per foot; no orebody was found. Company plans sinking.

UNITED PROMONTORY MINING CO. UTAH

Officers: B. D. Siegfus, pres., 560 12 E. St., Salt Lake City; O. P. Peterson, v. p.; D. H. Wenger, sec.-treas., with L. W. Phillips, T. W. James, and W. C. Smaltz, directors.

Inc. in Feb., 1915, in Utah. **Cap.,** $7,000; 1c par; 100,000 shares in treasury, June, 1919. Company's name was formerly Promontory Mining Co.

Property: 14 unpatented claims, in Boxelder county, Utah, 7 miles N. of Promontory, on the S. P. R. R., shows vein 20′ thick in limestone-porphyry contact. Developed by 90′ shaft, and two tunnels, 200′ and 300′ long. Upper level showed some high-grade copper-silver ore. Company has been developing the mine for about 8 years, spending $3,000 in 1918.

Equipment: includes a compressor.

UNITED STATES METALS REDUCTION CO. UTAH

A close corporation, controlled by a Pittsburg syndicate. A 15-ton plant 15 miles from Castleton, and 50 miles from Cisco, was built in 1918, to treat radium-bearing ores. The company owns 37 claims. Details not available.

UTAH BALTIMORE CONSOLIDATED CO. UTAH

Mail returned, 1918, from former address. J. P. Evans, pres., 408 S. 13 E. St., Salt Lake City, Utah; J. M. Williams, v. p.; C. A. Doe, sec.-treas.; J. T. White, W. D. Williams, directors.

Inc. in 1916. **Cap.,** $1,000,000; shares 5c par; no indebtedness.

Property: 10 claims, 5 in Beaver county, known as the Mollie Pitcher group, 5 in the Rocky district, known as the Bill Williams group. Mollie Pitcher group has a 100′ shaft in vein of copper ore, said to be 60′ wide and of shipping grade. Loading station on R. R. about a mile from mine. Probably idle.

UTAH & EASTERN COPPER CO. UTAH

Idle. **Office:** 127 Church St., New Haven, Conn. **Operating office:** 508 McCornick Bldg., Salt Lake City, Utah. **Mine office:** Dixie, Washington county, Utah. **Works office:** Shem, Washington county, Utah.

Officers: Louis E. Stoddard, pres.; T. W. Farnam, sec.-treas.

Inc. 1901, in West Virginia. **Cap.,** $1,500,000, increased later to $3,500,000; shares $5 par, in $2,000,000 preferred and $1,500,000 common stock.

Property: 11 claims, patented, 220 acres, and a 40-acre smelter site, including the old Dixie mine, in the Tutsagubet or Cave Springs district, near Green river.

Geology: 5 replacement deposits in limestone, 1 of 40′ estimated average width, [illegible] cuprite, azurite, and massive malachite ores, said to give average as[illegible]% copper.

Develo[illegible] a 775′ blin[illegible]nk from the breast of a 25[illegible] T[illegible]d. 1905, a[illegible] ecessary to run a new tunnel [illegible] Old wor[illegible] show about 100,000 tons of ore

Equipment: includes a small gasoline plant. The company has 2 smel-. 1 worthless; the new smelter has a 100-ton water-jacket blast furnace, with er power, secured from the Santa Clara river, 2 miles distant, and a small iliary steam plant. The smelter is at Shem, about 50 miles from Acoma, on Rio Grande Western railroad, the nearest shipping point, and transportation 14 miles of the distance is by traction engine.

Production: 1,448,597 lb. copper in 1904; 400,166 in 1905, and 391,779 in 7. Property considered promising but is handicapped by lack of rail trans-tation. Worked by lessees, who have shipped several cars of 30% ore. Letters returned unanswered, and no recent report received.

AH LEAD & COPPER CO. **UTAH**

Address: care H. M. Stonemetz, v. p., 53 State St., Boston, Mass. ıe office: Bingham Canyon, Utah.

Officers: Carl Brandt, pres.; Harry M. Stonemetz, v. p.; J. P. McDon-;h, sec.; J. H. Turnbull, treas., with Geo. E. Davis, directors.

Inc. Dec. 24, 1912, in Maine, as the successor of the Bingham Copper **Cap.,** $500,000; shares $1 par; outstanding, 262,000 shares. Debentures 0,000, 6% convertible; outstanding, $37,750. Federal Trust Co., Boston, ısfer agent; Paul Revere Trust Co., registrar.

Property: 13 claims, patented, about 102 acres, on the eastern slope of r Fork Canyon. Company also owns a one-half interest in the Diamond tension, and one-half in the Diamond claims adjoining.

The property shows 3 fissure veins, several bedded deposits of silver-lead and a fissure vein of copper ore of less promise. A big outcrop near the end line is said to have yielded considerable high-grade gold and silver ore h lead carbonates, to former owner.

Development: by 2 tunnels, longest 1,200', and 2 shafts on the Venice im. There are about 3,000' of workings, showing ore below commercial tenor ıerally, but with occasional streaks of ore assaying up to 70% lead and 15 30 oz. silver.

Equipment: includes a small air compressor. Property has been idle some time.

AH LEASING CO. **UTAH**

Office: 804 Newhouse Bldg., Salt Lake City, Utah. **Mine office:** H. H. ams, supt., Newhouse, Utah.

Officers: V. P. Strange, pres.; J. C. Dick, v. p.; D. R. Pingree, sec.-as., with Herbert Salinger and F. W. Royer, directors. R. P. McDonald, ditor.

Inc. in Utah. **Cap.,** $30,000; shares 10c par; assessable; 250,000 issued.

Dividends: $25,000 in 1916; $47,500 in 1917; $22,500 in 1918.

Property: a lease from South Utah Mines and Smelters, on about 1,000,-) tons of copper-gold-silver tailing at the old Cactus mine, Newhouse, Utah.

Equipment: one 20-ton steam shovel, 750-ton plant including two 8'x48", d one 6'x48", Hardinge mills, 2 Dorr classifiers and 2 Minerals Separation tation units.

Electric power is obtained from the Beaver River Power Co., at 44,000 volts, pped down to 2,200 and 4,400 volts.

Production: feed to the plant assays about .52% copper, which is claimed be the lowest head assay in the country; concentrate assays 21% copper, 7 oz. gold, 2 oz. silver. In 1915, 15,530 tons ore milled produced 86,941 lb. of pper; in 1916, 160,420 gave 1,286,011; in 1917, 207,270 gave 1,575,347; and in 18 205,000 tons ore gave 1,489,851 lb. copper.

Reported in May, 1919, that tailings dump was exhausted, 700,000 tons ving been treated during past 3½ years.

TAH MINING CO. **UTAH**

Mine address: Fish Springs, Juab county, Utah; A. F. Rynder, sec., 77 St., Salt Lake City.

Property: old Utah mine, 25 miles S. of Gold Hill, a large producer of h-grade silver ores in former days. The old dumps are estimated to contain

200,000 tons of ore. Present company has built a 200-ton mill to treat t
Details of operation not available.

UTAH MINING, MILLING & TRANSPORTATION CO.

Address: Moscow, via Milford, Beaver county, Utah. Chas. T.
ard, pres. and gen. mgr., at last accounts.

Property: includes the Hub and Lady Bryan mines, latter bough
of Mathew Cullen et al., S. of the Burning Moscow, 6 miles from a rail
the Star district.

Development: by a 400′ two-compartment main shaft, developing
variously reported as 2 to 30′ in width, carrying silver-lead carbonates,
bedded deposit in limestone showing high-grade cuprite, from which
shipments of ore have been made. Ore said to carry $6-$7 in silver a
with heavy percentage of iron. No recent returns. Probably idle.

UTAH NATIONAL MINES CO.

Address: G. W. Field & Co., 50 Broad St., New York.

Officers: F. E. McMillin, pres.; M. Butler, v. p.; T. L. Lloyd,
treas., with D. C. Pettibone, George Henderson and J. T. Lloyd, directors.

Inc. Feb., 1917, in Delaware. **Cap.**, $1,000,000; shares $1 par;
assessable. Listed on Boston Curb.

Property: the Silver King mine, in Newfoundland district, Box
county; and the Lady Bryan in the Star district, Beaver county, Utah.

Development: 3,000′ of work said to have been done in the Silver
opening silver-gold-copper ore assaying over $60 per ton. In the Lady
$16 ore is exposed to depth of 510′. Estimated reserves in May, 1917,
75,000 tons. No recent information, probably idle.

UTAH-OREGON MINES CO.

Address: Price, Utah; John C. Forrester, pres. Levied an assess
of 1c. a share, and expected to start operating its milling plant to treat a
tonnage of free-milling gold ore late in 1919.

UTAH ORE SAMPLING CO.

Office: 820 Newhouse Bldg., Salt Lake City, Utah.

Officers: Jesse Knight, pres.; E. P. Ellison, v. p.; W. L. Mangum,
treas., with J. W. Knight and R. E. Allen, directors. E. G. Jensen, gen.
Frank Burgner, gen. supt. at Murray.

Inc. Dec., 1909, in Utah. **Cap.**, $300,000; par $1; 215,000 issued.

Company owns and operates two ore-sampling mills at Murray and one
Silver City, with combined daily capacity of 1,000 tons of ore.

UTAH PLACER MINING CO.

Address: Box 92, Garfield, Utah.

Officers: Theo. Peterson, pres.; Leo. Erdman, v. p.; J. H. Butcher,
Edward Helmerich, treas., with Geo. C. Phillips, and H. H. Murphy, direc

Cap., $100,000; shares 10c par.

Property: 1,320 acres of placer ground on Grand river, Utah. Gra
is said to carry from 40c. to $3 gold per yard, also some platinum. One cha
is 9 to 20′ deep. Idle in 1918, plans resuming work in 1920.

UTAH-RELIANCE MINING CO.

Office: 408 South State St., Salt Lake City, Utah. *Mine office:*
Tooele county, Utah.

Officers: J. G. Bywater, pres.; D. B. Tripp, v. p.; *Richard B. Shepard*
sec. and gen. mgr.; W. A. Langford and Samuel Divett, directors.
1908, in Utah. Cap., $5,000; shares 1c par; assessable;
$3,0 paid.
P 5 claims ered, 160 acres, about 45 miles from a
way.
De ngl and 100′ shaft, latter showing
assayin old per ton.
Le ilable.
UTAH K
Addre

...t in Delaware. Cap. $...
...20,000 shares ...
...operty: 60 claims ...
...eaver county ...
...The Pine ...
...old ore. The ...
...g E-W ...
...velopment: ...
...id to show ...
...e by other ...
...ment.

... SILVER LEAD MINES CO.

...dress: Walker ...
...p., $250,000 ...
...roperty: 11 claims ...
U. P. R. R. ...
...eral hundred ...
...resent manager ...
...ing. Co. royalty ...
...velopment: Silver ...
...gs now caved ...
...d feet, and white ...
...54% to 26% lead ...
...tons ore blocked ...
...f the mountain ...
...will tap the Silver ...
...nd will test the main ...
...mpany sold $25,000 ...
...from Blacksmith ...
...e to lease ore on wage ...

...-UNITED COPPER CO.

...bsorbed by Beaver ...

...LEY VIEW MINING CO.

...ddress: 4725 S. State St., Murray, Utah. ...
..., Utah. Levied an assessment of $... per ...

...KSBURG GOLD AND COPPER CO.

...Mine near Milford, Beaver county, Utah. Leased June 1918 ...
...s Operating Co.
Property: 5 claims in Star district, covering 400 ... ore-bearing fissures.
Development: shallow, but some ore stripped May, 1918.

...TOR CONSOLIDATED MINING CO.

Inactive. Mine office: Eureka, Juab county, Utah.
Officers: J. S. Wells, pres.; A. W. McCune, v. p.; J. A. ... S. McCornick, treas., with J. H. Brown directors. Vivian McCune ...
Inc. 1903, in Utah. **Cap.,** $375,000; shares 50c par; all issued ...
5 assessments levied and fully paid. Stock is listed on the ...
...ange. *Prices:* 3-3½c. in 1918; 3-10½c. in 1919.
***Property:** 5 claims, 38 acres, patented, including the Victor ...
...and mines, carrying gold and lead-silver-bearing copper ore, ...
...of 1907. The mine has been in the hands of lessees since 1900. ...
...ore run 7% copper and 8 oz. silver per ton. No recent report.

... MINING CO.

...d: W. ... Wilson, sec.-mgr., 406 Dooley Block, Salt Lake City.
... address: Oakley, Idaho.
... 920 acres in Ashbrook district, in N. W. corner of ... ...dir...g the old Vipont mine. Development: by ... ...hi...ch much ore has been shipped. No. 2 tunnel is 1,... ...a r...placement deposit in limestone, carrying gold and ... ...clu...ding 100-h. p. engine and a compressor. Company

plans building a mill. Property is said to show a fair tonnage of ore assaying about 40 oz. silver and $1.80 in gold per ton, but is handicapped by a 25-mile wagon haul to Oakley, Idaho, the nearest R. R. point.

VOLUNTEER MINING CO. UTAH

Letters returned from last address. Milford, Beaver county, Utah.

Officers: W. C. Albertson, pres. and gen. mgr.; W H. Havenor, v. p.; S. G. Cole, sec.; H. E. Havenor, treas., asst. sec. and engr., with Geo. Havenor, directors, at last account.

Inc. in Utah. **Cap.**, $50,000; shares 10c par; non-assessable; issued $25,550. Annual meeting, second Monday in May.

Property: 6 claims, unpatented, 600 acres, in the North Star district seven miles from the Salt Lake Route. Claims show contact deposits between limestone and intrusive porphyry. The mine has only two 12′ pits and a 70′ tunnel. Company reported in 1916-17, operating a lease on the north end of the Lakeview Mining Co.'s property. No later information.

WASATCH BONANZA MINING CO. UTAH

Officers: Burdell Davis, pres., Provo, Utah; Wm. Davis, v. p.; Brigham Johnson, sec.-treas.; J. M. Buckner, Geo. A. Storrs, directors.

Inc. May, 1916, in Utah. **Cap.**, $10,000; 1c par.

Property: 4 claims, the Mayflower group in Decker Canyon, near Charleston, Wasatch county, Utah. No recent information.

WEDGE GOLD MINING & MILLING CO., THE UTAH

Office: 1102 W. 7th South St., Salt Lake City, Utah. Mine near Marysvale.

Officers: E. P. Mowers, pres.-gen. mgr.; N. W. Sonnedecker, v. p.; W. L. Grovenor, sec.-treas., with E. J. Schenck and K. D. Schenck, directors.

Cap., $300.000; shares $1 par; all outstanding.

Property: near head of Bullion canyon, 10 miles S. W. of Marysvale, Piute county. Mine contains a gold-bearing quartz fissure vein in latite; dip 15° S. E., strike N. E.-S. W. Orebody varies from ½″ to 20″ in width. Mine has been developed and worked chiefly under lease. Workings include a shaft 400′ adit and 200′ of drifts. Shipments are of high-grade ore only.

WESTERN PACIFIC COPPER CO. UTAH

Office: care Wilson Bros., Brooks Arcade, Salt Lake City, Utah. **Mine office:** Callao, Juab county, Utah.

Officers: E. J. Yard, pres.; Jackson H. McChrystal, v. p. and gen. mgr.; Elroy M. Clark, sec.-treas.

Property: 320 acres, adjoin the Western Utah Copper Co., in the Willow Springs division of Deep Creek district, Tooele county, just over the Juab county line.

Development: by a shaft and 2 tunnels, 400′ and 1,200′ long, developing ore averaging about 13% copper, 23% lead and 22% iron, with small silver and gold content. In 1914 a rich strike was reported in a south drift run from the bottom of the 250′ shaft. The vein is said to be 15′ wide and a 100-ton sample ran 24.4% copper. Occasional small shipments of ore have been made.

Equipment: includes steam plant and air compressor. Reported that work will soon be resumed.

WESTERN PACIFIC MINES CO. UTAH

Property: 12 claims at Crater Island, 25 miles S. of Lucin, said to show a 5′ copper-gold-silver vein. Developed by several shafts, deepest 80′. Plans continuing development work. Examined, 1919, by A. G. Burritt, Salt Lake City.

WESTERN UTAH COPPER CO. UTAH

Office: 1109 Boston Bldg., Salt Lake City. **Mine office:** Gold Hill, Tooele county, Utah.

Officers: F. G. [illegible]ley, pres., Pawtucket, R. I.; Duncan MacVichie, v. p.; G. R. Rawsl[illegible] C. G. Spittal, treas., also directors. Owen F. Brim[illegible] manager.

[illegible] 1906, [illegible] Cap., $2,500,000, $5 par; 499,500 issued.

:s, comprising the Gold Hill, Yellow Hammer, Calaveras, Tuolumne, and re Springs groups; also the Redding Springs ranch, valuable for water. The properties are situated in the Clifton district, Tooele county, reached he Western Pacific and Deep Creek railroads, about 167 miles S. W. of Salt e City. Examined in 1917 by F. R. Weekes.

Geology: the claims cover a granite-limestone contact, with replacement osits in limestone. See 'Economic Geology' for June, 1918.

Development: 700′ Gold Hill shaft recently sunk from 300′ level. Ore 300′ level assays about 5½ oz. silver, 13% lead, and 2% copper. On the 700′ l the vein is 62′ wide.

The Calaveras and Yellow Hammer groups commenced shipping about , 1919. The product from these groups is gold-copper-silver ore, with gold lominating.

Early in 1919, a 50-ton experimental mill, erected at Salt Springs, 27 miles n the mine at Gold Hill, treated copper-tungsten ore from the Yellow Ham- mine until in June, it was moved to the mine in order to treat second class Smelter shipments averaged about 100 tons ore daily during 1919.

Shipments of silver-lead ore from glory hole operations, totaled 3,750 tons, uary, 1920.

The Deep Creek railroad from Wendover, Utah, to Gold Hill, Utah, was pleted March, 1917.

STERN UTAH EXTENSION COPPER CO. UTAH

Address: A. E. Custer, mgr., Walker Bank Bldg., Salt Lake City, Utah, Gold Hill, Utah.

Officers: P. S. Chambers, pres.; D. A. Rees and A. R. Custer, v. p.'s; F. Duerr, sec.-treas., with John Pingree, directors. C. L. Glass & Co., Pittsburg, fiscal agents. B. T. Haywood, supt.

Inc. in Delaware. **Cap.**, $2,500,000; $1 par. Stock transferred at com- y's office.

Financial statement for year ending June 24, 1918, showed total assets of 52,441, of which property and development comprised $2,518,615.

Property: 15 claims, about 250 acres, at Gold Hill, Utah, adjoining the stern Utah Copper mine, in the Clifton district, Tooele county. Examined in by F. R. Weekes. Mine is said to contain a well defined fissure in lime- e and granite, over 5,000′ long.

Development: by 2,500′ tunnel work and 300′ Mogul shaft, with good in drift on vein on 300′ level. Smelter shipments in June, 1919, said to y about 4¾% copper and 3 to 6 oz. silver; 250 tons shipped in 1918 from elopment work.

Company plans developing an extension of its neighbor's orebody, and will shaft 1,000′ deep in near future.

STERN ZINC CO. UTAH

Probably dead. Was organized to operate a lease on the Lakeview Mining s property on Promontory Point, Utah, in 1916.

ST JORDAN SMELTER UTAH

Owned by U. S. Smelting Co., at West Jordan, Utah.

ST MERCUR MINES CO. UTAH

Offices: 11 Broadway, New York, and 827 McIntyre Bldg., Salt Lake . **Mine office:** Ophir, Utah.

Officers: E. J. Macnamara, pres.; Edw. H. Eckhoff, sec.

Company was doing a small amount of development work at last account in ine on the western dip of the Camp Floyd district. Reported in February, 9, that suit had been brought against the company by Walter and Fred. ricks, for $30,600 due on promissory notes.

Equipment: includes a 150-ton mill.

ITE STAR MINING CO. UTAH

Mine office: Eureka, Juab county, Utah.

Officers: C. H. Thompson; pres.; P. A. Sorenson, v. p.; Emma C. Shep ard, sec.; Bernard Rich, treas., and Harry Rich, directors.

Inc. 1898, in Utah. **Cap.,** $30,000; shares 10c par; assessable; with sev eral assessments levied.

Property: 4 claims, patented, 80 acres, 3 miles from Eureka, the nearest rail point. The mine has a 100′ shaft and 100′ tunnel.

Company has apparently acquired a new property in the North Star distri Beaver county, from which in August, 1917, two cars of $52 ore were shipped a a compressor, hoist and other electrically driven equipment were installed.

The White Star mine in the Silver Island district, Western Tooele Co. near the Kentucky-Douglas, Western Utah and Gethin Leroy mines, all acti in 1917, though no later news has been received.

WIG MOUNTAIN MINING & MILLING CO. UTA

Officers: George A. Storrs, pres., American Fork, Utah; George Brown, v. p.; J. W. Storrs, sec.-treas., John Curzon, and Jos. Thurgood, di rectors; F. Jardine, supt.

Inc. May, 1916. **Cap.,** $1,000,000; shares 1c par.

Property: the Jumbo group, 7 claims, on Wig mountain. Is a lead-silv prospect which was being developed in August, 1917. No recent return received.

WILSON CONSOLIDATED MINING CO. UTA

Offices: 208 Brooks Arcade Bldg., Salt Lake City, Utah, and Wendover Tooele county, Utah. Clyde H. Wilson, pres.; Frank L. Wilson, sec.-trea

Property: located in the Clifton section of Deep Creek district, Toel county, 45 miles from Wendover, was the only mine in the U. S. whi shipped bismuth ore in 1914. Reported to have shipped one 25-ton l of 8% bismuth ore carrying gold and silver. Ore was hand jigged t bring shipment up to 20%.

Reported in 1919, that company had resumed operations.

WOLF MOUNTAIN COPPER CO. UTA

Office: C. A. Harker, 705 Eccles Bldg., Ogden, Utah.

Officers: C. A. Harker, pres.-treas.; P. M. Parry, v. p.; with C. R. Col R. A. Eliason, and A. A. Allen, directors. S. A. Holmes, sec.

Inc. Jan. 31, 1914, in Utah. **Cap.,** $100,000; 10 par; assessable; 502.5 shares issued. Assessment No. 9, ½c a share, called, August, 1919

Property: 640 acres, in Paradise district, 19 miles S. of Hyrum, Cach county, said to show a N.-S. fissure vein in quartzite, 45′ wide, dipping 3 and carrying ore assaying 4½% copper, 1 oz. silver, and .01 oz. gold p ton. Examined by W. F. Mitchell, Don Maguire, J. T. Bacon and J. C Lind.

Development: by four tunnels totaling 930′ of work; 33,000 tons of o reported blocked out. Company making preparations to build a 50-ton m so that the ore can be made profitable.

WOODMAN MINING CO. UTA

Address: Gold Hill, Tooele county, Utah.

E. F. Woodman, pres.; T. J. Midgley, sec.

Property: the Frankie group, 2½ miles S. of Gold Hill, said to sho low-grade copper ore.

Ore: occurs in a granite-limestone contact, and the ore will, it is sa average 2% copper, $1.20 gold, 2 oz. silver.

Development: by extensive tunnel work and a shaft. In 1918, produc tion was about 2,000 tons, and net production about $30,000.

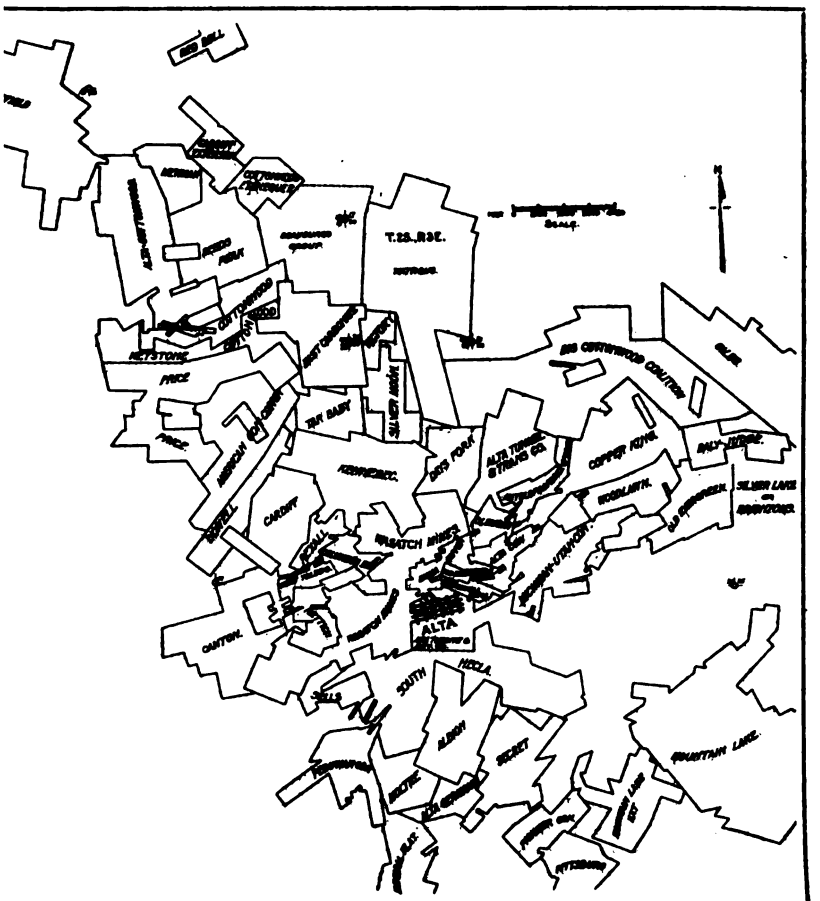
Company also owns the Cane Springs mine S. W. of Gold Hill, a the Alverado group E. of the town. In both groups a gold-bearing silic vein occurs in the granite-limestone contact. The two mines have, it said, produced $270,000. Seven men are employed at the Cane Spring mine.

ALTA-COTTONWOOD AND AMERICAN FORK DISTRICTS

Including Big Cottonwood and Little Cottonwood, whose combined output was 18,250 tons in 1919, compared with 35,269 tons in 1918.

ME MINING CO. **UTAH**

Officers: Edw. Southwick, pres.; Jacob Evans, v. p.; H. Gardner, sec.-as.; with John F. Bradshaw, Wm. E. Trinnamen, and Jas. Trinnamen, ectors.



PROPERTIES IN ALTA-COTTONWOOD DISTRICT, UTAH

Inc. 1919, in Utah. **Cap.,** $100,000; par 10c.
Property: located in American Fork canyon.

ERTA MINING CO. **UTAH**

Office: American Fork, Utah.
Officers: Ammon Mercer, pres.; S. H. Roundy, v. p.; Jas. L. Mercer, with M. F. Cowley, Nelson McCarty and David Davis, directors.

200,000 tons of ore. Present company has built a 200-ton mill to treat this ore. Details of operation not available.

UTAH MINING, MILLING & TRANSPORTATION CO. UTAH

Address: Moscow, via Milford, Beaver county, Utah. Chas. T. Birch ard, pres. and gen. mgr., at last accounts.

Property: includes the Hub and Lady Bryan mines, latter bought from of Mathew Cullen et al., S. of the Burning Moscow, 6 miles from a railway, in the Star district.

Development: by a 400′ two-compartment main shaft, developing a ve variously reported as 2 to 30′ in width, carrying silver-lead carbonates, and a bedded deposit in limestone showing high-grade cuprite, from which sma shipments of ore have been made. Ore said to carry $6-$7 in silver and go with heavy percentage of iron. No recent returns. Probably idle.

UTAH NATIONAL MINES CO. UTAH

Address: G. W. Field & Co., 50 Broad St., New York.

Officers: F. E. McMillin, pres.; M. Butler, v. p.; T. L. Lloyd, sec.-treas., with D. C. Pettibone, George Henderson and J. T. Lloyd, directors.

Inc. Feb., 1917, in Delaware. **Cap.**, $1,000,000; shares $1 par; non-assessable. Listed on Boston Curb.

Property: the Silver King mine, in Newfoundland district, Boxelder county; and the Lady Bryan in the Star district, Beaver county, Utah.

Development: 3,000′ of work said to have been done in the Silver King opening silver-gold-copper ore assaying over $60 per ton. In the Lady Bryan $16 ore is exposed to depth of 510′. Estimated reserves in May, 1917, were 75,000 tons. No recent information, probably idle.

UTAH-OREGON MINES CO. UTAH

Address: Price, Utah; John C. Forrester, pres. Levied an assessment of 1c. a share, and expected to start operating its milling plant to treat a large tonnage of free-milling gold ore late in 1919.

UTAH ORE SAMPLING CO. UTAH

Office: 820 Newhouse Bldg., Salt Lake City, Utah.

Officers: Jesse Knight, pres.; E. P. Ellison, v. p.; W. L. Mangum, sec.-treas., with J. W. Knight and R. E. Allen, directors. E. G. Jensen, gen. mgr.; Frank Burgner, gen. supt. at Murray.

Inc. Dec., 1909, in Utah. **Cap.**, $300,000; par $1; 215,000 issued.

Company owns and operates two ore-sampling mills at Murray and one at Silver City, with combined daily capacity of 1,000 tons of ore.

UTAH PLACER MINING CO. UTAH

Address: Box 92, Garfield, Utah.

Officers: Theo. Peterson, pres.; Leo. Erdman, v. p.; J. H. Butcher, sec.; Edward Helmerich, treas., with Geo. C. Phillips, and H. H. Murphy, directors.

Cap., $100,000; shares 10c par.

Property: 1,320 acres of placer ground on Grand river, Utah. Gravel is said to carry from 40c. to $3 gold per yard, also some platinum. One channel is 9 to 20′ deep. Idle in 1918, plans resuming work in 1920.

UTAH-RELIANCE MINING CO. UTAH

Office: 408 South State St., Salt Lake City, Utah. **Mine office:** Ibapah, Tooele county, Utah.

Officers: J. G. Bywater, pres.; D. B. Tripp, v. p.; Richard B. Shepard, sec.-treas. and gen. mgr., with W. A. Langford and Samuel Divett, directors.

Inc. 1908, in Utah. **Cap.**, $5,000; shares 1c par; assessable: issued $3,000, fully paid.

Property: 8 claims, unpatented, 160 acres, about 45 miles from a railway, showing porphyry and limestone.

Development: by a 175′ tunnel and a 100′ shaft, latter showing ore assaying up to 16% copper, 4 oz. silver and 40c. gold per ton.

Letters returned and no recent information available.

UTAH REVENUE MINES CORPORATION UTAH

Address: 527 5th Ave., New York.

loboken fissure from the Copper Prince level. Shipments reported rage about one car, 50 tons a month.

A COTTONWOOD MINING CO. **UTAH**

ddress: Salt Lake City, Utah. A. O. Jacobson, pres.; Franklin Webb, Val. S. Snow, sec.-treas., with J. C. Wood and R. S. Lewis, directors. nc. 1915. **Cap.**, $250,000; shares 25c par.

roperty: 28 claims, 18 patented, known as the Argenta group, located e Big Cottonwood district, 7 miles southwest of Park City. Claims i the Maxfield mine on the south and the Cardiff on the north. At last nts the company planned to start work on a long drainage and exion tunnel that had already been driven 1,300'.

A DIVIDE GOLD MINING CO. **UTAH**

fficers: A. F. Elfgren, pres.; L. H. Hardy, treas.; A. Y. Hardy, sec.; . W. Knudsen, and E. M. Tyson, directors.

c. April 22, 1916, in Utah. **Cap.**, $100,000; shares 10c par; 600,000 in treasury.

operty: 34 unpatented claims, in Big and Little Cottonwood dis- near Alta, shows gold values in a vein up to 30' wide in a shale te contact.

velopment: commenced in Spring of 1916, and in 1918 the tunnel was ag and $5 to $6 ore had been found. Idle in 1919, but work to be d.

GERMANIA MINES CO. **UTAH**

ly described in Vol. XIII. Merged 1919 into Albion Cons. Mng. Co., tee.

MICHIGAN MINES CO. **UTAH**

ce: 161 So. Main St., Salt Lake City, Utah. **Mine office:** Alta, Utah.

cers: same as South Hecla Mining Co.

in Utah. **Cap.**, $100,000; shares 10c par; assessable; outstanding, First assessment of 1c per share levied October, 1917. Listed on ke Exchange. Share prices 2½c to 8c in 1918; ½ to 9½c in 1919. ncial statement to January 1, 1917, showed total resources, $101,000, cluded: mines and plant, $16,250; treasury stock, $74,287; and cash, ccounts payable, $1,000.

perty: 17 acres, in Little Cottonwood district, said to show silver- per-gold ore. Development work is carried on through the Quincy evel of the South Hecla mine and some 5% ore is said to have pped. No later reports received.

MINING & DEVELOPMENT CO. **UTAH**

ess: 102 Mercantile Annex, Salt Lake City, Utah.

ers: Chas. A. Walker, pres.-mgr.; J. R. Walker, v. p.; H. M. lain, sec.-treas., with Walter C. Lewis and John M. Moore, direc-

June 29, 1906, in Utah. **Cap.**, $600,000; shares $1 par; 326,500 held ry. Annual meeting 1st Monday in January. Columbia Trust Lake City, Utah, transfer agent.

erty: about 160 acres in the Alta Cottonwood district, at the head Cottonwood canyon, includes the townsite at Alta between the mines and the South Hecla. The management expects to continue started in 1907, for 3,600' to explore the ground under the town- depth of 500'. Several contacts and well-defined fissures are said he property. Presumably idle since 1917.

RINCE MINING CO. **UTAH**

Johnson, pres.; C. W. Frees, sec.-treas., 739 E. 21st St., South, City, Utah.

1,000,000 shares, par 25c; 30,000 shares in treasury.

erty: 2 claims, patented, at Alta, Salt Lake county, between the Utah and the Prince of Wales Mining Co.'s property. Develop- el 1,065' at 500' depth. No recent information.

ALTA SUPERIOR M. & M. CO. UTAH

Office: Provo, Juab county, Utah.

Officers: A. E. Ahlander, pres.; N. A. Nelson, sec.

Inc. March, 1909, in Utah. **Cap.,** $50,000; shares 5c par; assessable. Previously known as Mineral Flat Extension M. & M. Co.

Property: 2 miles S. of Alta, Little Cottonwood district, Utah, showed 3′ vein of copper ore, also silver-lead ore.

Development: by tunnel and shaft with drifts on vein.

Reported, June, 1919, to show good ore in the 530′ tunnel.

ALTA TIGER MNG. CO. UTAH

Address: 420 Boston Bldg., Salt Lake City. **Mine office:** Alta, Utah. J. E. Phillips, pres.; Daniel Phillips, v. p.; A. T. Sanford, sec.-treas.

Inc. 1915. **Cap.,** $7,000; divided into 700,000 shares; assessable; with 20,000 remaining in the treasury. Assessments called 1918 and 1919. Listed on Salt Lake City Exchange. Shares sold ¼ to 1c in 1919.

Property: the Tiger patented claim, 6 acres and an interest in the Highland Chief claim, in the Alta-Cottonwood district, north of the town of Alta. The management intended to work the Tiger claim ground through the Highland Chief claim tunnel. The tunnel was cleaned out in the summer of 1915 when it was found that the Tiger ground had been mined to a considerable extent in early days. The work since has been devoted to the unexplored ground. One shipment made in 1916, claimed to have assayed 18% lead and 16.8 oz. silver per ton. Reported, June, 1919, that work had been resumed on the property.

One of the many Utah mining companies that does not reply to requests for information.

ALTA TUNNEL & TRANSPORTATION CO. UTAH

Office: 618 Newhouse Bldg., Salt Lake City, Utah.

Officers: John C. D. Clark, pres.; M. P. Braffet, v. p.; John Cain, sec.; F. V. Bodfish, gen. mgr., with V. E. Lollin and Geo. N. Wagner, directors.

Inc. Sept., 1911, in Utah. **Cap.,** $1,000,000; shares $1 par; 800,000 issued; assessable; assessment No. 9, 1c per share, called June, 1919. Shares varied from 5 to 12½c in 1918; 5 to 20c in 1919.

Property: 250 acres, includes the Lucky Dutchman group of 16 claims and the old Alta tunnel ground. Ore occurs in fissure veins in limestone with stringers of ore said to assay 9.7% copper, 21% lead and 13½ oz. silver per ton.

Development: by drifts and raises which have opened up several ore veins. Company is driving a mile-long drainage and transportation tunnel (3,550′ long in September, 1918) to open its own and adjoining properties with portal 3,500′ from Silver Fork on the Big Cottonwood, and 8,500′ above sea level. Tunnel will be 600′ lower than any mine workings of the district and will cut all the great veins of the section.

Equipment: 50-h. p. motor and compressor, drills, a 10′ fan for ventilating purposes, a 2-mile power line, boarding house and other buildings.

No reports issued by company.

ALTA-UTAH MINES CO. UTAH

Address: 161 So. Main St., Salt Lake City, Utah.

Officers: G. H. Watson, pres. and gen. mgr., Alta, Utah; H. Bamberger, v. p.; J. W. Harrington, sec.-treas.

Company was organized late in 1917.

Property: an old mine in the Cottonwood district, near the South Hecla. Developed by tunnels, one in 400′, and another 200′. The latter showed high-grade ore. No. 3 tunnel yielded a carload of 3% copper and 15 oz. silver ore.

AMERICAN CONSOLIDATED COPPER CO. UTAH

Office: Judge Bldg., Salt Lake City, Utah.

Officers: John C. Barnard, pres.; L. L. Smith, v. p. and mgr.; D. Dart, sec.-treas.; with J. W. McKinney and L. R. Wardrop, directors; Malmborg, supt.

Inc. 1907, in Utah. **Cap.**, $600,000; $1 par; changed to 1,000,000 shares; ar, October, 1917. Stock listed on Salt Lake Stock Exchange. Prices, in 1918; 3½-8c in 1919.
Property: 19 claims, 1 patented, in Big Cottonwood district, adjoins the iff and Howell on the west.
Development: several tunnels, longest 2,200′, driven to cut the Silver & Garfield fissures, showing heavy mineralization. Samples said to 48% zinc, with lead, gold and silver values.
Equipment: includes compressor, drills and mine buildings. Opera- resumed December, 1914, after an idleness of several years. Late in reported, following 2½′ of vein matter. Closed down December, but reopened May, 1919.

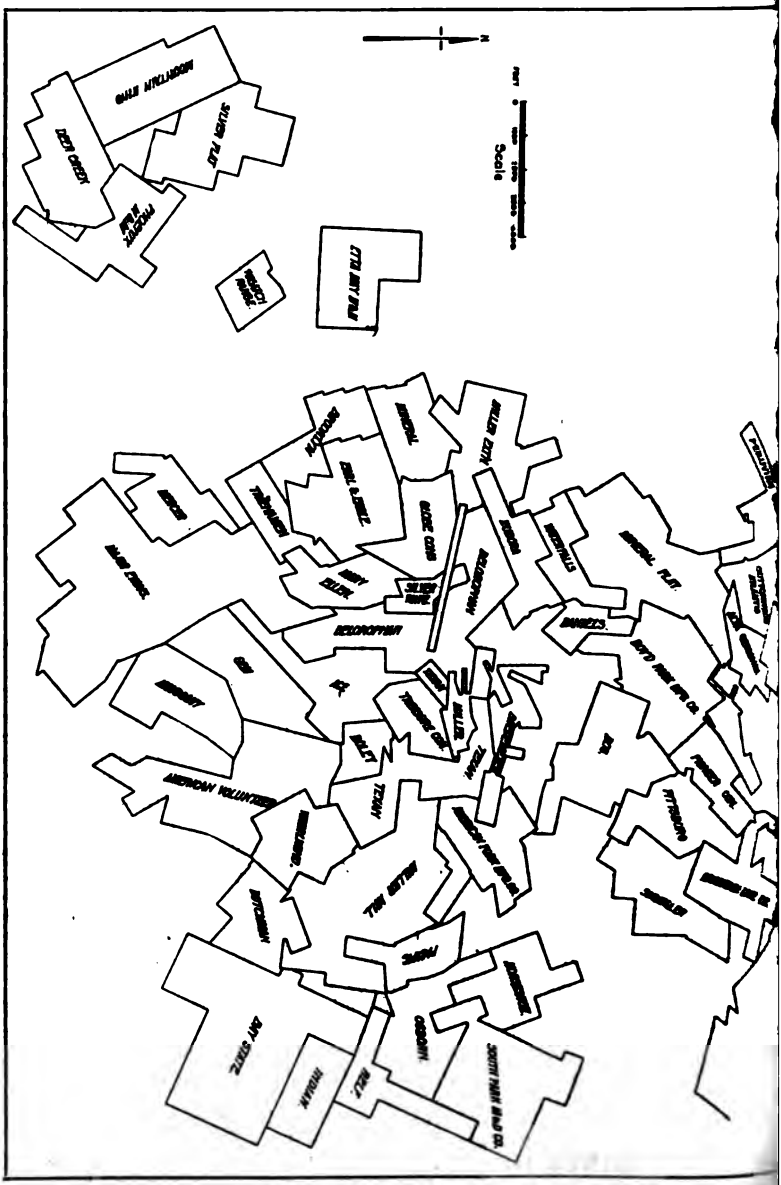
ERICAN CONS. MINES CO. UTAH
Address: 3 Stock & Mining Exchange Bldg., Salt Lake City, Utah.
Officers: Geo. E. Hemphill, pres.-mgr.; J. D. Blue, Jr., v. p.; J. W. rs, sec.; C. M. Beck, treas.; with F. Hardinge, directors.
Inc. 1918. **Cap.**, $1,500,000; $1 par; outstanding, 1,400,000 shares; assess- Assessment No. 3 called in October, 1919. Listed on Boston Curb.
Property: 22 claims, 400 acres in American Fork mining district, com- ng the silver-lead properties of the Earl & Eagle Mng. Co., and Bog Co. The veins carry silver-copper ore, as well as silver-lead.
Development: mainly by tunnel with total workings of 4,000′. The Earl agle tunnel was over 2,000′ long at last accounts. The Bog tunnel 600′ has yielded some shipping ore in former years. Property is still a lopment proposition.

ERICAN FORK EXPLORATION CO. UTAH
A merger of the Wild Dutchman M. & M. Co., and the Fissures Expl.

Address: American Fork, Utah.
Officers: W. E. L. Dillaway, mng. dir. and treas.; J. E. Rothwell, W. B. ner, J. B. Hubbard and F. J. Justin, directors; Peter Miller, supt.
Inc. in Utah. **Cap.**, $300,000; $1 par. 150,000 issued. Listed on Boston
Property: company owns a lease on the Dutchman mine; also a lease he Pacific mine of the Pacific Gold M. & M. Co.
Development: by upper and lower tunnel following the Pacific fissure cross fissures. Estimated value of ore reserves is $1,000,000. Ore is in lead and silver; while copper ore carrying gold is being developed.
Equipment: in Oct., 1917, a new 200-ton mill, costing $100,000, started ing dump ore. Houses were erected for staff and employees, also ssary shops, 300-ton concentrate bins, assay-office, etc.
Production: during the season of 1918, $89,881 was realized from crude and concentrate shipped.

ERICAN MINING CO. UTAH
Office: 400 Ness Bldg., Salt Lake City, Utah.
Officers: A. A. Crome, 1st v. p. and gen. mgr.; Wm. Crome, sec.-treas.
Inc. 1896, in Utah. **Cap.**, $50,000; shares 10c par; assessable; all issued; sessments levied to end of 1918. Annual meeting 3rd Monday in May.
Property: 10 patented claims, on Scott Hill, in Big Cottonwood dis- 5 miles from a railroad. Ore occurs as sulphides in lime. Orebody om 2″ to 2′ wide and average assays run from 5-18% copper, 10 oz. r and $3.50 gold.
Development: about 2,000′ of shafts and tunnels.
Property reported under lease and bond, in 1918, for $100,000.

ELOPE & PRINCE OF WALES MINING CO. UTAH
Not incorporated. Controlled by Walker Bros., of Salt Lake City.
$1,250,000; shares $1 par; 400,000 shares held in treasury.
Property: 9 claims, patented, in the Alta-Cottonwood district, cover a of the Prince of Wales fissure, worked years ago to a depth of 900′,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said to have produced $1,000,000 from one shoot alone, being the "bone ntention" in a celebrated lawsuit in the seventies.
Development: 930′ incline shaft and 600′ "Annie'" tunnel. In 1915 es continued the tunnel several hundred feet, cutting the vein 140′ w bottom of shaft. Vein where cut is said to have shown good ore aining silver chloride and galena. Company planned to continue the : of the lessees. No recent report.

ONAUT MINING & SMELTING CO. UTAH
Address: 310 Kearns Bldg., Salt Lake City, Utah.
Officers: Wm. Chipman, pres.; Hugo B. Anderson, v. p.; J. Tracey tton, sec.-treas.; J. H. Wootton, mgr., with John Hower, directors.
Inc. February, 1917, in Utah. **Cap.,** $50,000; shares 5 cts. par; assess- 515,000 shares outstanding. Annual meeting, 2nd Tuesday in January.
Property: 7 claims, 140 acres, in American Fork canyon, claimed to a fissure vein of lead sulphide and iron carbonate, with a 4″ shoot ad ore, assaying about $25. Developed by tunnel, 90′ long, to be ex- d 200′ at last report.

KERS MINES CO. UTAH
Offices: J. A. Maxfield, Maxfield Apts., Salt Lake City, Utah.
Officers: Noble Warrum, pres.; J. A. Maxfield, v. p.-sec.; A. D. Wil- s, treas., with M. B. Connell, B. Y. Golding and Aquilla Nebeker, tors.
nc. November, 1916. **Cap.,** 1,000,000 shares; 10c par; 500,000 shares in ury.
Property: 39 claims, about 780 acres, adjoins the Logger mine in Big onwood Canyon, and is near the old Maxfield mine.
Development: by a tunnel which is expected to cut the Logger vein 0′ in.

STATE MNG. & DEV. CO. UTAH
Address: American Fork, Utah county, Utah.
Officers: Geo. B. Tyler, pres. and mgr.; J. H. Wootton, v. p.; J. W. s, sec.-treas., with A. Chipman and E. J. Bennett, directors.
Cap., $1,000.000; shares 5c par; assessable; last assessment, No. 5, of alled June 14, 1917. Stock listed on Salt Lake Exchange. Prices range ¼c in 1918; ¼-½c in 1919. Financial statement from April 26, 1917, to ber 12, 1918, shows total receipts of $12,361; of which $392 was from ales, and $11,490 from assessments. Cash on hand, October 12, 1918, $210.
Property: at American Fork canyon. 22 claims, unpatented, 18 miles the railroad. Company claims to have 1,000 tons of ore on the dump ging 5 to 8% lead and 8 to 10 oz. silver, and 210 tons of ore averaging er ton.
Development: is by tunnel with about 1,200′ of workings.

OROPHON MINING CO. UTAH
Address: A. T. Sanford, Boston Bldg., Salt Lake City, Utah. Carl n, mgr., has a bond and lease on the property.
Cap., $100,000; shares 10c par par; 960,000 shares issued.
Property: 250 acres adjoining the Live Yankee group on the north in rican Fork canyon, Utah. The Live Yankee and other veins are said to the claims.
Ore: occurs in fissures in quartzite and in contact between lime and zite, carrying gold, copper, silver and lead.
Development: by 800′ tunnel. A small mill was built in 1918, and ore nents reported, August, 1919. The property is not operated in the r months on account of the deep snow.

COTTONWOOD COALITION MINES CO. UTAH
Officers: W. G. Romney, pres., 271 4th Ave., Salt Lake City; E. J. ny, v. p.; C. E. Robertson, sec.-treas., 777 7th Ave., Salt Lake City; R. Papworth, Jr., W. H. Hurd, W. C. Hurd, and H. J. McKean, direc-

Property: 14 claims, partly patented, 18 miles from railway, in the Alta Cottonwood district, 6 miles from Salt Lake City, includes the Mountain Chief group, N. W. of the Columbus Rexall.

The Cardiff is now one of the richest silver-lead mines of Utah. After being idle for years, a new prospecting tunnel was started in 1914. The tunnel cut a bedded orebody, averaging 10' thick, on a limestone-quartzite contact, at a point where it was intersected by a fissure vein. The orebody was opened for a length of 235' and for 795' on its dip (22°) developing 250,000 tons of $30 ore. New orebodies on the same contact, were cut at intersections of other fissures. One orebody found 800' S. of the main working winze is 5 to 9' wide and is continuous for over 200' along the strike.

Development: by main haulage tunnel, and an 1,180' inclined shaft which follows the ore down along the limestone bedding plane. A new 235' shaft in quartzite hanging wall, has recently been completed. Ore reserves of 200,000 tons of $30 ore were blocked out January, 1917. Proven reserves estimated to be large enough for an output of 100 tons daily for 3 years.

Equipment: includes compressor, drills, electric power, dwellings, machine and blacksmith shop.

Production: amounts to 125 tons daily of $45 to $50 ore during the summer months, but is only 30 to 40 tons when the winter snows cover the ground.

Output in 1919 was 6,520 tons of ore yielding 102,043 oz. silver, 3,111,900 lb. lead, 106,982 lb. copper, and 952,917 lb. zinc.

COLUMBUS EXTENSION MINING CO. UTAH

Consolidated with Rexall Silver & Copper Co. to form the Columbus Rexall Con. Mines Co., which see.

Described Vol. XII.

COLUMBUS-REXALL CONS. MINES CO. UTAH

Is a consolidation of the Columbus Extension and Rexall Silver & Copper Mng. Co., described in Vol. XII.

Office: 309 Kearns Bldg., Salt Lake City, Utah. **Mine office:** Mercur, Utah.

Officers: L. Greene, pres.; M. R. Evans, v. p.-mgr.; F. B. Cook, sec.; S. A. Whitney, treas., with H. W. Lane, Fred A. Price and John Gallacher directors. C. M. Evans, supt.

Inc. July 15, 1915, in Utah. **Cap.**, $600,000; $1 par; 586,234 shares issued; assessable. Columbia Trust Co., N. Y., registrar and transfer agts. Annual meeting, 1st Monday in June. Listed on Salt Lake City Exchange. Shares jumped from 13c in July to $2 in September, 1917. Prices in 1918 were $1.05 high, 25c low. In 1919, 45c high, 23½c low. An initial dividend of 2½c a share was paid December 30, 1918.

Property: 14 patented claims, 12 acres, in the Little Cottonwood district. Ore is copper with some galena.

Development: by 5,500' tunnel with total workings of 13,000'. An orebody was cut in July, 1917, at a point 5,000' from the tunnel portal at a depth of 1,350'; the ore occurs in limestone, near the quartzite contact. This orebody yielded 1,900 tons of ore, assaying 13.9% copper, 3.8% zinc, 0.5 oz. gold, and 32.9 oz. silver per ton. Late in 1919 a drift from the main tunnel cut ore at 75', and passed through 16' of high-grade ore. A raise above the 800' level in December, 1919, showed 6' of 41 oz. silver and lead ore. A connection was being made with the Cardiff, early in 1920.

Equipment: includes tramway and motors.

Production: shipments to April 21, 1919, totaled 7,223 tons of first-class ore with net smelter returns of $233,402, and 861 tons of second class with net smelter returns of $7,793. Ore is treated by the Murray mill. Lack of transportation facilities has kept down shipments. Early in 1920 company shipped over $40,000 worth of ore.

The total output in 1919 was 1,337 tons of ore, 7,842 oz. silver, and ,950 lb. copper, worth $39,688 gross.

)TTONWOOD ATLANTIS MINING CO. **UTAH**

Office: 420 Vermont Bldg., Salt Lake City, Utah. **Mine office:** Alta, ah.

Officers: Samuel Neff, pres.; R. O. Dobbs, v. p.-gen. mgr.; J. H. Moss, .-treas.; with Geo. F. Busch and R. C. Middlewood, directors.

Inc. July, 1915, in Utah. **Cap.,** $100,000; 10c par value; 900,000 shares ued.

Transfer office: 420 Vermont Bldg., Salt Lake City. Annual meeting May.

Property: 6 claims, 50 acres, in the Little Cottonwood district. Ore ich carries lead, silver, gold and copper occurs in shoots at the inter- tion of two orebearing fissures with a thrust fault contact having a estone foot wall and a quartzite hanging wall. This contact courses ıth 15° East and dips 25°. The developed portion of the Atlantis prop- y was sold to the Louise Mining Co. in November, 1917.

It is the plan of the company to crosscut to the thrust contact as has n done at the Cardiff mine two miles north.

)TTONWOOD KING MINING CO. **UTAH**

Office: 502 Boyd Park Bldg., Salt Lake City, Utah.

Officers: A. Anderson, pres.; A. L. Thomas, Jr., v. p.; H. H. Harris, -treas., with H. P. Hucy, G. H. Webb, C. R. Halstead and J. W. Mc- ughlin, directors. A. B. Gattrell, mgr.

Inc. July 2, 1915. **Cap.,** $150,000; shares 10c par; 150,000 shares in treas- . Assessment No. 5, ¼ per share levied August, 1918. Listed on Salt ke Exchange.

Property: 28 claims, 560 acres, and a bond and lease on the Giles prop- y of 31 claims, located between Big Cottonwood and Park City, Utah. nd calls for $600,000, with no payments due for 2 years.

All the property of the Big King Mining Co., bought, 1917, by exchange stock share for share, property 52 claims, 1,040 acres, adjacent to Cotton- od King ground.

Development: 2,100′ of tunnels and 187′ shaft with 500′ of workings. nagement states that on account of faults, 600′ of development done in 6-17 proved disappointing. In 1918 the Sunnyside tunnel was advanced '. Work was resumed in May, 1919. Property is still in a prospective te. It adjoins the Daly Judge and Silver King Coalition of Park City.

)TTONWOOD METAL MINING CO. **UTAH**

Office: 503 Utah Savings and Trust Co. Bldg., Salt Lake City, Utah.

Officers: W. M. Ferry, pres.; E. E. Watrous, v. p.; S. J. Truman, sec.- as., with E. P. Watrous, and H. R. Watrous, directors.

Inc. in Utah. **Cap.,** $100,000; 10c par; 205,000 shares paid for property d organization expenses. The balance is to provide funds for velopment work. Listed on Salt Lake Exchange. Shares sold 1-3½c in 8; 6c in 1919.

Property: 38 full claims, 760 acres, known as the Watrous group, in the g Cottonwood district, said to be crossed by six large fissures which cut : series of sandstone, shale, quartzite and limestone. These fissures run 35°-40° E., dip 60° to the N. W., and are cut by E. and W. fissures. Ore- dies are found at these intersections especially in the soluble white lime. e deposits of the district are bedded deposits by replacement.

Development: by 1,070′ tunnel that has cut 3 fissures. It is the plan of company to continue the tunnel to cut all the fissures. The Silver King [illegible] is expected within 500′.

[illegible]ment: 4-drill compresor, blacksmith shop, and houses.

[illegible]ment frankly states that property is a prospect, and that they [illegible] development. Prof. J. H. Webber of Salt [illegible] first-class territory to prospect.

DAYS FORK MINING CO. **UTAH**

Office: 608 Boston Bldg., Salt Lake City, Utah.

Officers: Henry Harker, pres.; M. T. Ellison, v. p.-mgr.; E. O. Le sec.-treas., with H. E. Booth and B. H. Cannon, directors.

Inc. April, 1911, in Utah. **Cap.**, $60,000; 10c par; 475,000 shares ou standing.

Property: 5 claims, 85 acres, in Big Cottonwood mining district, sa to show gold, silver, and copper ore in fissure veins. **Development:** abo 1,000' of tunneling. Is a prospect.

EARL & EAGLE MINING CO. **UTAH**

Described in Vol. XIII. merged with American Cons. Mines Co which see.

EAST HECLA MINING CO. **UTAH**

Office: 1119 Boston Bldg., Salt Lake City, Utah. **Mine office:** Alt Utah.

Officers: J. B. Taylor, pres.-gen. mgr.; E. J. Broberg, v. p.; W. Hans Jr., sec.-treas.; D. J. Cook, supt.

Inc. in 1916, in Utah. **Cap.**, 1,000,000 shares; 10c par.

Property: a group of claims at Alta, adjoining the South Hecla mm said to show a prominent outcropping vein and about 3' of ore in a sha sunk on it. Ore carries copper, lead, silver and gold values.

Development: a tunnel, 250' long, being driven to cut the downwa extension of the vein beneath a 75' shaft, that shows copper ore.

Management doing exploration work at last accounts.

EMMA CONSOLIDATED MINING CO. **UTAH**

Dead.

Former officers: G. G. Rice, pres.; Wm. Barret Ridgely, v. p.-treas Judge H. D. Rummel, 2d v. p.; I. H. Weinberg, sec.; J. J. Beeson, gen. mg

Inc. 1917, in Delaware. **Cap.**, $3,000,000; $1 par; 2,668,693 issued. Wa the holding company, owning more than 98% of the outstanding capitaliza tion of Emma Copper Co. and over 80% of Old Emma Mines Co Als bought the lease on Old Emma Mines Co. ground from the Old Emm Leasing Co. (now dissolved), which ran until September, 1917.

Emma Copper Co.

Controlled through ownership of over 98% of outstanding capitalizatio by the Emma Cons. Mng. Co.

In 1918 the company after shipping a few hundred tons of ore wen into the hands of a receiver, and in 1919, the Emma Silver Mines Co. wa formed as a reorganization of the Emma companies, assuming their deb and assets.

EMMA SILVER MINES CO. **UTAH**

Mine address: Alta, Salt Lake county, Utah.

Officers: C. S. Burton, pres.; John Dern, v. p., Salt Lake City; Fran B. Cook, sec.-treas.; with J. E. Galligher, John M. Hayes, and A. L. Hoy paugh, directors. Geo. H. Dern, mgr., Jas. Quirk, supt.

Inc. 1919, in Utah. **Cap.**, $5,000,000; $1 par. Listed on Salt Lake Ex change.

Company is the offspring of Emma Cons., Old Emma Mines Co. an the Emma Copper Co., which were controlled by Emma Cons. In 191 Emma Cons., which had been fostered by George Graham Rice, went int the hands of a receiver and one of the results was the formation of th Emma Silver Mines Co. Shareholders in the Old Emma companies wer given the "privilege" of exchanging one share of old stock for three s new on payment of 10c. a share on the old stock or one share of ne for one of the old with no assessment; receiving 20c a share cash for eac of the old. Some of the shareholders of Emma Cons. had paid as high a $3.75 a share for this stock in 1916; it afterwards fell to a few cents pe share.

The new company after paying all debts of the old company is said ave started business with $100,000 and 1,000,000 shares of stock in the ury and no debts. As there are many who still have faith in the un- ored part of the property, it is hoped that the new management will this old and much abused mine into the productive class.

Property: included 11 claims in Little Cottonwood district and the ad- ng Vallejo and Joab Lawrence groups, bought 1915 in exchange for 00 shares of stock. The company had a lease on the Emma mine d by the Old Emma Mines Co., which see.

History: the Old Emma mine was a famous early-day producer, having ed over $6,000,000 worth of lead-silver ore in the 60's and 70's, from e the 300′ level. It was sold to the Emma Silver Mng. Co., for 0,000 and soon afterwards the orebodies appeared worked out, or cut y a fault. After vain attempts to find the orebodies below the fault, nine lay idle until 1915.

Chas. S. Herzig made a geological study of the property with the de- on that it contained a faulted portion of the Old Emma bonanza ore- . whereupon diamond drilling was started. Under direction of J. J. on, geologist, the Emma vein was located, 1916, at about 250′ below e it had been cut off by the fault, and the displaced segment of the ore- opened up.

Development: by 1,700′ tunnel, 400′ shaft and drifts on several levels. Management diamond drilled in 1917, in the hopes of locating the ward extensions of 4 other orebodies, all presumably cut off by the tezuma fault. In November a mineralized zone 50′ wide was passed gh, assaying a few ounces of silver.

Early in 1920, a winze from the bottom level opened 5′ of ore assaying lead and 180 oz. silver per ton. Shipments were begun shortly there-

Production: from Jan. to Nov., 1917, 8,400 tons were shipped with age net returns of $30 a ton.

A MAY MINING CO. **UTAH**

Address: Frank Jardine, mgr., American Fork, Utah.

Officers: B. H. Neilson, pres., Frank Jardine, v. p. and mgr.; Milas son, sec.-treas., with Nelson Miller and T. E. Tullis, directors.

Stock assessable; assessment of ½c per share levied in 1918.

Property: in American Fork district, said to show lead-silver ore, with e copper. Developed by a 250′ tunnel.

SURES EXPLORATION CO. **UTAH**

Company no longer in existence. Entire stock issue owned by Ameri- Fork Exploration Co., which see.

E COINAGE MINING & MILLING CO. **UTAH**

Letters neither answered nor returned from office: 69 Commercial , Salt Lake City, Utah. Mine near Alta, Salt Lake Co., Utah. L. A. ns, pres.; D. H. Wenger, sec.-treas.

Inc. 1896, in Utah. **Cap.,** $125,000; shares 25c par; assessable, with 2 ssments levied.

Property: 4 claims, 3 patented, in Little Cottonwood canyon, 2 miles a railroad, developed by shaft and tunnels, showing lead and copper

NWOOD MINING CO. **UTAH**

Office: 1102 West Seventh South St., Salt Lake City, Utah.

Officers: E. P. Mowers, pres. and gen. mgr.; N. W. Sonnedecker, v. p.; . Grovenor, sec.-treas.

Inc. Feb. 21, 1901, in Utah. **Cap.,** $30,000; shares 10c par; assessable; eased 1912, to $125,000, shares 25 cts. par.

Property: 8 claims, patented, in Big Cottonwood district, 6 miles from ilroad, opened by shafts and tunnels, with about 1,600′ of workings. No nt information.

GLOBE CONS. MINING CO. UTAH

John Cleghorn, pres.-gen. mgr., Boston Bldg., Salt Lake City, Utah.

Property: located in American Fork Canyon, said to show limestone cut by fissure veins with lead-silver ore.

Developed: by tunnels—main tunnel had a length of 800' early in June 1919. Management claims to have a good tonnage of milling ore.

GOLD HILL MINES DEVELOPMENT CO. UTAH

Main office: 425 Atlas Block, Salt Lake City, Utah. **Mine office:** American Fork, Utah.

Officers: Theo. Nicholes, pres. and gen. mgr.; A. J. Weber, v. p. J. Fitzgerald, sec.-treas.

Inc. July, 1916. **Cap.,** $1,000,000; par $1; 300,000 in treasury; 200,000 sold. Increased 1916 from $50,000; 10c par; assessable.

Property: 9 claims in American Fork district, Utah county, on Mill Hill. Ledge said to show copper ore, with lead, gold and silver.

Development: by 3 short tunnels, lowest driven to open ore found in upper tunnel.

GRATER CONS. MINES CO. UTAH

Address: 201 Ness Bldg., Salt Lake City, Utah.

Officers: J. A. Maxfield, pres.; C. F. Johnson, v. p.; B. D. Field, sec.-treas.; with Geo. W. Robbins, and Peter Crystal, directors.

Inc. Feb., 1919, in Utah. **Cap.,** $1,500,000; $1 par; outstanding, 1,250,000 shares.

Property: 76 claims in Big Cottonwood Canyon. Company has an ambitious scheme of driving a 5-mile tunnel to cut several fissures: the tunnel would pass under the Maxfield, Dolly Varden, Kennebec, Flagstaff, Prince of Wales, Woodlawn, and other mines.

The project may have merit, but the advertising matter sent out may prove misleading to the uninitiated.

GREAT COPPER KING MINING CO. UTAH

Inc. Aug., 1904, in Utah. **Cap.,** $50,000; shares 10c par; issued, $47,500; assessable; last assessment 1/10 ct. delinquent March 7, 1914.

Property: 10 claims, unpatented, including 4 claims, 1 fractional, held under bond and lease, near the mouth of Little Cottonwood canyon, 7 miles from Alta.

Development: by shallow shafts and a 330' tunnel, with about 800' of workings, showing auriferous and argentiferous copper and lead ore. Ore occurs in fissure veins as contact deposit in granite and quartzite.

Samples taken from main tunnel on 300' level said to assay from 19-33% copper. J. E. Smith, a director, was developing property under contract in 1916. No later information.

GREAT WESTERN GOLD & COPPER CO. UTAH

Merged with Mountain Lake Mining Co. and Thor Mining Co. under title of Great Western Mines Co., which see.

GREAT WESTERN MINES CO. UTAH

Office: Knight Bldg., Provo, Utah.

Officers: Jesse Knight, pres.; J. W. Knight, v. p.; W. L. Mangum, sec.-treas., with Jas. H. Moyle, W. I. Snyder, R. A. Brighton and K. S. Jordan, directors.

Inc. 1916, in Utah. **Cap.,** $150,000; 10c par; outstanding 1,270,000 shares. Listed on Salt Lake City Exchange. Company is a merger of the Great Western Gold & Silver Co., Mountain Lake Mining Co., and the Thor Mining Co., all described in Vol. XI, Copper Handbook.

Property: 98 claims, in the Big Cottonwood and Snake Creek districts in Salt Lake and Wasatch counties.

Ore: gold, silver, copper and lead, mainly in contact deposits: no estimate of ore in sight.

Development: 500' of shafts, 8,500' of tunnels, 350' winzes and raises, and 2,000' of crosscuts. Ten cars of copper ore said to have been shipped from the property. Company has a transportation agreement with the Snake

:k Mining & Tunnel Co., a subsidiary of the Judge Mining & Smelting for use of the 14,000′ tunnel.

WELL MINING CO. **UTAH**

Office: 209 Felt Bldg., Salt Lake City, Utah.

Officers: T. L. Walden, pres.-mgr.; M. J. McGill, v. p.; J. H. Deming, treas.; with J. M. Howell and T. H. Paull, directors.

Inc. in 1910. **Cap.**, $600,000; shares, $1 par; 555,000 shares outstanding; ssable. Assessment No. 6, 1c a share payable, August, 1919, and No. 7, a share, payable November, 1919, $1,250 in treasury, June 20, 1919. es sold 3½-17c in 1918; 7-12½, in 1919 **Listed on Salt Lake Exchange.**

Property: an old mine, formerly known as the Baby McKee, 7 patented ns, in the Alta-Cottonwood district, about 25 miles S. E. of Salt Lake , adjoins the Cardiff property on the east. Claims cover strike of vell vein, said to be traceable on property for over a mile, with strike E.-S. W. and 4′ width. Country rock is quartzite and limestone. **Ore:** r. copper, lead, zinc and antimony, said to average $20 to $50 per ton.

Development: 150′ of shafts, and over 1,800′ of tunnels. The main tun- is in over 1,400′. Shipments were made prior to 1910. Development k only is being done; several small fissures have been cut.

VA COPPER MINING CO. **UTAH**

Address: Park City, Utah.

Officers: L. R. Perry, pres., Forrest City, Iowa; D. G. Scott, v. p.-gen. .; R. T. Kimball, sec.-treas., with J. Carson and D. E. King, directors. e Scott, supt.

Cap., $100,000; 10c par; 750,000 issued; assessable; last assessment, 1c share, levied May, 1919. Ore sold, 1917, was valued at $5,740, and in , at $2,277.

Property: 4 patented claims, and 2 unpatented claims, 180 acres, in Cottonwood district, 1,000′ N. W. of Silver King Coalition.

Development: by tunnel, with 200′ incline in ore and several hundred of workings, mainly along a limestone quartzite contact.

In 1917 a compressor and other mining machinery was installed. Sev- shipments were made, yielding as high as $900 per carload. Com- y is working only 3 or 4 men, and shipped 125 tons in 1919. Reported ember, 1919, that during the past year, $2,500 had been spent on new pment, and 550′ of new work done.

IAN MINING & MILLING CO. **UTAH**

Dead. Described Vol. XIII. Formerly operated at American Fork.

NNEBEC CONSOLIDATED MINING CO. **UTAH**

Address: 1105 Newhouse Bldg., Salt Lake City, Utah.

Officers: Ezra Thompson, pres.; Jas. D. Murdoch, sec., with A. T. San- l, Shand Smith and P. S. Keogh, directors.

Inc. in 1901. **Cap.**, $400,000; shares 1c par; 63,390 shares in treasury.

On the basis of 3c per share on their holdings, shareholders subscribed loan bearing 8% in June, 1917.

Property: 30 patented claims, about 400 acres, in the South Fork of Big Cottonwood district, adjoins the Cardiff on the east and west and Wasatch Mines and Columbus Rexall on the south.

Development: by a 700′ incline shaft, a 3,000′ lower tunnel and an upper el.

Property is an old-time, but very small silver-lead producer. Inactive some time, but in June, 1919, company levied an assessment of 3c per e to provide money for resumption of work.

NNEBEC MINING CO. **UTAH**

Company reorganized in October, 1917, under name of Kennebec Con- dated, which see.

ST CHANCE MINING CO. **UTAH**

Address: Newhouse Bldg., Salt Lake City, Utah.

Officers: Jas. A. Hauerbach, pres.; F. O. Horn, sec.-treas.

Cap., $25,000; 10c each; assessable; 200,000 shares issued. Company reported out of debt and amply financed.

Property: 1 patented claim adjoining the Cardiff, in the Big Cottonwood district, near Alta.

Development: 400′ tunnel and 150′ winze. Ore is said to assay 60-70% lead, and 50-75 oz. silver. Employs 3-4 men steadily on development. Management hopes to enter shipping list in 1920.

LOGGER MINING CO. UTAH

Officers: R. D. Maxfield, pres.-mgr.; Jas. Marlow, v. p.; D. J. Bloem, sec.-treas., with J. M. Hamilton, and Henry Erickson, directors.

Inc. July, 1915. **Cap.**, 1,000,000 shares; 1c each. Stock listed on Salt Lake Exchange. Quoted 1¾-2c in 1919.

Property: the Logger mine in Big Cottonwood canyon, adjoining the Maxfield mine, shows a 1′ fissure vein, developed by a 475′ adit, a winze sunk on the vein from the 200′ point and a crosscut at 350′ from portal, exposing ore. Assays said to return $16.47 gold, 13.4 oz. silver and 1% copper.

A lower tunnel was started 100′ below upper tunnel, 1916, and is reported to have cut the vein seen above with several other small veins of ore assaying from $50-$240 per ton in copper, gold and silver. Development work was resumed in 1919.

LOUISE MINING CO. UTAH

Address: 420 Vermont Bldg., Salt Lake City. **Mine address:** Alta, Utah.

Officers: Samuel Neff, pres.; R. O. Dobbs, v. p.-sec. and gen. mgr.; David Neff, treas.; with J. H. Moss, G. F. Busch and R. C. Middlewood, directors.

Inc. Nov. 16, 1917, in Utah. **Cap.**, $100,000; 10c par; assessable; outstanding, 501,600 shares.

Property: 7 patented claims, 70 acres, in the Little Cottonwood mining district at Alta, said to show silver-lead ore with some copper and gold.

Development: by three tunnels, 800′, 450′, and 250′ in length with total workings of 2,500′.

Management plans to thoroughly develop the property.

MAJOR EVANS MINING CO. UTAH

Mail returned, 1918, from former address, 440 Boston Bldg., Salt Lake City, Utah. C. B. Felt, pres.; R. Leo Bird, sec.

Inc. 1915, in Utah. **Cap.**, $100,000; 10c par; assessable; treasury, 44,000 shares. Listed in Salt Lake City.

Property: 42 claims in American Fork mining district, said to show copper-lead-silver ore. Is a prospect. Probably idle.

MARY ELLEN MINING & MILLING CO. UTAH

Address: American Fork, Utah.

Officers: W. C. Boley, pres.; T. S. Priday, v. p.; J. W. Storrs, sec.-treas.; with R. C. Boley and T. M. Allman, directors.

Inc. 1909, in Utah. **Cap.**, $100,000; 10c par; assessable; 650,000 issued.

Property: 7 claims, 125 acres, in American Fork district, Utah, said to show a vein in quartzite and limestone. **Ore:** is partly sulphide, and contains lead, silver, and gold.

Development: by tunnels totaling 700′. Idle for 3 years, but work resumed in 1917. No report since.

MAXFIELD MINE UTAH

Operated by Boston Development Co.

MICHIGAN-UTAH CONSOLIDATED MINES CO. UTAH

Office: 411 Felt Bldg., Salt Lake City, Utah. **Mine office:** Alta, Salt Lake county, Utah.

Officers: Norman W. Haire, pres. and gen. mgr.; H. R. MacMillan, v. p.; N. A. Robertson, sec.; L. H. Farnsworth, treas.; with Frank B. Cook, C. A. Gillette, and W. J. Halloran, directors. R. R. Van Valkenburgh, supt.

Inc. April 26, 1915, in Utah, as a reorganization of the Michigan-Utah

ing Co. **Cap.**, 1,500,000 shares; 25c par; assessable; assessment, 2½c a e, called November, 1919; 1,328,255 shares issued. Listed on Salt Lake hange. Sales, 9-23c in 1918; 8-15c in 1919. Columbia Trust Co., regis- . Annual meeting, 2nd Monday in February.

Gross earnings in 1917 were $226,408; all from ore sales.

Property: 72 claims, 42 patented, 1,200 acres, including a millsite, in the and Little Cottonwood mining districts. Claims show Paleozoic sedi- its cut by granite, the ore occurring in fissure veins in limestone, and contact metamorphic deposits between limestone and granite, having eneral strike of N. 65° E., and a dip of 32°. There are 5 distinct and allel veins showing average widths of 2½′ and traceable 5,000′, reported carry copper, lead, zinc, silver and gold values, averaging $25 per ton. s are carbonates at and near surface, succeeded below by sulphides.

Development: principally by tunnels, all workings being in the oxide carbonate zones, but sulphides are proven to occur in depth by work- s of the Columbus Consolidated Mining Co., near by. Total under- und openings aggregate over 50,000′, about one-half being tunnels, drifts crosscuts that are all in ore, raises and winzes aggregating 10,500′ ad- onal. Ore is transported by aerial tramway to Tanners flat, 5 miles n the mine, thence by narrow-gauge railway to Wasatch, where connec- n is made with the Salt Lake & Alta standard gauge road which runs the Midvale smelter. The tram has a maximum capacity of 200 tons y.

The Copper Prince tunnel has been driven under property about 2,000′, osing several large orebodies.

Equipment: includes two 90-h. p. hoists, and everything necessary for ning 150 tons daily. Air is supplied by the Wasatch Power Co. from tle Cottonwood creek.

Buildings include machine shop, carpenter shop, several dwellings and a thy, located underground as a measure of protection from snowslides, ich are of frequent occurrence in this region.

Production: ar	Gold Oz.	Silver Oz.	Copper Lb.	Lead Lb.	Receipts Net
5	67	43,146	99,066	515,296	$29,901
6	154	90,816	364,685	916,851	130,342
7	227	148,318	384,906	1,865,379	244,125

The mine was worked continuously throughout 1918, and in July, 1919, duction was about one car of ore daily, the company, like many others, ng short of miners.

Part of the property was operated under lease by the Triangle Mng. ., a close corporation, which see.

LLER MINES DEVELOPMENT CO. UTAH

Office: 804 Newhouse Bldg., Salt Lake City, Utah.

Officers: J. H. Leavell, pres.; G. H. Ryan, v. p.; H. W. Ragland, sec.- as.; with M. P. Kirk, and L. D. Foreman, directors. J. C. Fitzgerald, t.

Inc. in Utah. **Cap.**, $1,000,000; 10c par; 543,500 issued.

Property: Miller mine, 11 claims, 10 patented, 70 acres, at Miller Hill, American Fork district, operated under 5 years' lease and bond from Mng. & Sm. Co.

Geology: replacement deposit in upper Cambrian limestone. Orebody d to be 600′ long and of good width. Ore carries lead and zinc car- , and is reported to assay 0.73 oz. gold, 20.7 oz. silver, 43.95% lead. , and 6.1% zinc.

Development: by tunnels 300 to 1,200′ long to depth of 400′ with total workings of about 15,000′. No recent report.

MILLER MINING & SMELTING CO. UTA

Office: 406 Dooly Block, Salt Lake City, Utah. W. A. Wilson, ge mgr.

Property: in American Fork canyon, under lease and bond to Mill Mines Dev. Co. q. v.

MINERAL FLAT EXTENSION MINING & MILLING CO. UTA

Name changed to Alta Superior Mining & Milling Co., which see.

MINERAL FLAT MINING CO. UTA

Fully described in Volume XIII. Consolidated with Albion Cons. Mi ing Co., which see.

MONARCH MINES CO. UTA

Title changed from Plentiful M. & M. Co., 1916.

Address: American Fork, Utah.

Officers: Chas. Ohran, pres.; F. W. Wright, v. p., with W. A. McBri E. J. Seastrand, and J. A. Kauffman, directors. J. Watt Storrs, sec.-tre

Inc. June, 1915, in Utah. **Cap.,** $30,000, increased March, 1916, to $40.0 increased November, 1917, to $62,500; shares 5c par; 600,000 issued; sessable.

Property: 9 claims, 186 acres, near American Fork, Tooele county Lakeside mountains, shows galena and carbonate ore in fissure vein ting blue and gray limestone, with N.-S. strike and dip of 70° W. Pay reported to have been cut in 1916, at 140′ depth in a 40′ vein of lead bonates. A 2½′ streak is said to assay 78% lead and 10 oz. silver.

Development: by 3 incline shafts, deepest 193′. **Ore reserves:** 10 tons estimated as blocked out.

Equipment: includes 2 motor trucks. Company does not reply to quests for information.

MONETAIRE MINING CO. UTA

Office: 405 Newhouse Bldg., Salt Lake City, Utah.

Officers: D. J. Williams, pres.; N. V. Jones, v. p.; B. F. Cumm sec.-treas.; with W. H. King and D. W. Cummings, directors.

Inc. Sept. 19, 1912, in Utah. **Cap.,** $250,000; shares 25c par; assess 885,000 shares outstanding. Annual meeting third Tuesday in Jan Listed in Salt Lake City.

Property: 2 patented claims, 6 acres, in Little Cottonwood mining trict, said to show lead-zinc ore, with some molybdenum, in fissure ve limestone and quartzite. Veins strike E. W. and dip almost vertical shipped said to have returned $17 per ton. No recent shipments re

Development: 127′ vertical shaft and tunnels, with about 1,0 workings. Claim to have 20,000 tons of ore blocked out.

Equipment: includes an electric hoist.

NEVA MINING CO. UT

Office: 400 Boyd Park Bldg., Salt Lake City, Utah. **Mine** o Brighton, Utah.

Officers: A. H. Rock, pres.; C. E. Cole, v. p.; Walter Steadman, se

Inc. 1906, in Utah. **Cap.,** $75,000; shares 15c par; assessment No. 7, levied October, 1918. Stock is listed on Salt Lake Exchange. Sales ¼ high, 1918; ¼-½ in 1919.

Property: 5 unpatented claims, adjoining the Cardiff on the W. silver-lead-gold ore in a fissure vein, running E. W. along a quart contact and said to give assays of 45% lead, 30 oz. silver and 0.1 o Developed by incline shaft and tunnel. Operations were resumed and shaft sunk to intercept the Cardiff contact lode.

Property in dispute with the Cardiff Mining Co. was won by the and is considered valuable. Operations are carried on by small ments.

OLD [illegible] LEASING CO. U

D[illegible] 1917. [illegible]onsisting of 416,667 shares of Emm Mines [illegible] ockholders at ratio of 3 shares of O for 1 [illegible]ge Graham Rice promotion.

.D EMMA MINES CO. **UTAH**

Emma Consolidated Mining Co. owned 80% of the outstanding capitaliza-
n.

Property was leased for 14 months from July, 1916, to Old Emma Leasing
., which was dissolved in April, 1917. Lease sold to Emma Cons. Mining Co.
mpany went into hands of receiver in 1919. Property now controlled by Emma
ver Mines Co., which see.

.D EVERGREEN M. & T. CO. **UTAH**

Address: at last accounts was care H. G. McMillan, gen. mgr., 649 E.
uth Temple St., Salt Lake City, Utah.

Cap., $300,000; shares $1 par; all outstanding.

Property: 12 patented claims, 3 miles N. E. of Alta, in the Big Cotton-
od district. Mine is an old-time producer of gold-copper ore, with 2,700'
inage and transportation tunnel. Idle.

BORN CONSOLIDATED MINING & MILLING CO. **UTAH**

Dead. Described in Vol. XIII.

CIFIC GOLD MINING & MILLING CO. **UTAH**

Office: American Fork, Utah.

Officers: J. L. Craig, pres.; Jas. Chipman, Jr., v. p.-treas.; H. C. John-
, sec.-mgr., with A. B. Stevenson, A. K. Thornton, directors.

Inc. 1900, in Utah. **Cap.,** $100,000; shares 10c par; assessable; 400,000
res outstanding. Annual meeting, first Monday in February. Financial state-
nt for 1918 showed balance in bank, $1,306; Liberty bonds, $2,000.

Property: Blue Rock group, 7 patented claims, 120 acres in American
k mining district, shows quartzite and limestone, carrying several fissure
s varying in width from 17" to 15'. Veins strike N. 30° E. and dip 50°
W.

Ore: lead-silver sulphide, estimated by management to average 50%
l, 25 oz. silver, .02 oz. gold, 1.5% zinc, 15% iron, 0.1% copper, 22% sulphur.

Development: by 3 tunnels 300', 700' and 1,000' long with about 5,000'
workings, estimated to show 100,000 tons of ore blocked out for stoping, De-
ber, 1915. January 1, 1919, reported to have 7 month's ore supply blocked
Main fissure was cut at depth of 500'. Property was leased to the Fissures
loration Co (controlled through stock ownership by American Fork Explora-
Co.), on a royalty basis. Royalties received in 1918 totaled $10,842.

Equipment: includes a hydro-electric-generating plant, installed in Dec.,
, at a cost of $20,000. A 200-ton mill constructed during 1917 treated about
ons per day in 1918, concentrates netting $37 per ton.

THE MINING CO. **UTAH**

Address: American Fork, Utah.

Officers: John E. Berg, pres.; L. A. Anderson, v. p.; Boise A. Wells,
nd v. p.; S. L. Anderson, sec.; S. T. Shelley, treas., with W. F. Anderson
Abner Chipman, directors.

Inc. March, 1917, in Utah. **Cap.,** $10,000; shares 1c par.

Property: the Silver King Nos. 1 and 6 claims in American Fork dis-
. No recent information; probably idle.

UVIAN CONS. MINING CO. **UTAH**

Office: 53 S. West Temple, Salt Lake City. Henry Welling, pres.; J.
ays, sec.

Property: a group of claims near Alta, from which company shipped
rs of $18-$25 lead-silver ore during summer of 1919.

TSBURGH CONSOLIDATED MINING & MILLING CO. **UTAH**

Officers: Mrs. E. Tarbet, pres.-mgr., 160 First Ave., Salt Lake City; H.
reen, v. p.; J. G. Doolittle, sec.-treas., with B. Snyder and P. S. Keoch,
rs; J. Benton Leggatt, cons. engr.

1903. **Cap.,** $500,000; $1 par; 300,000 issued.

perty: 9 claims, 8 patented, in both Salt Lake and Utah counties,
the American Fork side of the divide. **Ore:** occurs in fissure
...

: on the Pittsburgh fissure, by 3 tunnels from American

Fork canyon. A 500′ upper
under former management.
and raises. Operations were
erty by J. Benton Leggatt.
phide is said to be exposed,
26% sulphur and 5% iron.

In 1915 the 3 tunnels w
sures. A fourth tunnel, star
3, will be driven 1,200′ and
road was built to Alta in 19

Equipment: includes
since 1916.

PRICE MINING CO.

Office: Room 1 Macki

Officers: F. W. Price,
sec.-treas.

Inc. April, 1915. **Cap.**,
sessment. 1c a share, delinqu
the Salt Lake Exchange. Sl

Operating expenses in 1

Property: 17 claims, 30
mining district, considered t
right angles by several fissu
assayed 34% lead, 20% zinc,
of ore is 4″ to 16″ in width.

Development: by 400′

Equipment: includes a

PRINCE OF WALES M

Address: Walker Bros.

Property: at Alta, 60
destroyed its equipment. N
worth of ore was mined, 18
Alta T. & T. Co. tunnel will

Partly reopened. July, 1
several carload shipments of

QUEEN LEASING CO.

Address: Alta, Utah.
the Cardiff mine.

RED BELL MINING C

Office: 519 Newhouse

Office: S. A. Parry, pr

Inc. Nov., 1916. **Cap.**,

Property: 16 claims in
Old Maxfield mine, reported

Development: by 150′
dike carrying lead, iron, and

RED CLOUD MINING C

F. N. Leonard, mgr.
First Chance, and Red Clou

Development: by 675′ t
ore. In June, 1919, was prep

REED'S PEAK MINING

Office: 1 Mining Exch

Officers: Frank Andre
sec.-treas., with Robt. Kimbal
berg, directors.

Inc. Feb. 14, 1907, in U
April, 1917, 489,000 shares; a
1¼ low, 2½ high, 1918 [redacted]

Financial statement for fiscal year ended September 30, 1916, last available, ws: receipts, $18,191; expenditures, $9,799; cash balance, $8,391.

Property: 21 unpatented claims, 420 acres, 12 miles from a railroad, lo-d on South Fork in Big Cottonwood mining district, said to show silver-lead in fissure veins in limestone.

Development: by tunnels, upper 450′ long, lower 1,450′ long. Objective lower tunnel is the intersection of the Birthday No. 1 fissure with a N.-S. ure at a depth of 800′ from surface; this intersection is expected to be ched within a short distance; Birthday fissures Nos. 1 and 2, said to have n productive of shipping ore on upper levels.

Equipment: includes a compressor, machine drills and electric power. A few tons of ore have been shipped from development work; property is rospect. In June, 1919, a 1c assessment was levied to provide funds for re-ing work.

XALL SILVER & COPPER MINING CO. **UTAH**

Consolidated, 1916, with Columbus Extension Mng. Co., and now known Columbus-Rexall Cons. Mines Co., which see. Described Vol. XII.

PATRICK MINING & MILLING CO. **UTAH**

Idle. **Office:** 855 Sherman Ave., Salt Lake City, Utah. **Mine office:** ghes Canyon, Salt Lake county, Utah.

Officers: D. A. Buck, pres.; H. H. Patterson, v. p.; B. A. M. Froiseth, -treas.

Inc. March 17, 1906, in Utah. **Cap.,** $50,000; 20c par; issued, 180,000 res.

Property: 6 claims, unpatented, 7 miles from railroad, in Big Cotton-od mining district, opened by shaft and tunnel, with about 750′ of workings, wing gold and silver-copper ore. Annual assessment work only being done.

OTIA MINING CO. **UTAH**

W. E. Weihe, pres.; Jas. H. Douglas, v. p., Ogden, Utah; Jas. S. Morgan, -treas., with A. A. Beesley, A. L. Pratt, O. G. Pratt, and R. G. Pratt, direc-

Cap., $500,000; 10c par; 200.000 shares issued.

Property: in Honeycomb Gulch, of Big Cottonwood, shipped a few oads of lead-silver ore in 1918. Reported that controlling interest has passed Messrs. Dunn and Fabian, of Salt Lake City.

CRET MINING & MILLING CO. **UTAH**

Offices: 618 Newhouse Bldg., Salt Lake City and Alta, Utah. Reported ad" in Copper Handbook, Vol. X. Reorganized and rejuvenated in 1915.

Officers: R. W. Clough, pres.; W. M. Minor, v. p. and treas.; H. S. per, sec., with E. R. Phelps and W. H. Clough, directors.

Inc. about April, 1906, in Utah. **Cap.,** $300,000; increased in 1915 to),000; shares $1 par. In 1919, increased number of shares to 1,000,000; par Listed on Salt Lake Exchange. Share sales 1c, 1918.

Property: 15 claims, 300 acres, 100 patented, at Alta, Little Cottonwood ing district, adjoining the Albion on the S. E., said to show lead-silver ore. intry rock is quartzite.

Development: by tunnels; reported in April, 1916, that an 80′ tunnel uld be extended to cut the surface showings at a depth of 800′. The company lso reported as having obtained the right from the Albion to drive a crosscut Secret ground from a point 2,500′ in from the portal of the Albion tunnel. upper tunnel is in 500′. Workings total 700′. No orebodies large enough for duction have been found. In May, 1919, work was again resumed after a od of idleness. Property is in the speculative class.

LLS MINING CO. **UTAH**

[redacted]: Judge Bldg., Salt Lake City, and V. S. Snow, supt., Alta.
[redacted]: John Zink, pres.; John Gallacher, v. p.; W. H. Weyher, sec.-[redacted]. Joerger, directors.
[redacted]: Utah. **Cap.,** 600,000 shares; 25c par; 400.000 issued In [redacted] $3,994 in the treasury; debts amounted to $13,500 on the [redacted] on the 6 patented claims, latter amount was due September

1, 1916. Assessment No. 4, of 1c a share was levied in March, 1919. Last assessment, 2c a share, delinquent October 18, 1919.

Listed on Salt Lake City Exchange. Shares 8½ low, 21 high in 1918; 4 low, 13½ high in 1919.

Property: 16 claims, 6 patented, in the Alta-Cottonwood mining district, 8 miles from a railroad, said to cover 1,800′ to 3,000′ along the mineralized zone passing through the South Hecla property which adjoins on the west.

Ore: carries silver lead, zinc and copper, in fissure veins in limestone and in contact deposits between limestone and granite; veins strike N. E. S. W.

Development: mainly through the Dwyer tunnel of the South Hecla company, also a 200′ shaft, 2,200′ of tunnels and 600′ of raises. Connection has been made with the old Lexington tunnel, giving another opening to the Sells and improving ventilation. Shipments average about 2 cars per week.

Early in 1920 a 125′ raise above the tunnel level opened an orebody said to sample $14.50 gold and 240 oz. silver per ton, with 4% copper.

An aerial tram, 2,000′ long, costing $10,000, to carry 10 tons per hour, was erected in 1918. This should permit transportation during the winter. Is a speculative mining venture that has promising ground.

Company has remained courteously non-communicative to requests for information.

SILVER FLAT MINING CO. UTAH

Presumably dead. **Property:** the old Nebraska mine in Delta Creek, Silver Lake section, American Fork, Utah, shows silver-lead ore in fissures in limestone cut by porphyry dikes.

Ore: complex silver-copper-lead, high in zinc.

Development: by 1,200′ of tunnels. No recent information.

SILVER MOON MINING CO. UTAH

Office: 27 Latimer Block, Salt Lake City, Utah.

Officers: A. L. Headbug, pres.; Wm. Crome, sec.-treas.

Inc. Jan. 29, 1912. **Cap.,** $10,000; shares 2c par; assessable. Last assessment levied August 15, 1919. In treasury, May, 1916, 200,000 shares and $[illegible] in cash; no debts. Listed in Salt Lake City.

Property: 7 unpatented claims in the Big Cottonwood district.

Ore: carries silver, gold, lead. Little development has been done. Four men employed. Property is a prospect.

SILVER SIDE MINING CO. UTAH

Address: American Fork, Utah.

Officers: J. E. Beveridge, pres.; A. O. Jacobson, v. p.; W. Holmes, sec.-treas., with H. P. Huey and M. M. Beaver, directors.

Inc. 1916, in Utah. **Cap.,** $50,000; shares 5c par.

Property: 5 miles up American Fork canyon, is said to show silver-lead ore in contact deposit between limestone and quartzite.

Development: by tunnels and shallow shaft. No recent information.

SOUTH CARDIFF MINING CO. UTAH

Address: George N. Lawrence, pres., 420 Boston Bldg., Salt Lake City; W. H. King, v. p.; Allen Sanford, sec.treas., and George A. Steiner, director.

Inc. April 9, 1916, in Utah. **Cap.,** 1,000,000 shares; 450,000 in treasury.

Property: 10 claims, 160 acres in Cottonwood district, adjoining Cardiff, Howell & Monte Cristo, and the Canton Mining Co. holdings, is supposed to carry extension of Cardiff fissure. No recent information; property idle.

SOUTH HECLA EXTENSION MINING CO. UTAH

Office: 161 So. Main St., Salt Lake City, Utah.

Officers: the same as South Hecla Mng. Co.

Inc. in Utah. **Cap.,** $100,000; shares 10c par; assessable; outstanding $53,879. Listed in Salt Lake City. Shares 1¼-5c in 1918; 2¼-5c in 1919.

Assets at January 1, 1917, totaled $101,747, including $32,085 for property and plant, $19,422 for development and $46,122 for treasury stock. Current assets were $[illegible] against current liabilities of $1,747. Later figures not available.

Property [illegible] acres in the Little Cottonwood district, adjoining [illegible]

cla Mining Co., said to show silver-lead-copper-gold ore. Development is ng done through the Quincy tunnel level of the South Hecla mine. Is in prospect class.

UTH HECLA MINING CO. **UTAH**

Office: 161 So. Main St., Salt Lake City, Utah. **Mine office:** Alta, Salt ke county, Utah.

Officers: Geo. H. Watson, pres.-gen. mgr.; Herman Bamberger, v. p.; W. Harrington, sec.-treas., with A. B. Watson, and H. C. Edwards, directors.

Inc. Sept. 14, 1910, in Utah. **Cap.,** $500,000; $1 par; assessable; issued 2,920. Geo. H. Watson & Co., registrar. Annual meeting, second Wednesday September.

Listed on Salt Lake Stock Exchange. Shares, 63c low, $1.30 high, 1918; 80-2.70 in 1919.

Company was organized as a merger of the South Columbus Consolidated ning Co., and Alta-Hecla Mining Co., and holds properties formerly held by Bingham-Centennial, Alta-Quincy, Columbus Wedge, Ivanhoe and Lilburn ing companies. Company exchanged stock on the basis of 1 share of South cla for 5 shares of South Columbus, and 1 share of South Hecla for 5 shares Alta-Hecla.

Assets at end of 1918 totaled $627,420, including $202,534 for property, $236,- for treasury stock, and $51,662 discounts. Net earnings in 1918 amounted $69,849, all from ore sales, and exclusive of $3,855, royalties received. Initial idend, 15c per share, paid August 10, 1916; last dividend, 15c a share, paid tember 5, 1919.

Property: 41 claims, partly patented, 584 acres, in the Little Cotton- od district. Claims carry 8 well-defined ore-bearing fissures in granodiorite limestone, running N. 70° E., dipping 70° N. and contact deposits between estone and granite. The 3 orebodies under development, one in the Kate yes, the others in the Wedge fissure, are reported by the management to rage 20′ in width, and to carry malachite, azurite and tetrahedrite in the face zone, succeeded by chalcopyrite, galena and sphalerite, estimated by the nagement to average 1% copper, 15% lead, .05 oz. gold and 35 oz. silver per . No. 1 shoot of the Kate Hayes is 940′ long; No. 2 proven for 300′ long.

Development: is by two main working tunnels, the Quincy and Dwyer: Dwyer, 2,000′; Alta-Quincy, 1,800′; South Columbus, 1,400′; Rustler, 1,200′; tt, 1,700′; Neversweat, 150′, and the White, of 700′. The mine as a whole has ut 7 miles of workings, lighted by electricity; new work in 1918, totaled 3′. Main development during 1918 was on the 500′ level of the Wedge vein, ch was opened up for 160′ above the 500′ level. A total of 4,000 tons shipped 1918 averaged 0.02 oz. gold, 10.4 oz. silver, and 5.3% copper. Milling ore s opened on other levels, but management desired to stope only smelting ore. May, 1919, a new body of sulphide ore was reported found in the Dwyer nel.

Equipment: includes a 60-h. p. electric plant, with a 10-h. p. hoist good 200′, and a 2-stage compressor. Buildings include a shop building, housing thy, machine and carpenter shops, with a 3-story boarding house and 5 ellings.

Production: company in 1916 shipped 7,962 tons of ore containing 267 gold, 164,619 oz. silver, 1,236,357 lbs. lead, 55,366 lbs. copper, 738,473 lbs. zinc 782,059 lbs. iron. Lessees marketed 1,097 tons of ore containing 34 oz. gold, 93 oz. silver, 218 lbs. lead, 5,361 lbs. copper, 157,854 lbs. zinc, and 47,089 lbs. n. In 1918, combined output by company and lessees was 9,232 tons ore, ding 165 oz. gold, 112,920 oz. silver, 238,985 lb. lead, 577,773 lb. copper, 137,556 zinc, and 4,261,888 lb. iron.

In 1919 the output was 7,703 tons of ore yielding 107 ounces gold, 77,029 ces silver, 51,424 lb. lead and 361,428 lb. copper, all of a gross value of $140,299. t yet operations show a loss of $5,554.

PARK MINING & DEVELOPMENT CO. **UTAH**

O. A. Relf, pres.; J. Tracy Wootton, sec.-treas.

ly 24, 1916. Cap., $50,000; shares 5c par; assessable. Last assess-

ment, ½c a share, delinquent, September 27, 1919. $3,000 issued. Listed in Salt Lake City.

Property: 17 claims, 14 patented, in American Fork mining district, said to show iron carbonate containing silver and lead.

Development: by tunnels, crosscutting the formation. Work has usually been suspended during the winter months, and resumed in May. At that time in 1919 main tunnel had a length of 700', and a drift was started on an orebody showing 450' from the portal.

SWASTIKA MINING CO. UTAH

A. H. McKnight, pres.-mgr.

Operates a property in Honeycomb gulch, near Alta, formerly owned by Bishop L. G. Hardy, of Salt Lake City. Reported to have opened a large deposit of low-grade ore by several thousand feet of workings.

TAR BABY MINING CO. UTAH

Office: 523 Atlas Block, Salt Lake City, Utah. **Mine office:** Alta, Salt Lake county, Utah.

Officers: J. M. Matsen, pres. and gen. mgr.; R. W. Savage, v. p.; W. [illegible] Grundy, sec.-treas.; A. P. Davidson and J. W. Brewer, directors; H. D. Green, supt.

Inc. 1911, in Utah. **Cap.,** 500,000 shares, increased June, 1916, from 400,000; 20c par; outstanding, 483,000 shares. Listed on Salt Lake City Exchange. Shares 1½c. low, 5¾c. high in 1918; 2c.-7½c. in 1919. Assessment No. 21, 1c per share, levied in February, 1920.

Property: 6 claims, in the Alta-Cottonwood district, on the south side of Big Cottonwood. The purpose of the enterprise is to cut the Cardiff lime-quartzite contact by working through the Victor company's tunnel, whereby an additional depth of 500' will be gained. No ore in commercial amount has yet been found.

TEXAN MINING CO. UTAH

Office: 400 W. 7th South St., Salt Lake City, Utah.

Officers: Chas. Tyng, pres.; Frank Nelson, sec.

Inc. in Utah. **Cap.,** $1,000,000; shares $1 par; outstanding, 825,000. Listed in Salt Lake City. Share prices 1c-8c in 1918. No quotations, 1919.

Property: 200 acres in American Fork district, said to show silver-lead-copper-gold ore. A tunnel was driven over 1,000' in the Texan mine, which the Miller Hill tunnel is in 2,100'; both tunnels are in quartzite. No commercial orebodies have yet been found. Probably idle.

THOR MINING CO. UTAH

Merged, 1916, with Great Western Gold & Copper Co. and Mountain Lake Mining Co., with title of Great Western Mines Co., which see.

TRIANGLE MINING CO. UTAH

Went into receiver's hands, Jan., 1919. N. W. Haire, receiver, 411 Felt Bldg., Salt Lake City, Utah. **Mine address:** Alta, Utah.

Officers: Howard C. Fields, pres.; Wm. C. Stewart, v. p.; Irma L. Fields, sec.-treas.; Howard H. Fields, mgr., with Harry A. Marsh and Wm. [illegible] Lidvall, directors.

Inc. July 15, 1917. **Cap.,** $25,000; shares $1 par; 6,201 outstanding. Operated as a close corporation. Annual meeting, first Saturday in September.

Company operated a lease on part of the property of the Michigan Utah Consolidated Mines Co., which see.

Production: in 1915 was 2,000 tons; in 1916, 5,000 tons averaging $[illegible] per ton.

UTAH CENTENNIAL MINING CO. UTAH

Address: Pleasant Grove, Utah.

Officers: J. E. Thorne, pres.; L. L. Nelson, v. p.; D. Noble, sec.-treas.; J. W. Thorne, J. E. Thorne, C. Thorne and L. L. Nelson, directors.

Inc. 1907. **Cap.,** $1,000,000; shares 5c par; outstanding, 250,000 shares, assessable; last assessment, $5 per 1,000 shares, called in May, 1919. Annual meeting in April.

Property: [illegible] American Fork Canyon, American Fork district.

ure vein carries gold, silver, lead, copper ore. Developed by a 450′ tunnel reported to have struck a few inches of high-grade silver-lead ore. Property prospect undergoing development.

TOR MINING CO. **UTAH**

Address: 702 McIntyre Bldg., Salt Lake City, Utah.

Officers: C. R. Greene, pres. and gen. mgr.; Lee Case, v. p.; R. B. kin, sec.-treas., with H. V. Greene, and E. C. Davies, Jr., directors.

Inc. in Utah. **Cap.**, $20,000; 5c par. Listed on Salt Lake Exchange.

Property: adjoins the Tar Baby and Cardiff in the Alta-Cottonwood rict. After driving a crosscut, work was stopped owing to war conditions. 1919, the company started development work through the Tar Baby tunnel. perty examined by J. Fewson Smith.

SATCH MINES CO. **UTAH**

Office: 713 Judge Bldg., Salt Lake City, Utah. **Mine office:** T. W. ce, supt., Alta, Salt Lake county, Utah.

Officers: A. H. Cowie, pres.; A. C. Ellis, Jr., v. p.; W. O. Williams, sec.-s., with H. G. Williams, W. S. Cooper and L. K. Cowie, directors.

Inc. Feb. 8, 1913, as a merger of the Columbus Consolidated Mining Co., gstaff Copper Co., and Superior-Alta Mining Co. **Cap.**, $1,000,000; shares ar; issued 358,905 shares; assessable, limited to two 5c. levies a year. Consoli-on of these properties was effected on the basis of 160,000 shares for Colum- Consolidated Co., 100,000 shares for Flagstaff Co., and 40,000 shares for erior-Alta. Stock is listed on the Salt Lake Stock Exchange. McCornick & Salt Lake City, registrar. Annual meeting, second Thursday in June.

Property: 60 claims, 40 patented, about 900 acres, and millsites at Tan-s Flat and at the mouth of Little Cottonwood canyon, on the E. flank of the satch mountains.

Geology: claims show a number of fissure veins cutting through lime-e, shale and quartzite; also numerous bedded and contact deposits between stone and quartzite. The bedded deposits contain the principal orebodies, ch range from 30 to 100′ in width, several hundred feet long, and carry up 1% copper, 18% lead, 15% zinc, 66 oz. silver and $4 gold per ton. Outside he shoots the ore is generally pockety and mainly below payable tenor.

The Flagstaff group carries several ore channels, one of which is said to ge up to 300′ in width and to be traceable 2,000′, and is developed by the 0′ Tom Moore tunnel. This tunnel also cuts 6 smaller veins and has a 450′ scut to the N. E., with about 13,000′ of workings. Other workings include 500′ Burgess tunnel, 1,200′ Burnswood tunnel, 1,200′ Flagstaff tunnel, and 700′ Flagstaff shaft. The mine was a notable producer of silver-lead car-ates in early days.

The Columbus Consolidated group shows a vein, known as the Braine ire, of about 12′ average width, opened by 2 tunnels, 1,250′ apart, on prac-ly the same level.

Development: about 3 miles of workings connected with the main 5,100′ nage tunnel, 4,000′ down the canyon, planned to unwater the Columbus and ining properties. The Holland and Columbus tunnels are connected on the ne fissure, the first-named with electric traction. There are also 3 other els and several shallow shafts. The output consists of copper ore, silver-ore and concentrating ore. The mine is wet and has a 600-gal. pump.

Shipments have assayed from 34c to 70c gold; 8 to 51 oz. silver; 5 to 6% ; 5 to 14% copper, 6 to 14% excess iron per ton, yielding from $20 to $60 ton.

A Pelton water wheel works under a head of 494′, taking water through [redacted] 22″ steel pipe line of 4,500′ length, developing 660 h. p., which is trans-[redacted] into electricity by two 300-k. w. dynamos and carried to the mine by a [redacted] transmission line. At the mine there are four 25 h. p. hoists good for [redacted] 3-drill Nordberg and two 5-drill Ingersoll-Sergeant air compressors, [redacted] and a sawmill.

[redacted] concentrator is equipped with a Gates gyratory crusher, 2 sets

[illegible] Rogers rolls, six 3-compartment jigs and 7 Wilfley tables, the [illegible] about 4 or 5 tons into 1. A cyanide unit was installed in 1915.

Development work above the tunnel level proved disappointi[ng]. management has concentrated all energy on the deep drainage tu[nnel] driven 5,000', about 500' below the present lowest workings and which deep mining easy and profitable; the tunnel is from a few hundred [feet] to other properties in the district. Company derives sufficient funds operating expenses from the sale of electric power and compressed air of the mines in the district.

In November, 1919, the main tunnel was in over 5,100'. Progress limestone is 7-8' daily with 2 shifts.

WASATCH UTAH MINING CO.

Company probably out of business as mail was returned, 1919, from addresses: Kearns Bldg., Salt Lake City, and mine office, R. D. No. 4, Utah.

Officers: at last accounts, F. L. Palmquist, sec.-treas.; J. L. Kr[ause], Meeds, A. W. Manz, J. Hyldahl, E. Tressing, Asa Bacon, J. W. Reibm[an] directors.

Inc. October, 1902, in Nevada. **Cap.**, $1,000,000; par $1; assessab[le] issued.

Bonds: authorized, $100,000; issued, $35,000. Annual meeting, [3rd] Monday in June.

Property: 51 claims, 14 patented, known as the Consolidated Je[ff] mine, 9 miles from railroad, near mouth of Little Cottonwood canyon 40 acres dumping ground. Mine has two systems of veins, a narrow fissure in hornblende schist with high-grade gold, silver and copper ore, large N.-S. quartz fissure about 8' wide containing ore running from $2 gold per ton, which is all milled.

Development: by adit and glory-hole into 500' stope.

Equipment: includes compressors, buildings, experimental 5-stan[d] with Wilfley and vanner, large mill with crusher, Chilean mill, plates and [a] amalgamator.

WEST TOLEDO MINES CO. U[tah]

Office: 146 S. West Temple St., Salt Lake City. **Mine office:** Alta, [Utah]

Officers: A. L. Hurley, pres.; J. A. Foley, v. p.; E. W. Hulse, sec.-t[reas.] with A. O. Jacobson and P. M. Magregor, directors. J. A. Foley, mgr.

Cap., $50,000; shares 10c par; outstanding 452,000 shares. Listed on Salt Lake Stock Exchange. Shares 2c-11c in 1918; 3c to 14c in 1919.

Property: 11 claims in the Little Cottonwood district, Salt Lake co[unty]

Development: chiefly by the Superior and Frederick tunnels which to be extended to cut several known mineralized veins. The Frederick [tunnel] is over 3,000' long. Grade of ore so far found is reported to be low. Pr[operty] is in a line with Cardiff and South Hecla in both of which the overthrust [fault] has proven ore bearing. Developing in 1919.

WHIRLWIND CONSOLIDATED MINING CO. U[tah]

Office: 400 W. 7th St., Salt Lake City, Utah; Harry Kreuse, [pres.] American Fork, Utah.

Officers: Chas. Tyng, pres.-mgr.; Frank K. Nelson, sec.

Inc. April 24, 1916, in Utah. **Cap.**, $250,000; shares 25c par; [all] shares issued. Listed on Salt Lake Exchange. Shares 1c-5c in 1918; [$]1 in 1919.

Property: 7 claims, unpatented, 110 acres, in the American Fo[rk] ing district, adjoining the Miller Hill on the West, 20 miles from a rail[road] to show silver-le[ad]

Developme[nt] [illegible] tunnels; one 1,000' long was reported to [be] [illegible] lead carbo[nate] [illegible] 500 in.

[illegible] was planned and stock offer[ed] [illegible] formation, presumably [in]

DLAWN COPPER MINING CO. **UTAH**

ice: 305 Atlas Blk., Salt Lake City, Utah. Mine near Brighton, Salt unty, Utah.

cers: H. W. Lawrence, pres.; E. S. Hills, v. p.; George N. Lawec.-treas.; W. J. Lawrence, mgr., with C. R. Long, directors.

. 1899, in Utah. **Cap.**, $700,000; shares 10c par; assessable. Listed Lake Exchange.

roperty: 7 claims, patented in the Big Cottonwood district, 18 miles a railroad, show lead, zinc, silver and copper ore, whose value is mainly id.

Development: work was resumed in 1915, after an idleness of several : the main tunnel was 1,650′ long in September, 1919; there are also sevshorter tunnels. Various fissures cut by the main tunnel are being explored ifts, raises, etc., and some good ore sacked and shipped.

BINGHAM DISTRICT.

INE GALENA MINING CO. **UTAH**

)wned and operated by Alpine and Provo men.

Property: in Alpine Canyon, near Bingham, contains ferruginous lead n bunches in black limestone.

Development: by 312′ tunnel and incline shaft. Planned to drive tun- reach blowout 350′ below surface. No recent report; probably idle.

GHAM AMALGAMATED COPPER CO. **UTAH**

ully described in Volume XIII. Succeeded by United Bingham Copper which see.

GHAM ANACONDA COPPER CO. **UTAH**

lail returned, 1918, from former address, 11 Main St., Salt Lake City. Mine in Markham Gulch, Bingham, Utah.

Officers: E. McCarrick, pres.; B. B. Gray, v. p.; P. L. Meyers, sec.- : above, with A. Gustaveson and R. E. L. Collier, directors.

Cap., $1,000,000; shares 10c par. Owns a group of claims in Bingham ct. Probably idle.

GHAM CENTRAL MINING CO. **UTAH**

dle. At Bingham Canyon, Salt Lake county, Utah. This company and lingham Standard Copper Co. were controlled by the Bingham Central ard Copper Co., which sold its stock holdings, 1909, to Utah Metal Min- o., receiving stock in latter company which is now controlled by the Utah & Tunnel Co., which see. Described Vol. X.

GHAM CENTRAL STANDARD COPPER CO. **UTAH**

rganized as a holding company, controlling, through ownership of prac- entire stock issues, the Bingham Central Mining Co. and Bingham Stan- Copper Co. Sold these subsidiary stocks, 1909, to the Utah Metal Mining or 300,000 shares of latter, which was escrowed until 1911 and extended payment of 10,000 additional shares until November 8, 1912, and subse- y to January 1, 1914, to permit building by Utah Metal Mining Co. of a 0 aerial tramway from the western end of the big tunnel to the Interna- at Tooele. On release of escrow, 1914, company was to be wound by minority stockholders, who attempted to recover property, disposition of the company's assets. Stock valueless.

COALITION MINES CO. **UTAH**

Exchange St., Portland, Me. **Mine office:** Bingham Can-

ler, pres., Springfield, Mass.; H. P. Sweetser,

Cap., $1,000,000. increased 1916 to $1,500,000; $1

par. Bonds, $150,000. Stock listed on New York and Boston Curbs. State Street Trust Co., Boston, and Registrar & Transfer Co., New York, registrar and transfer agents.

Property: is a merger of the Butler Liberal, Red Wing, and Massasoit properties, about 50 claims, in Markham and Freeman gulches. The claims carry the Florence Erie, Julian, Red Wing and other fissures, all of them good producers in the upper levels.

Development: by crosscut tunnels with about 5 miles of workings cutting the above named fissures (veins) containing lead ores with silver, copper, and gold values. **Equipment:** includes 200-ton Red Wing mill.

Production: in 1917 was 127 oz. gold, 29,249 oz. silver, 57,684 lb. copper and 1,625,830 lb. lead. No later figures received.

BINGHAM COPPER BOY MINING CO. UTAH

Out of funds and idle several years, with no sale or market for the stock so far as known. See Vol. XI, Copper Handbook.

BINGHAM EMPIRE MINES CO. UTAH

Officers: Jesse Knight, pres., with A. M. Knight, W. L. Mangum, S. S. Jordan, G. A. Storrs, E. G. Jensen, directors.

Inc. July 31, 1915, in Utah, for development of property in the Bingham district. **Cap., $10.000**; shares 1c par; 484,000 shares in treasury.

BINGHAM MINES CO. UTAH

Office: 60 Congress St., Boston, Mass. **Operating office:** 404 Dooly Blk., Salt Lake City, Utah; Joseph Hyland, supt., Lark, Utah.

Officers: Jas. P. Graves, pres.; Henry N. Sweet, v. p.; M. K. Billings, sec.; Thos. S. Woods, treas., with Alfred B. White, Arthur W. Chesterton and Lewis B. McCornick, directors. Imer Pett, gen. mgr.; Fred R. Sands, purch. agent.

Inc. April 6, 1908, in Maine. **Cap., $1,500,000**; $10 par; all issued.

Is a reorganization of the Bingham Consolidated Mining & Smelting Co., stock being exchanged, share for share, on payment of $3.50. Controls about 95% of the outstanding stock of the Eagle & Blue Bell Mining Co., a dividend payer, of Eureka, Juab county, Utah; also controls the Yosemite Mines Co., of Bingham Canyon, Salt Lake county, Utah. Purchased the entire capital stock of the Victoria Cons. Mng. Co. in 1914 and the property was conveyed to the Bingham Mines Co. in November, 1917. The Victoria property consists of 4 acres mineral land at Eureka, adjoining the Eagle and Blue Bell.

First National Bank, Boston, and Chase National Bank, New York, registrars. Federal Trust Co., Boston, and Guaranty Trust Co., New York, transfer agents. Stock listed on Boston Stock Exchange and New York Curb. Sold in 1919, at $10¼. Annual meeting, third Wednesday in April, at 97 Exchange St., Portland, Maine.

Company has liquidated its bonded indebtedness of $1,480,790, besides having paid for the property of the Victoria Cons. Mng. Co.

Comparative Balance Sheet:

Assets—

	Real Est. & Mines	Cons. & Equip.	Mining Stocks	Cash & Loans	Accts. Rec.	Supplies Ins., etc.	Tot
1918.....	$1,308,329	$41,398	$845,366	$19,766	$89,568	$11,949	$2,31
1917.....	1,049,714	39,986	861,830	188,203	82,782	16,058	2,23
1916.....	962,280	33,462	663,022	85,158	67,998	12,640	1,82

Liabilities—

	Capital Stock	Accts. & Notes Pay.	Reserve Deprec.	Reserve Depletion	Surplus	Tot
1918	$1,500,000	$66,370	$17,595	$366,535	$365,877	$2,31
1917	1,500,000	2,392	12,248	79,908	644,028	2,23
1916	1,500,000	1,079	12,248	.....	400,224	1,91

Comparative Operating Statement:

	1918	1917	1916
shipments, gross value	$390,821	$364,336	$283,490
ict smelting, freight, etc	137,408	113,398	78,229
receipts from ore	$253,413	$250,938	$205,261
r revenues (royalties, etc.)	36,481	57,324	46,181
s earnings at properties	$289,894	$308,262	$251,442
rating expenses	149,290	120,569	107,691
earnings	$140,604	$187,693	$143,751
: development	59,961	37,680	23,904
operating gain	$80,643	$150,013	$119,847
lends on mining stocks	83,629	365,788	65,912
gain and income	$164,272	$515,802	$185,759

Dividends: initial dividend of 50c and Red Cross dividend of 25c a share, July 2, 1917; 50c paid October 5, 1917; 5 dividends of 50c, or $2.50 in 1918, two dividends to October 1, 1919, a total of $4.50 per share, or nominally nually. Total is $674,500.

Property: the Dalton & Lark and Commercal mines, 60 claims, pat-l, 430 acres mineral land, in the Bingham district, and 596 acres non-mineral . Also 92% of Eagle & Blue Bell Mining Co. and control of Victoria Cons. Co. at Tintic, as already noted, and the Yosemite Mines Co.

Development: at Dalton & Lark and Commercial mines is extensive, being many miles of workings. New work in the first named in 1918 nted to 2,755', compared with 3,670' in 1917. The Commercial mine has een worked for 3 years. It is considered that a large quantity of ore will veloped in the Brooklyn, Lead Mine, and Lark veins below the Mascotte l. Lessees extract ore from old workings in the Dalton & Lark and Com-ial, and shipped 4.862 tons during 1918, yielding the company a royalty of 53. In 10 years they have produced 1,332 oz. gold, 481,258 oz. silver, 2,060,088 ad, and 7,960,157 lb. of copper.

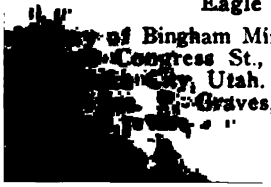
Equipment: at Dalton & Lark—25-h. p. steam plant, hoists, 25-drill ressor, shops, etc., and spur line with electric locos connecting with the R. G. At Commercial, hoist, 10-drill compressor, and other machinery, all ically driven.

Production: of Dalton & Lark, exclusive of lessees:

Ore, tons	Gold oz.	Silver, oz.	Lead, lb.	Copper, lb.
..... 25,776	1,872	139,241	679,007	1,681,848
..... 27,710	1,900	154,036	736,992	1,502,865
..... 44,975	3,399	188,216	1,221,219	2,244,078
..... 49,867	3,613	188,905	1,110,762	3,738,773
..... 38,988	2,995	179,117	1,122,955	2,745,818
..... 49,987	3,731	225,763	1,427,780	3,777,320

ompany is in hands of engineers who have made splendid progress in ng difficult financial and mining problems.

Eagle & Blue Bell Mining Co.



of Bingham Mines Co.
Congress St., Boston, Mass. **Operating office:** 404 Dooly , Utah. **Mine office:** Eureka, Juab county, Utah.
Graves, pres.; Henry N. Sweet, v. p.; Imer Pett,

asst. treas.-gen. mgr.; Thos. S. Woods, treas., with Fred H. Williams and Du can MacVichie, directors. Myron K. Billings, sec. Wm. Owens, mine supt.

Inc. Sept. 1898, in Utah. **Cap.**, $250,000, increased, March, 1910, $1,000,000; $1 par; issued 893,146 shares.

In March, 1910, issued 644,347 shares of new stock at 50c to take up floating debt of $269,925 and put $50,000 in the treasury, for working capi Is controlled, through stock ownership, by Bingham Mines Co. First Natio Bank, Boston, registrar; Federal Trust Co., Boston, transfer agent. Stock listed on the Boston Curb. Annual meeting, first Saturday after first day October.

Financial Statement, years ending December 31:

Year	Gross Earnings	Expenses at mine	Freight, treatment etc.	General	Net Profit	Div
1919.....	$621,322	.....	.....	.....	$128,310*	...
1918.....	1,090,303	$297,212	$462,199	$42,162	288,730*	$26
1917.....	1,069,603	223,827	353,970	14,577	393,359*	35
1916.....	531,451	160,369	207,456	8,849	154,776	8
1915.....	.....	.....	.....	....	143,345	13

* After deductions for Federal taxes.

Working Capital:

Year	Current assets	Current liabilities	Net current a
1918.....	$156,121	$34,548	$121,57
1917.....	264,933	86,534	178,39
1916.....	67,580	.....	.....

Dividends: 20 cents in 1913; 15 cents in 1914; 15 cents in 1915; 10 ce in 1916; 40 cents in 1917; 30 cents in 1918; 10 cents in 1919. The total to of 1919 is $1,250,405.

Property: 17 patented claims, 73 acres, includes a 9-acre millsite carry ing the water right to a spring having a flow of about 30 gal. per minute. La lie between the Centennial-Eureka, Victoria and Chief Consolidated mines the Victoria-Grand Central ore zone, in the Mammoth Limestone.

Geology: chamber deposits in limestone, carry silver-lead ores co taining gold and some copper. The lime is cut by numerous fissures, at angles, with mainly vertical dip, carrying pipes, shoots and erratic deposits ore at the intersections of fissures and bedding planes, in massive blue lime The mine has considerable bodies of silicious copper ore, lead sulphides and c bonates. Pay shoots vary from 6 to 100' in width. Average assays of dry 0.230 oz. gold, 12.99 oz. silver; 0.31% copper; lead ore assayed: 0.13 oz. gold, oz. silver and 17.05% lead.

The mine workings indicate 4 separate ore channels striking northerly southerly, and occasionally joined together by immense ore deposits made a easterly and westerly cross faultings. The ore occurrence shows a great larity throughout, giving the zone a width of over 600', but each channel parently has its characteristic mineral association.

History: according to C. H. Blanchard, pres. of the D. & B. Mines C ore was discovered by 30' shaft, and mill erected before ore development rranted, with consequent abandonment. Relocated several times, and pro developed by 1,200' tunnel, that eventually found downward extension shoot cut by sha Profitably worked till panic of '93; later reopened and ore in sight ta nd mine was idle until sold to Bingham Mines C who sank deep tunnel; extracted all ore in sight and ran into (for $400,000; Weeks assumed debt, taking company notes Owens as supt. New management the 1,000' level and found of Tintic. last few years; the

nt shaft is 2,018′ deep, with levels at 700, 1,000, 1,350, 1,550, 1,700 and 1,875, l blind levels at 1,100, 1,200, 1,300, 1,425 and 1,538′.

In 1918, two main deposits supplied most of the output. One of these is the 50 orebody, which, although irregular in occurrance, extends up to 1,350′ and on to 1,845′. Stoping is over 900′ long. The other orebody is in the North tension claims, and is found mainly below the 1,000 north drift. Stoping on ; ore is also extensive, but its full size is not yet known. New work in 1918 aled 5,519′, compared with 4,783′ and 3,086′ in the two previous years.

Equipment: includes a 180-h. p. double-drum hoist, good for 2,000′ th, a 100 h. p. tubular boiler and a 4x6″ electric triplex pump. The mine was trically equipped throughout and a 250 h. p. air compressor and 225 h. p. tric hoist installed in 1916. Electric power is supplied by the Utah Power & ht Co.

Production:	Ore, tons	Gold, oz.	Silver, oz.	Lead, lb.	Copper, lb.
).....	22,274	1,641	389,526	4,908,342	4,409
5.....	42,190	2,605	579,075	9,389,376	16,012
7.....	36,146	2,819	519,880	9,069,091	4,089
5.....	25,594	987	347,501	5,714,776	577
5.....	26,744	1,226	441,263	8,275,734	3,806
4.....	32,736	1,444	554,411	8,588,565	31,443
3.....	35,244	7,514	417,279	4,664,362	129,062

Victoria Consolidated Mining Co.

Owned by Bingham Mines Co. Mine at Eureka, Tintic district, Juab county, h.

Property: the Snowflake and Victoria mines, 7 patented claims, 49 s, at Eureka, which contain chamber deposits of silver-lead ore in limestone. ore shoots and streaks are of variable size, up to 100′ in width. Copper, rring as chalcopyrite and tetrahedrite is found with the galena.

Development: includes 1,200′ shaft with several thousand feet of work- . Has compressor, 112 h. p. hoist, and uses electric power. Property is oper- through No. 1 shaft of the Eagle & Blue Bell. New work in 1918 amounted 313′, opened a disappointing tonnage of new ore.

Production:

r	Ore, tons	Gold, oz.	Silver, oz.	Lead, lb.	Copper, lb.	Net profit
.....	6,790	1,048	139,304	176,019	165,508	$44,319
.....	13,543	2,875	338,751	515,993	119,553	122,297
.....	7,339	1,894	79,047	657,416	15,261	35,451
.....	3,071	248	17,985	232,016	.....	.....

Yosemite Mines Co.

Subsidiary of Bingham Mines Co.

Property: 12 claims, patented, in the West Mountain mining district, *ham* Canyon, Utah.

Development: by the Yosemite shaft connecting with the Mascotte el on the 2,200′ level and the 1,650′ Paradox tunnel. In 1918 new work led 1,799′. Greater depth was attained on the two ore-shoots in the Lead vein, but conditions were found to be much the same as on the upper levels. annual report for 1918 says: "The results so far attained in the development is property are by no means satisfactory."

Production:

	Ore, tons	Gold, oz.	Silver, oz.	Lead, lb.	Copper, lb.	Net smelter return
.....	2,010	80	10,189	314,258	21,034	$18,422
.....	795	34	5,849	220,644	10,608	12,301
.....	839	36	5,047	121,776	11,005	9,375

BINGHAM-NEW HAVEN C. & G. MNG. CO. UTAH

Absorbed by the Utah Metal & Tunnel Co., and property described there under.

BINGHAM-TOOELE MINING CO. UTAH

Address: 307 Utah Svgs. & Trust Co., Salt Lake City, Utah.

Officers: S. D. Huffaker, pres.; H. L. Dodd, sec.-treas.; M. T. Awoki supt., Box 136, Bingham, Utah.

Inc. May 27, 1915, in Utah. **Cap.,** 100,000; 10c par; assessable.

Property: 13 claims, 187 acres, in Middle Canyon, Tooele county Company was driving a tunnel, 1,600′ long, in May, 1919, to "encounter a lo anza" of copper ore. Is a prospect.

CONGOR GOLD & COPPER MINING CO. UTAH

Office: 506 Auerbach Bldg., Salt Lake City, Utah. Mine near Bingha Canyon, Salt Lake county, Utah.

Officers: Glen R. Bothwell, pres. and gen. mgr.; R. C. McCona v. p.; Frank E. Loose, sec., with E. F. Jenkins and C. G. Hall, directors, a accounts.

Cap., $1,000,000; shares $1 par.

Property: 10 claims, 150 acres, adjoins the Bingham Amalgamat on the north, in Bingham Canyon, Salt Lake county, Utah. **Developing** 3′ ve from 4,000′ tunnel of Montana Bingham Co., working about 100′ from face tunnel. Mine reported to have about 100,000 tons of ore exposed, running fro $6 to $50 per ton and averaging $14.

Company had a contract with the Montana Bingham Consolidated Mi Co., shipping its ores through the Miller Ore Transportation tunnel of th company to the Denver & Rio Grande railroad tracks at a cost of 25c per t of ore and 12½c per ton of waste. Probably idle.

EAGLE & BLUE BELL MINING CO. UTAH

A subsidiary of Bingham Mines Co. and described thereunder.

FORTUNA MINING & MILLING CO. UTAH

Inactive and property sold to Montana Bingham. See Vol. XIII.

GENERAL EXPLORATION CO. UTAH

Alfred Frank, gen. mgr., Newhouse Bldg., Salt Lake City, Utah.

Officers: Alfred Frank, pres.; E. L. Newhouse, Jr., v. p.; O. Ba berger, sec.-treas. (all of Salt Lake City), with John MacGinniss, of Butte, d rectors.

Inc. in Utah, in June, 1915. **Cap.,** 10,000 shares: $1 par; 7,500 st standing.

Company operated the Ohio Copper Co. property until it was taken ov the reorganized Ohio Copper Co. of Utah. Royalties aggregating upwards $500,000 were paid, and lessees are said to have made large profits.

GREAT DIVIDE MINES CO. UTAH

Inactive. **Office:** 521 Atlas Block, Salt Lake City, Utah.

Inc. Aug. 15, 1903, in Utah. **Cap.,** $2,000,000; $5 par. Company co trolled Western Mining & Milling Co. and Homestead Tunnel & Copper Co.

Property: 108 claims, mainly patented, 1,735 acres, 600 considered well mineralized, with 160 acres mill and smelter sites, lying on the Tooele s of the Oquirrh mountains and on the summit of the range, west of the h of the Utah Consolidated. Property shows Cambrian quartzite, monzo porphyry and altered limestone, with a number of fissure veins and contact posits between limestone and quartzite. Claims cover 11,600′ on the west course of the mineralized limestone beds of Bingham. This tract is 21/ from E. to W. and 10,800′ N. S., and contains the apexes of many ore-bea fissures, and the westerly extensions of the ore-bearing limestone bed in the Utah Consolidated, Bingham New Haven, Utah Apex and Yanq

Development: includes the 400′ Homestake tunnel in Pine Cr 525′ North tunnel at 6,600′ elevation, and the 2,457′ Spring tunnel. Th nels are prospect work only, but ore is cut in the last named at 1,050′ a a 5′ width for 40′ along the drift and in a 25′ raise. A vertical E. W. fis

le is also cut at 2,250′ from the portal and shows kidneys and stringers of er-lead ore.

Equipment: includes a 35-h. p. electric plant, with a 1-drill compressor, l there are 10 buildings, including a small power house, 2 smithies, a bunk se, stable and dwellings. Electric current is taken from the Telluride Power . over this company's private line from the sub-station at Bingham. Prop- y was under lease and bond to the Homestake T. & C. Co., which expired y 1, 1919. No later information.

GHLAND BOY GOLD & COPPER MINING CO. **UTAH**

Controlled by Utah Cons. Mining Co., and described under that title.

TERMOUNTAIN MINING & INDUSTRIAL ASS'N **UTAH**

Thos. B. Crawford, sec., Ouray, Colo.

Inc. 1905, in Arizona. **Cap.**, $5,000.000; par $1.

Property: Mystic Shrine group of claims, at Bingham, which adjoins perty of Utah Copper Co. Evidently idle, and for sale.

YSTONE EXTENSION MINING CO. **UTAH**

Mine near Bingham, in West mining district, Salt Lake county, Utah. Com- y inactive for some time owing to heavy flow of water in mine workings. perty covers about 3,000′ of the Keystone vein outcrop and shows ore said to rage $14 per ton in gold, silver, lead and copper values, from surface down ottom of 165′ shaft.

Development: by inclined shaft with drifts on vein opening up stopes m which shipments have been made. The Montana Bingham Consolidated ing Co. was to open the ground by its deep tunnel, thus eliminating pumping ts and heavy wagon-haul charges on ore shipped.

NERAL LANDS CO. **UTAH**

Idle. **Office:** 102 Exchange St., Portland, Me. Carl W. Smith, treas. **Inc.** 1913, in Maine. **Cap.**, $100,000; $5 par. Company owns large in- st in Bingham Coalition Mines Co., also Vespasian-Hoogly group of claims Markham gulch, Bingham, and other mining interests. Treasurer reports, rch, 1919, that company has a substantial surplus.

NTANA-BINGHAM CONSOLIDATED MINING CO. **UTAH**

Office: 66 West Broadway, Salt Lake City, Utah. **Mine office:** Bing- Canyon, Utah. J. Benton Leggatt, gen. mgr.

Officers: C. G. Ballentyne, pres. and mng. dir.; E. A. Vail, v. p.; J. B. sman, sec.-treas., with W. E. Hubbard, Imer Pett, L. B. McCornick, and . Leggatt, directors.

Inc. July, 1910. **Cap.**, $3,000.000; $1 par; issued, 2,385,802; assessable. assessment of 10c a share, levied March, 1918; one of 3c in November, 1918, a third, 2c in May, 1919. Annual meeting, first Tuesday in March. Owns 00 shares of Bingham Amalgamated C. Co stock. Debentures: $200,000, 6%: ,600 outstanding; due June 1, 1918; extended to June 1, 1919.

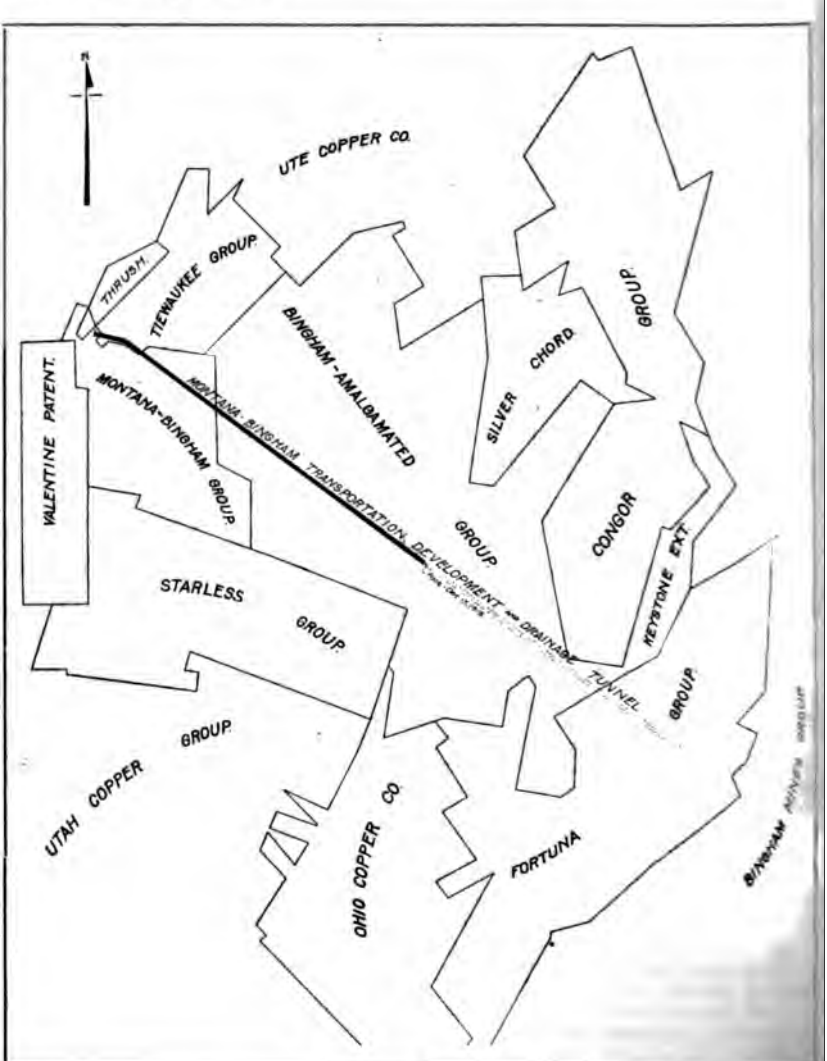
Financial statement, June 30, 1919, shows fixed assets of $3,428,756; invest- t in the B. A. C. Co., $52,650; cash, $14,645, with total current assets of 22. Liabilities included $120,066, accounts, notes, interest, and taxes; this des $75,000 balance due on purchase of Fortuna mine.

Income statement for year ending December 31, 1918, shows: total income, 40, of which $31,325 was from ore sales. Office and administrative expenses d out, $31,548, or 82%; of this $13,500, or 35%, was the president's salary, $5,560, general office salaries. Mine labor totaled $53,043, and total expendi- s for mine and mill was $135,481. Total income for first 6 months in 1919 $8,008.

Profit and loss statement for 1918 show a charge of $10,000, "special com- ation to president—for surrender of life position in Honolulu, for loss ugh sacrifice sale of personal effects and property, and to cover expenses of ing to Salt Lake City," he also received 50,000 shares of capital stock as part ensation.

In 1919, a committee representing the minority stockholders' interest was rumental in causing the cancellation of the contract which employed the dent and general manager for five years with a salary of $15,000 per annum

for two years and $25,000 per annum for three years thereafter, of which contract a little more than one year had run; also has been instrumental in causing economies in the overhead expenses of the company to the extent of several hundred dollars per month."



PART OF BINGHAM DISTRICT, UTAH

Property: consists of 335.5 acres, patented, in the West Mountain mining district (Bingham), Salt Lake county, Utah, comprising the Fortuna group of 23 claims, 170.8 acres, in the Keystone and Dalton gulches, and the David claims, 6.2 acres, underlying the town of Bingham; (2) the Eddie group of

ims. 50.3 acres in Bingham Canyon; (3) leases and options on the Valentine ent and Tiewaukee group, 10 claims, 114 acres, in Bingham Canyon.

The Montana-Bingham Transportation & Drainage tunnel over 5,540′ long, ers the mountain in the N. W. corner of the Eddie group, within 50′ of the & R. G. railway, and runs S. E. through the Eddie group, then through the ıgham Amalgamated Copper Co. group and the Congor Cons. Mng. com- ıy's ground to the Fortuna group. This tunnel crosscuts, nearly at right an- s, the Eddie and Cleveland veins of the Eddie group, the Copper Glance and ınifay veins of the Bingham Amal. group, the veins of the Conger group, the ester and Virtick veins of the Keystone Extension Co.'s group and the Sierra ande, Fortuna and Mayflower veins of the Fortuna group. The three last med veins, are cut 470′ vertically, or 1,400′ on the dip, below the lowest of the ong drift tunnels of the old Fortuna mine, but the S. rake of the orebodies ened in the old mine, carries them 1,700′ or more south of this tunnel. Ex- ısive lateral development was done to block out ore. The Mayflower vein this horizon shows an oreshoot estimated by the manager to be 700′ long, 22′ ck, and 1,400′ on the dip, equal to 1,500,000 tons of 2% ore with an equal ıount between the M. B. tunnel and the Mascotte (of the Ohio Co.), 550′ ver- ally below it.

Geology: the Fortuna group, the most important holding of the com- ıy, shows an intruded sheet of monzonite-porphyry in tilted series of quartzite d limestone beds, traversed by four nearly parallel veins following the strike d dip of the monzonite sheet or of the quartzite bedding, occasionally cutting ·oss and accompanied by some fracturing and crushing. These veins are to 25′ thick, and carry streaks and shoots of pyrite, with varying copper value, chalcopyrite and chalcocite. Southern workings have shoots of silver-lead ² and in Eastern end of workings lenses of ore occur that are 20′-50′ thick and ·ry 2% copper.

These veins are opened by the 4,200′ Keystone tunnel and 3 other tunnels mprising the old workings of the Fortuna mine.

Tiewaukee mine: 9 claims, 45 acres, is explored by a main tunnel, over 1,000′ ıg, cutting several bedded veins, large stopes of old workings north of it, con- n much milling ore. Pillars left in stopes show 18.9% lead, 6% copper, 27 oz. ver per ton. Tiewaukee shaft is 90′ vertical, connecting with a drift from the ain tunnel, while shaft continues as an incline on the bedded vein.

The Valentine mine, also in Bingham Canyon, has been an irregular ipper from an orebody assaying 4% copper. It has a 500′ tunnel and 225′ shaft, tting a vein of silver-copper ore.

Company has contracts with Bingham Amalgamated C. Co. and will receive % of net proceeds on all ore shipped through the tunnel; from Keystone Ex- ısion Mng. Co., 25c per ton of ore and 12½c per ton for waste; from Bingham- ngor C. Co., 15c p. t. of ore or waste; from Fortuna Mng. Co., 25c p. t. ore d 15c per ton for waste; also an agreement with Col. E. A. Wall to handle arless ores when drift from tunnel has been extended on one of Montana-Bing- m veins into Starless ground: 300,000 gallons water per day is flowing from nnel, which is valuable for milling, etc.

Production: Nov., 1918, to July 9, 1919, was 1,547 tons of ore yield- ¿ $20,720 net smelter returns. About half of this ore was mined by leasers.

Work was resumed in June, 1919, after a shutdown of four months. Ship- ents for 1919 totaled 4,763 tons of ore containing 220 oz. gold; 14,667 oz. ver; 99,051 lb. lead; 358,212 lb. copper, all of a gross value of $110,390. erations for 1919 resulted in an expenditure of $15,829 over and above ore urns.

EW ENGLAND GOLD & COPPER MINING CO. UTAH

Went into hands of receivers in 1915.

Office: 67 Milk St., Boston, Mass. **Mine office:** Bingham Canyon, Salt nty, Utah.

[illegible] S. Williams, pres.; E. E. Abercrombie, v. p. and managing [illegible] Bradstreet, sec.-treas.; preceding, with Woodford Yerxa, [illegible] Bancroft, directors.

Inc. June, 1899, in Colorado. **Cap.**, $2,000,000; shares $10 par; issued $1,294,467.

Bonds: $500,000 authorized, at 6%; issued, $390,000. Paid a 10% stock dividend, October, 1908. Federal Trust Co., Boston, registrar; Geo. F. Bradstreet & Co., transfer agents. Annual meeting, first Monday in June.

Property: the Bingham group of 9 fractional claims, 18 acres, in the Bingham, or West Mountain district, Utah, south of the Boston Consolidated and near the Utah Metals property. The company also owns a group of claims at Goldfield, Nev.

The old Nast mine of the Bingham group shows porphyry cut by 3 fissure veins, of 30" average width, opened by the 1,600' Nast tunnel and the 1,670' Benton tunnel, both in ore, and 2 shafts, 1 of 159', with a total of about 6,000' of workings. Ores said to average 30% lead, 10% zinc, 15 oz. silver and $4.50 gold per ton, with small and variable percentages of copper.

Equipment: includes a steam plant with 2 hoists, 1 of 30-h. p., good for 800' depth. The concentrator has a 4x12" crusher, 2 rolls, 2 Hartz jigs and 1 Wilfley table, operated by commercial electric current.

Production: was 2,108 tons of lead concentrates and 165 tons of copper ore, 1907, but property was closed down, late 1907; mine was worked on only a small scale, 1908 to 1910, securing 936 tons of ore, giving net smelter returns of $36,986. In 1910, the Utah Metal Mining Co. sued this corporation for $700,000 damages, alleging tresspass and illegal ore-extraction. A survey proved that company was not guilty of tresspassing and suit was cancelled.

In 1911 the mine produced milling silver-lead ore, yielding 150 tons high grade concentrates per month, netting the company $25,874. In 1913 output was reduced to 8,360 and the mine was shut down by reason of western creditors forcing their claims. The Trust Co. holding mortgage securing the bonds, foreclosed same, December, 1915, at request of the bondholders and a reorganization of the company was contemplated. Interest, amounting to $46,800 on bonds has not been paid since February 1, 1914.

NEW UTAH BINGHAM MINING CO. UTAH

Described in Vol. XIII. Property and assets acquired by New York Bingham Mining Co., which see.

NEW YORK BINGHAM MINING CO. UTAH

Acquired property and assets of New Utah Bingham Mining Co.

Office of treasurer: H. A. Bellows, Suite 711, No. 53 Park Row, New York City. **Mine office:** Bingham Canyon, Utah.

Officers: T. B. Beacher, pres.; H. A. Bellows, treas.; R. L. Reisch, sec.; with F. T. Bellows, J. W. Thompson, E. S. Burns and H. F. Hoevel, directors.

Inc. Nov. 19, 1918. **Cap.**, $200,000; shares 20c. par; 73,648 shares outstanding, March, 1920.

Bonds: of old company outstanding when property was taken over, $14,000. Stock was exchanged share for share. Annual meeting, November.

Property: 20 claims, 19 patented, 130 acres adjoining the Telegraph of the United States Mining Co., in Bingham Canyon, Utah. Claims cover about 3,000' along the footwall portion of the Jordan limestone ore-bearing zone of Bingham. The large orebodies of this district are found in fissures within limestone, or along limestone contacts, and the Jordan belt is the most productive of the 3 belts known in the camp; 16 fissure veins have been opened. Before the company acquired the property a number of promising veins carrying ore in the porphyry, but too narrow to be valuable, had been exposed. These veins pass into the limestone and are expected to have large orebodies at the contact. Ore is mainly silver-lead.

Development: consists of about 15,000' of work, mainly by 3 tunnels. In the Turngren tunnel, over 1,300' long, 8 veins from 1 to 4' thick have been cut, 7 showing ore and 2 of them worked. These two veins run north, are parallel and contain high-grade ore in the Spanish mine and along the outcrop in the company's ground. The Harrison tunnel, 600' long, is in quartzite and will crosscut the Rough and Ready veins, which are opened by 3 other tunnels higher

the mountain, all showing ore. Work on these veins has been discontinued and work concentrated on the Giant Chief.

The Giant Chief vein is a fault fissure, developed by a 200′ shaft from which ther exploration is being conducted on the 150′ level; 600′ of drifts and cross- s driven in 1915 from this point have at 800′ depth in the sulphide zone cut issures encountered in the higher workings. These veins carry oxidized ieral matter, surrounded by a soft lime, and show porphyry mineralized with ı pyrites. A small vein of carbonate ore, running nearly 50% lead, has been ned; the Bonanza tunnel was driven 977′ along the Giant Chief vein, and)ss it to reach the ore, 150′ deeper than where first opened.

Equipment: includes compressor, 180-h. p. electric plant, taking current n the Utah Power & Light Co., hoist and all necessary buildings.

Production: several cars of ore reported to have been shipped during past 2 years, running from 6 to 12 oz. silver, and 20 to 38% lead. Lessees working the lower tunnels.

Property is well adapted for tunnel work, has large blocks of virgin ground is considered promising. Company is an intermittent producer.

IAGARA MINING CO. UTAH

Is controlled by United States Smelting, Refining & Mining Co., which see.

RTH BINGHAM CONSOLIDATED MINING CO. UTAH

Office: Provo, Utah. Mine near Bingham Canyon, Salt Lake county, h. Jesse Knight, pres.; Wm. W. Matthews, v. p.; W. Lester Mangum, sec.- s., and J. Wm. Knight, directors.

Inc. June, 1907, in Utah. **Cap.,** $100,000; shares 10c par; assessable; ontrolled, through stock ownership, by the Knight Investment Co.

Property: 6 claims, in Barney Canyon, has a very wide ore zone, said ıow leached ore carrying traces of copper and up to $2.80 gold per ton.

Development: includes a tunnel of about 1,000′, and a 2-compartment t. Property is considered a good development proposition. Idle.

IO COPPER MINING CO. UTAH

Property sold at foreclosure sale, August, 1916, to representatives of bond- ers' committee and company reorganized as Ohio Copper M. Co. of Utah, h see. Also see Vol. XII.

IO COPPER MINING CO. OF UTAH UTAH

Office: 43 Exchange Place, New York. **Operating office and concen-)r:** Lark, Utah.

Officers: H. E. Rogers, pres.; Chas. A. Kittle, v. p.; E. S. Hooley, v. p.; e with J. H. Flagler, M. N. Buckner, A. R. Rogers, A. R. Peacock, Hugh n and S. B. Sherman, directors. G. M. Colvocoresses, gen. mgr. Jos. A. zman, sec.; S. K. Kellock, treas.-asst. gen. mgr.

Inc. Nov., 1916, in Maine, as a reorganization of the Ohio Copper ing Co., formerly the Ohio Copper Co. **Cap.,** $2,500,000; $1 par; ,625 shares issued. Listed on Salt Lake Exchange and on Boston Curb. York Trust Co., transfer agent. Price range 70c. to $1.05 in 1918; 35c. ic. in 1919.

Balance sheet as of December 31, 1918, shows: total assets, $2,676,732, which des: property, $2,096,793; stocks and bonds of Bingham Central Ry., 820; current, $118,108; prepaid insurance, interest, etc., $21,087; general t and loss-deficit, $112,925. Liabilities show: capital stock, $2,225,625; ır convertible 7% notes dated September 20, 1918, $250,000; current, $156,389; ry reserves, $44,718.

Profit and loss statement shows: total value metals produced, $817,210; cost roduction, $941,745; operating loss, $124,535; rents, interest received, etc., 9; miscellaneous expenses, $18,764; profit and loss deficit, 1918, $140,300. it, December 31, 1918, $112,924. Fire loss, due to burning of the mill, is as $104,233.

Revenue in 1919 was $188,599 from concentrates sold, and expenses were 386.

For detailed history of old company and the plan of reorganization, see XIII of the Mines Handbook.

Property: 14 claims, patented, 120 acres, bounded on the N. and W. by holdings of the Utah Copper Co., on the E. by the Montana Bingham Con. M. Co., on the S. by United States Mining Co., and on S. W. by the Boston Consolidated. The Mascotte tunnel, owned by the Bingham Central railway, a subsidiary company, charges toll on all ore hauled to the mills.

Geology: property carries a belt of quartzite 500' wide carrying 2 parallel veins known as the What Cheer and All's Well. These veins are not more than 500' apart, and separated by mineralized quartzite which constitutes the main orebody of the property, the ore averaging 1.015% copper. The quartzite which adjoins the laccolithic mass of monzonite-porphyry of the neighboring Utah Copper and Boston Consolidated properties, is much shattered and broken with ore disseminations and impregnations along shatter and cleavage planes, ore in the brecciated material being chiefly chalcocite and chalcopyrite, associated with pyrite, readily amenable to concentration, and lying above the level of the Mascotte tunnel.

Estimates of ore developed vary greatly, the former management claiming that ore had been developed under about 5 acres, the "porphyry" orebody being estimated as 400' wide, 1,000' long and 600' deep. One estimate gave 3,7[illegible] tons of ore developed with 9,738,690 tons of probable ore and the average [illegible] probably about that of the ore milled, or 1.01% copper. Proven ore reserves July 31, 1919, were 6,000,000 tons of 0.8% copper, with another large block of ore not yet fully developed that averages 1% copper.

The 14,000' single track Mascotte tunnel, connecting with the shaft at a depth of 1,100', cares for the large volume of water coming from the workings. The ore is blocked out in 100' squares, with extensive development on the 3rd, 5th and 7th levels, and the caving system is used in extraction. Ore is sent from the upper workings, through chutes, to a 4,000-ton ore-bin, 20' wide and 200' long, extending over both tracks; loaded in about 4 minutes from the bins into trains of 18 to 20 five-ton double-bottom steel cars, and hauled by electric locomotives to the concentrator at Lark.

The mill: at Lark, 3,200' from the mouth of the Mascotte tunnel. On August 10, 1918, fire destroyed the mill. It was rebuilt and operations were again started, October 1, and by February 23, 1919, the 5-unit flotation mill was completed. On March 10, 1919, all operations were stopped on account of the lack of demand for copper.

Production: in 1918 was 3,362,119 lb. copper, compared with 5,27[illegible] lb. in 1917. In 1918, there was also produced 5,290 oz. silver and 731 oz. gold.

Output in 1919 was 1,012,920 lbs. copper, 1,149 oz. silver and 96 oz. gold.

A special stockholders' meeting was called for September 10, 191[illegible] authorize an increase in the capitalization to 3,500,000 shares of $1 par, 1,000,[illegible] of which will be kept in treasury to provide for converting $1,000,000 7% [illegible] year bonds to be sold to further finance operations and retire $250,000 of the [illegible] year notes.

Reported, November, 1919, that a syndicate had underwritten $550,000 of the authorized bond issue.

With this financing successfully completed and if copper stays above the 20 cents per pound mark, it is expected that Ohio Copper will quickly be put on the permanently profitable basis outlined by President Rogers and made possible by moder[illegible] facilities.

PHOEN[illegible]NING CO UTA[illegible]

See [illegible] Mining

PINE C[illegible] & BIN[illegible] TUNNEL CO. UTA[illegible]

Office T[illegible] Lake City, Utah.

Office [illegible]ard Savage, v. p.; Homer Bea[illegible] 2nd v. p.; [illegible]

Inc. Ju[illegible] par; 800,000 issued [illegible] in secretary's [illegible]

Property [illegible] of Bingham, [illegible]

Star vein, in quartzite carrying limestone beds and cut by Bingham monzonite porphyry.

Company owns 2,000′ tunnel running from Pine Canyon toward Bingham. Portal of the tunnel will be 1½ miles from the International smelter at 5,600′ elevation. The Great Western tunnel at an elevation of 7,300′ is between the Great Divide group and the Star group, half way up the mountain side between the Nancy Hanks and the portal of the new Pine Canyon tunnel. Company does not reply to requests for information.

SILVER SHIELD MINING & MILLING CO. **UTAH**

Office: McCornick Bldg., Salt Lake City. **Mine office:** Bingham Canyon, Utah.

Officers: Henry Cohn, pres.; H. S. Joseph, v. p.-gen. mgr.; Allen T. S. Sanford, R. E. Miller, N. G. Hall, D. L. Wertheimer, J. A. Barclay, directors.

Inc. in Utah. **Cap.,** $300,000; shares $1; assessable; assessment No. 49 1c. a share, was levied in February, 1919; last assessment, 2c., delinquent, September 20, 1919; 298,700 shares issued. Paid $4,500 in dividends prior to 1903. Listed in Salt Lake City. Financial statement covering period January 1, 1916, to July 1, 1918, showed total receipts of $48,166, including $8,028 from ore sales, $14,800 from treasury stock sales, and $12,000 from assessments. Disbursements amounted to $48,166. Cash balance October 1, 1919, was $4,441, compared with debt of $7,162 year previous.

Property: about 320 acres, at Bingham Canyon. **Ore:** carries mainly silver-lead, with some gold.

Development: by shaft and 8,000′ tunnel to depth of 538′. Workings connected with tunnel of the U. S. Mng. Co. In February, 1919, a carload of high-grade ore was in the bins ready for shipment, but property is still in development stage. Reported that lessees opened a body of good ore early in 1920.

Equipment: hoist, 5-drill compressor, 50-h. p. motor, etc.

STARLESS MINE **UTAH**

Office: care Col. Enos A. Wall, owner, Salt Lake City, Utah. **Mine office:** Bingham Canyon, Utah.

Property: 8 claims patented, 160 acres, lying N. E. of the holdings of the Utah Copper Co., is developed by an incline shaft and numerous tunnels, longest 2,000′, with crosscuts and upraises, aggregating 10,000′.

Development: said to block out 800,000 tons of 1 to 2% copper ore.

Equipment: includes a hoist.

The 125-ton mill, idle, though it was enlarged and remodeled 1910, at a cost of $50,000, is equipped throughout with machinery of Col. Wall's own design, comprising Wall corrugated rolls, Wall steel rolls for middlings, 3 sets of jigs, 4 tables for concentrates, 2 Wilfley tables, and washers, of trough form, with valves and sprayers, concentrates being discharged through the bottom and sands from the top.

STIBNITE MINING CO. **UTAH**

Address: H. C. Baker, 2421 Washington Ave., Ogden, Utah.

Officers: H. C. Baker, pres.; A. M. Miller, v. p.; G. M. Flowers, secretreas., with Leroy Buchmiller and H. J. Craven, directors.

Inc. April, 1917, in Utah. **Cap.,** $100,000; 10c par; 800,000 issued.

Property: 686 acres, patented, 4 miles N. of Bingham, in Wasatch Range, Box Elder county, Utah.

Development: by 2,452′ adit, total openings 4,315′ to depth of 800′, showing various types of ore deposits in limestone, quartzite and shale, the ore containing lead and antimony. Reserves are estimated at 126,000 tons. Antimony ore, mined in 1916 was 67 tons, assaying 66% metal.

Equipment: compressor, 6,200′ tram, 125-ton concentrating plant. Flotation have been added in 1918. No recent information, probably inactive.

[illegible] GROUP **UTAH**

[illegible] South State St., Salt Lake City, Utah. **Mine office:** Bingham, Salt Lake county, Utah. A. M. Surbaugh and Thos. Moore Sur-

Property: 39 claims, 22 patented, 715 acres, with direct rail connection, in the N. E. part of the Bingham camp.

Development: by 16 shallow shafts and short tunnels, principal work being by the Highline tunnel, with another tunnel driving at lower depth. The mine carries gold and silver-bearing lead and copper ores, with small quantities of native copper, in quartz. Owners do not care to have output or other details made public, and returned letters unopened. Probably idle.

UNITED BINGHAM COPPER CO. UTAH

Officers: L. A. Marks, pres.; G. R. Bothwell v. p.; F. R. Snow, sec.-treas., 252 Canyon Road, Salt Lake City, with P. E. McConaughy, and W. P. Davis, directors.

Inc. 1919, in Utah. **Cap.,** $100,000; 10c par; issued 900,000 shares.

Company is the successor of Bingham Amalgamated Copper Co., described in Vol. XIII. The new company was organized in order to make the stock assessable. Old stock was exchanged for new on payment of 1c. a share.

Property: 22 claims, 300 acres, patented, known as the Illinois and Copper Glance groups, carrying 7 mineralized veins. The principal orebodies exposed in the Bingham Amalgamated are on the same vein as the Congor orebodies and of about the same character of ore. Vein is 15 to 40′ thick, developed for several hundred feet in depth, but the water and high cost of wagon haul stopped further development. In a tunnel on the west side of the property a 20′ vein shows streaks of good ore all through it. The Montana Bingham tunnel cuts this vein about 100′ deeper, 3,948′ from the portal, and opened it for 10′. Samples taken from this vein said to run from 3.2-6.5% copper, 7 oz. silver, $1.20 gold and 25% iron. Development work resumed the latter part of 1915 after an idleness of several years.

The Illinois has a 640′ shaft, with a 6 to 9′ vein carrying a 2′ pay-streak of about 5% copper ore, with occasional assays up to 40%, the average of 50 assays being 2.8% copper, 2 oz. silver and $2 gold per ton. The Copper Glance group has a 1,400′ tunnel, in McGuire gulch. Mine has a total of 2,450′ of workings.

In summer of 1917, company mined ore from a raise at the East end of the 300′ level. A trial shipment of 90 tons in June, yielded $25 per ton, the ore carrying 4.73% copper, 2 oz. silver, $1 gold, and 26.4% iron and 35.6% insoluble. The shaft, flooded in July was reopened later. Recent work has been on a small scale on the 400′ level, east side; some ore was shipped in 1918. Company plans more active exploration work in 1920.

UTAH-APEX MINING CO. UTAH

Office: 10 Post Office Square, Boston, Mass. **Mine office:** Bingham Canyon, Utah.

Officers: R. F. Haffenreffer, Jr., pres.; J. J. Murphy, v. p. and treas., with N. P. Duvally, sec.; G. F. McGahey and M. W. Sangy, directors. V. S. Rood, mgr.

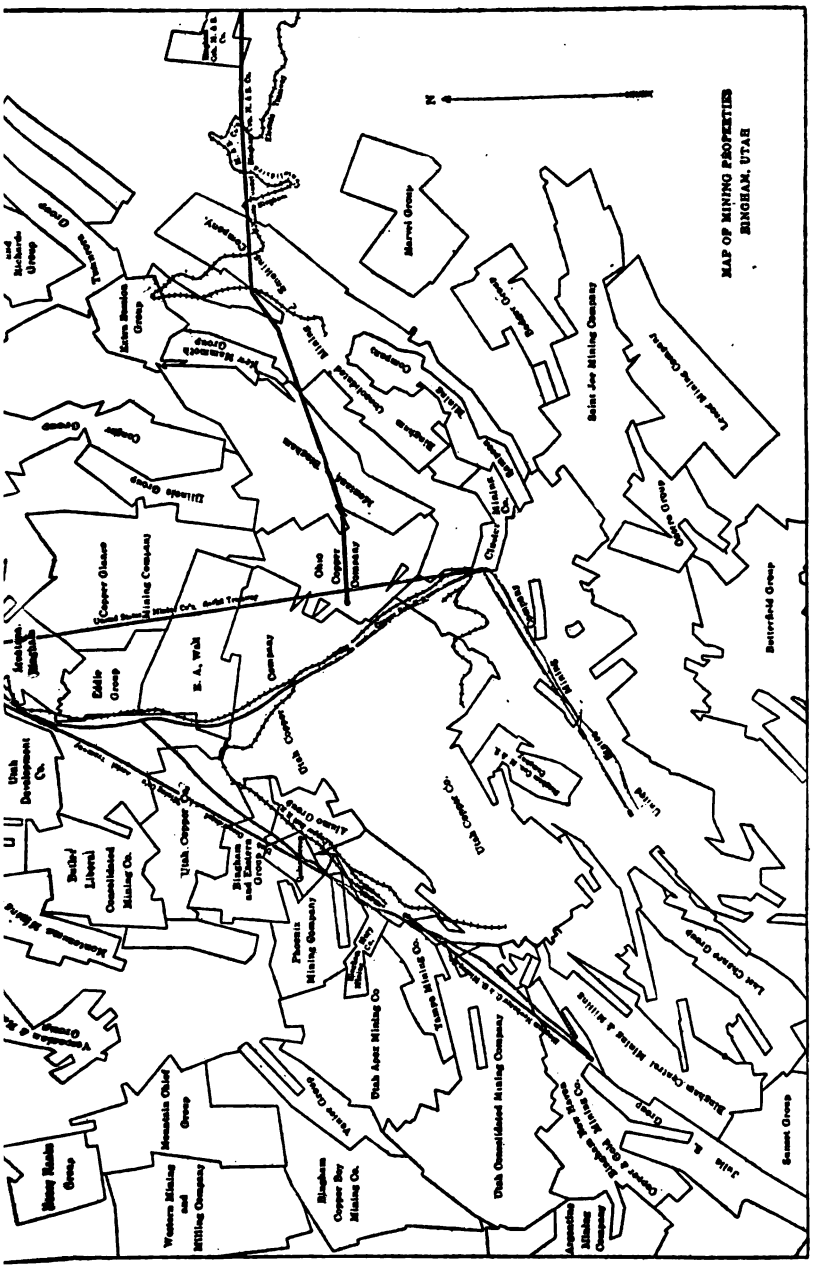
Inc. May, 1902, in Maine, as a merger of the Copperfield Mining Co. and York Mining Co. **Cap.,** $3,000,000; increased 1906, from $2,500,000; $5 par; issued 528,200 shares. State Street Trust Co., Boston, transfer agent. Listed on Boston Stock Exchange and on New York Curb. Price range $1¾ to $4½ in 1918; $1⅛ to $3⅞ in 1919.

Bonds: $500,000; authorized at 6%, convertible, were retired July 1, 1916. Company absorbed the Highland Boy, Petro, Minnie and Phoenix mining companies. Annual meeting, second Thursday in November.

Balance sheet for year ended August 31, 1918, shows assets totaling $3,770,000, including $2,480,789 for cost of properties; $302,781 cash; $507,798 for development and equipment.

For fiscal year ending August 31, 1918, gross receipts from ore sales, royalties etc., were $1,761,044. Mining, development and milling cost, $1,189,306; miscellaneous expenses including general insurance, taxes, depreciation, etc., $121,586; litigation expenses and settlement of claims, $68,139, leaving a net profit of $255,858. Dividends absorbed $132,050.

Gross receipts for 1919 were $923,888, as against expenses of $1,097,995.


MAP OF MINING PROPERTIES
BINGHAM, UTAH
N
Utah Copper Co.
Boston Consolidated Mining Co.
Ohio Copper Company
Utah Apex Mining Co.
Utah Consolidated Mining Company
Bingham Central Mining & Milling Co.
Bingham Con. & Sunnyside Gold Mining Co.
Bingham Copper & Gold Mining Co.
Bingham Copper Mine
Bingham Copper Mine Group
Bingham Mines Co.
Bingham and Eastern Group
Bingham Copper Mine Group
Bingham Copper Mine Group
Bingham Mines Co.
Bingham Mines Co. Group
Bingham Mines Co. Group
Bingham Mines Co. Group

Dividends: initial quarterly dividend, 12½c, paid Oct. 1, 1915, 75c in 1916; 50c. in 1917; and 50c. in 1918.

Within the past few years the company has had several law suits, the last (1919) being one brought by the Utah Cons. against the Apex Co. for $1,000,000 damages for ore illegally mined from its ground.

Property: 34 claims, 244 acres, including the York, Copper Field, Petro, Highland Boy Consolidated and Phoenix groups, adjoins the Utah Consolidated on the S. and W., on York hill, Carr Fork canyon.

Geology: claims show limestone and quartzite, carrying the Parnell, Petro, York, and Andy bedded veins. These veins are cut by several fissures which have been more or less developed. The Dana, the principal orebody, is apparently a contact deposit between quartzite and limestone, showing as a shoot standing vertically, without disseminations in the contact, up to 15' in width and 500' in length on the 4th level. The mine primarily is a producer of high-grade lead ore, but has considerable copper, and some zinc: all ores carry silver and gold values with an excess of iron, giving low smelting charges. First-class ores carry about 2% copper, and $6 to $8 combined gold and silver values per ton, the second-class copper ores carrying about $3 per ton in combined gold and silver values. First-class lead ores carry 35 to 50% lead with silver and gold values, and second-class lead ores range 7 to 14% in lead with small gold and silver values.

Development: by 3 shafts and 6 tunnels, with over 20 miles of workings. The main working shaft is down to the 1,800' level. The tunnels, such as the Parnell, Minnie, Smilax, Andy, Andy No. 2 and Parvenu, are spaced 200' vertical intervals, and are connected by incline blind shafts, with electric hoists, on the Parnell vein, which is estimated by the company to be 5' in width and to be mineralized for about 1,000' in length and to 2,000' in depth. The Andy tunnel develops 3 ore-shoots, on the Parnell vein. The Parvenu tunnel, which is the principal working, is about 1 mile in length, cutting the Parnell with a back of about 2,200'. Since the decline in the copper market 1907, production had been devoted mainly to silver-lead ore. A silver-lead orebody in the Parvenu tunnel, having a maximum thickness of 100', with a width better than 100' and length undetermined, shows direct smelting ore of 15% lead, with 3 to 5 oz. silver per ton, and excess of iron, estimated to contain values of $8 to $10 per ton. The Parvenu shaft was completed to the 4th and hoisting started in April, 1917.

A 3,000' aerial tram, not in present use, runs from the portal of the tunnel to a loading station. Ore is shipped over a spur track of the railroad of the Utah Copper Co.

Mine was examined 1916, by Pope Yeatman, who discussed the lead, lead-silver-zinc and copper ore occurrences, of which lead has been the important. There is little chance for development of ore between 200 and but above 200' there are possibilities. The York beds show promise at depth. The principal orebody is the Parvenu, which on November 1, 1 tained 50,000 tons of 14% lead and 14% zinc ore. Its lower extension be close to the 1,500' level. The future lies in extensive development departments being in good order.

Ore reserves are estimated at over 200,000 tons, assaying 0.03 oz. oz. silver, 11% lead and 8% zinc. Present indications show that new maintain, if it does not increase reserves. During last fiscal year importa of milling ore were found on 100' level; reserves of this ore amounting tons, assaying 8% lead and 2 oz. silver per ton. New bodies of shi were found on the 1,150', 1,225', and 1,300' levels; reserves of this o to 160,000 tons ore assaying 12½% lead, and 4 oz. silver per ton.

Equipment: includes two 15-drill air compressors and 2 elec 1 of which is a double-drum hoist installed at the 7th level station in the tunnel. In April, 1917, a new Nordberg hoist was installed on th The old Phoenix mill at the mouth of the Parvenu tunnel was dismant new 200-ton mill built 1909, on the same site. The mill is said to ef centration of 4 into 1, with a saving of about 77% of assay values

mpany increased the capacity of the concentrator to about 350 tons daily, and 1915 a flotation equipment was added. In 1918, a large electric compressor is added.

The mill treated 53,518 tons of lead ore in the year ended August 31, 1916, om which 16,947 tons of concentrates were recovered; and 2,010 tons of copper e. Average cost of milling was 72.2c. per ton in 1915, as compared with 79.8c. 1914. In 1917 the mill treated 17,637 tons of ore, assaying 0.034 oz. gold, 3.76 . silver, and 11.37% lead. In 1918, 49,742 tons were milled.

Company has contracts with U. S. Mng. & Sm. Co. and American. Sm. & f. Co. for daily shipments of 300-400 tons lead zinc ore and lead ore and concentrates respectively. Employs over 500 men.

Production, years ended August 31:

ar	Gold Oz.	Silver, Oz.	Lead, Lbs.	Copper, Lbs.
19	2,257	195,715	14,753,984	386,833
18	6,171	641,551	42,811,805	1,427,576
17	3,551	396,989	24,414,451	.....
16	4,924	620,022	37,304,675	2,355,475
5	4,000	560,000	32,000,000	2,400,000

Zinc produced in 1919 amounted to 7,671,742 lb.

Mine idle from May until late in September, 1919, when shipments were umed. November outputs averaged about 500 tons daily.

It is said that a large tonnage of milling ore is available.

'AH CONSOLIDATED MINING CO. **UTAH**

Office: 42 Broadway, New York. **Operating office:** 608 Dooly Block, t Lake City, Utah. Mine office: Bingham Canyon, Utah.

Officers: R. H. Channing, Jr., pres.; Adolph Lewisohn, v. p.; with Sid- Chase, J. S. Dunstan, H. N. Anthony, J. W. Allen, Maxwell Woodhull, ctors; A. H. Melin, sec.-treas.; Frederick Cowans, gen. mgr.; A. S. Winther, t.; T. S. Van Wagoner, purch. agt.

Inc. 1903, in New Jersey. **Cap.,** $1,500,000; shares $5 par.

Is a reorganization of Utah Consolidated Gold Mines, Ltd., a British corpo- on that in turn succeeded the Sevier Gold Mines, Ltd., October, 1896. Prop- of the Utah Consolidated Mining Co. is 2,490 shares of the 2,500 shares of capital stock of the *Highland Boy Gold & Copper Mining Co.,* of New Jersey, latter corporation holding direct title to the Utah properties. The company owns 8,250 shares of the Anaconda Copper Mng. Co., stock derived from of Internat'l S. & R. Co.

Shares are listed on the Boston and Salt Lake Stock Exchanges. Price e, $7 to $10 in 1918; $7½ to $12¾, July, 1919. Transfer agent, International st Co., Boston. Annual meeting, first Tuesday in April.

Comparative Profit and Loss Account shows:

	1918	1917
Sale of metals	$2,827,571	$3,513,079
Other receipts	107,065	101,698
Total receipts	$2,934,636	$3,614,777
Mining expense	1,450,743	1,562,636
Smelting expense	907,492	1,054,943
Refining, Marketing, etc	170,863	117,970
Administration and legal expense	51,619	67,033
Litigation expense	101,155	.....
Total expense	$2,681,872	$2,802,582
Net profit	252,764	812,195

Total receipts in 1919 were $2,060,404, of which $181,966 was profit. Current s exceed liabilities by $1,931,687.

Dividends:

1903	$3.20	1909	$2.00	1915	$2.00
1904	3.00	1910	.50	1916	1.50
1905	3.50	1911	.50	1917	1.75
1906	5.00	1912	1.50	1918	1.50
1907	7.00	1913	1.50	1919	0.25
1908	2.00	1914	2.00		

Property: 46 claims, patented, 393 acres, known as the Highland Boy group, in Carr Fork canyon, 2½ miles from Bingham canyon. The Highland Boy mine was a considerable producer of silver-lead ore, 1870-90.

In 1915 the Bingham Copper Boy group adjoining the Utah Cons. on the north was purchased for $18,747. Property promising but undeveloped. In 1918, the Yampa mine, 51 acres, adjoining on the north, was purchased from the Tintic Mining & Dev. Co. for $100,000.

Geology: the Highland Boy group, the original property, has 6 ore deposits which are replacements of limestone beds 150 to 300′ thick, with quartzite above and below. These beds dip from 25 to 45° N. and the rocks are cut by a series of porphyry dikes that are nearly vertical and run N. E. The ore deposits form well-defined shoots with E.-W. strike and N.-E. pitch. They are large, varying up to 100′ in width and 100 to 200′ in length, and are separated by barren limestone; the largest orebody so far developed is said to be 320′ in extreme horizontal width and 340′ in length. An ore-shoot carrying galena was found in the lower workings in an extension of the Yampa limestone. The predominating ore of the mine carries chalcopyrite, with some bornite and chalcocite, associated with pyrite in a limestone gangue.

Development: the Highland Boy mine is opened by a main shaft 1,600′ deep, and 7 tunnels, of 1,000 to 2,600′ in length. No. 7 tunnel, 700′ below the crest of the mountain, is 2,600′ in length and is the main haulage way, all tunnels being connected, and ore milled, through chutes, to this tunnel. There are 2 blind shafts, deepest 500′, starting from the 700′ level, with large electric hoists raising ore to that point for extraction by the electric haulage plant in No. 7 tunnel. The ore breaks easily and is extracted by the top-slice caving system, mainly on contract.

New openings totalled 29,206′ in 1917; 21,067′ in 1918; 17,407′ in 1919.

The most important exploration was done in opening up the 1,400′, 1,500′ and 1,600′ levels from a vertical winze sunk from the 1,300′ level. On the 1,400′ and 1,300′ levels 850′ of new drifting was in 2% copper ore of an average width of 3½′. Crosscutting to north at E. end of both levels disclosed another orebody 4′ in width, assaying 2.5% copper on the 1,200′ and 4% on the 1,300′ level. On the west end of the mine crosscutting on the 1,300′ level disclosed 6′ of 2.5% copper ore. The lead ores on the 1,400′ and 1,500′ levels, reached by the winze from the 1,300′, are reported to be holding up well.

In 1918, an option was taken on adjoining property of the Utah Lead & Copper Co. Exploration work is being done in this ground from the 1,300′ and 1,500′ levels.

Suit was filed against the Utah-Apex Mining Co. for damages, 1919. Utah Cons. claiming it had the apex of the vein from which Utah-Apex had been mining ore. By an agreement with the Utah Metal and Tunnel Co. apex litigation with that company is ended, but in November, 1919, Utah-Apex commenced suit against Utah Cons. for alleged wrongful extraction of ore.

Ore reserves:

	Copper Ore Tons	Copper %	Silver Oz.	Gold Oz.	Lead Ore Tons	Lead %	Silver Oz.	Gold Oz.	Copper %
1919...	848,000	1.94	0.66	.040	38,400	15.70	5.36	.060	[illegible]
1918...	27[illegible]	2.33	0.78	.048	29,591	15.93	5.23	.058	[illegible]
1917...	[illegible]	[illegible]	0.6[illegible]	[illegible]	31,000	14.90	4.96	.06	[illegible]
1916...			0.[illegible]		33,400	16.03	5.62	.038	[illegible]

A fl[illegible] [illegible]000 tons of low grade copper ore.

A 12,700′ aerial tram leads from the portal of No. 7 tunnel to ore bins on Rio Grande Western railway. There is a subsidiary aerial tram, crossing · Fork canyon, used for handling lumber and mining supplies.

While the great orebodies of the mine are worked out the property is far ı exhausted, and development work is encouraging.

Production:

Copper Ore Tons	Copper %	Silver Oz.	Gold Oz.	Lead Ore Tons	Lead %	Silver Oz.	Gold Oz.	Copper %
... 124,199	2.22	1.27	.070	45,377	17.50	5.34	.041	.82
... 221,651	2.03	0.82	.054	31,725	15.18	4.71	.04	.64
... 226,536	1.797	.764	.050	58,247	13.91	4.57	.039	.61
... 360,034	1.734	.796	.052	74,542	14.17	4.25	.041	.74

	Lbs. Copper	Lbs. Lead	Oz. Silver	Oz. Gold
.....	5,710,346	13,072,177	373,180	10,548
.....	8,476,197	7,812,653	306,152	13,307
.....	7,968,165	13,014,841	408,560	13,530
.....	12,211,118	18,175,709	558,845	21,727
.....	8,836,091	17,777,604	370,985	19,387
.....	7,584,391	14,588,276	284,196	15,528
.....	7,710,668	19,208,063	378,960	14,172
.....	6,506,814	8,734,398	230,004	14,042
.....	9,162,023	3,311,939	160,366	16,730
.....	7,489,471	.....	154,321	14,802
.....	10,043,900	.....	.....	.....
.....	10,648,243	.....	.....	.....
.....	13,987,557	.....	390,296	34,554
.....	18,533,974	.....	457,812	42,001
.....	17,264,474	.....	374,685	28,290
.....	13,553,483	.....	.....	.....

ʜ COPPER CO. **UTAH**

Office: Deseret Bank Bldg., Salt Lake City, Utah. **Mine office:** Bing- Canyon, Salt Lake county, Utah. Works office: Garfield, Utah.

General office: 25 Broad St., New York City.

Officers: Chas. M. MacNeill, pres.; Daniel C. Jackling, 1st v. p. and ging director; Chas. Hayden, 2nd v. p.; K. R. Babbitt, sec. and gen. counsel; - directors, Spencer Penrose, E. A. Guggenheim, H. F. Guggenheim, W. C. r, Stephen Birch, W. P. Hamilton, R. C. Gemmell (asst. managing director gen. mgr.), W. Hinkle Smith, Wm. B. Thompson, J. K. MacGowan (pur- ng agent), and R. A. Penrose, Jr.

Operating officials: L. S. Cates, asst. gen. mgr.; John M. Hayes, treas. asst. sec.; J. D. Shilling, supt. of mines; D. D. Moffat, consulting engr. of F. G. Janney, gen. supt. of mills; H. C. Smith, supt. Magna plant; T. A. ey, supt. Arthur plant; H. C. Goodrich, chief engineer of mines and railway; Jennings, asst. purch. agt.

nc. June 4, 1903, and reorganized April 30, 1904, in New Jersey. **Cap.,** 0,000; shares $10 par; originally, $4,500,000; capital successively increased ber, 1905, to $6,000,000; February, 1907, to $6,600,000; January, 1908, to 0,000; January, 1910, to $25,000,000; issued, $16,244,900. The new stock 1910, amounted to $8,282,240, of which $3,100,000 in stock was given for the rty of the Boston Consolidated Mining Co.; $4,445,120 or 445,512 shares,

UTAH COPPER COMPANY

Our Statistical Department will furnish complete information on application.

HAYDEN, STONE & CO.

bers New York, Boston and Philadelphia Stock Exchanges.

reet Street, NEW YORK 87 Milk Street, BOSTON

dry to approximately 10 mesh by 23 sets of 37½x15" rolls, three 8x6 Marcy b mills. Screening and circulation is done with help of seventy-eight 3x4 in screens and twenty-six elevators. It is then crushed wet to approximately mesh by twenty-six Chilean mills and twenty-six 7x10 tube mills: twenty- elevators; twenty-six drag classifiers; fifty-two 4-compartment and fifty-f 5-compartment Richard Janney classifiers.

The concentrate department has Garfield roughing tables, No. 5 Wil finishing tables, and 6' vanners.

The electric power used at both Arthur and Magna plants is taken fr the Utah Power & Light Company. It is stepped down into substations fr 44,000 to 440 volt. The 13,000-h. p. steam-electric plant, 1,500' northeast of Magna mill, was equipped with 20 Heine 440-h. p. boilers, working under lbs. steam pressure, equipped with American automatic stokers. General room contains two 26x50x48" Allis-Chalmers cross-compound Corliss condens engines direct connected to 1,500 k. w., A. C. generators; also three 32x70 Nordberg cross-compound Corliss condensing engines direct connected to 2 k. w., A. C. generators. There are two concrete smoke stacks 180 ft. high 12 ft. inside diameter. This plant has not been in operation since February, 1

The Leaching Plant.

This plant, located near the Magna mill, completed during 1917, treats oxidized and partially oxidized capping overlying the sulphide ore, which car approximately 15 pounds of copper per ton, of which about 12 pounds are sol in sulphuric acid.

Ore from the mine at Bingham is discharged in crusher building wher is reduced to 15% on ½" mesh screen by two No. 6 Gates gyratory crush style "K," and two 72"x20" Garfield rolls. A noticeable feature in the crush plant is the absence of any elevators; all intermediate crushing products ha handled on incline conveyors.

The crushed ore is charged from loading bridge into twelve 100'x50'x18' d mastic lined concrete leaching vats equipped with suitable filters in bottoms

The vats of ore are leached in rotation with a sulphuric acid solution c taining a maximum of 1½% free acid.

The leaching solution is handled and circulated by means of 6" centrif antimonial lead pumps and air lifts. The leaching solution, containing n .2% to .3% free sulphuric acid, and the copper, in the form of sulphate, is to mastic lined concrete and wooden precipitation launders filled with scrap i where the copper is precipitated. The cement copper precipitate is then s from the precipitation launders, drained, dried and loaded into cars pre to shipment to the smelter. The tailing is discharged from the vats by unloading bridge equipped with a 10-ton grab bucket into 30-yard dump and hauled away by locomotives to the waste dumps.

Arthur Mill.

The Arthur mill was built by the Boston Consolidated Mining Comp a cost of upwards of $1,500,000. It was remodeled to a capacity of 7,800 ton ore daily in 1916, by replacing the Nissen stamps with rolls and Chilean to correspond to the practice at the Magna mill. Later additions have inc this capacity to 16,000 tons daily.

The ore is brought to the head of the primary crushing department by road cars of 69 tons capacity, which are spotted on a car dumper by a haulage system; this equipment having a capacity of 30 cars per hour.

The railroad delivers the railroad cars in the electric mule haulage which is constructed on a 1.50% down grade. The car riders uncou cars and drop them down the grade beyond the mule pit, where they are on the dumper by the mule haulage system. The loaded car, as it is on the dumper, kicks off the empty car which runs down a grade back dumper and up a kick back track, where it reverses its direction and co on down into the empty yard located opposite the car dumper and mule

ks. Four men are required to ride these cars from the mule haulage tracks ss the dumper and back again.

The dumper discharges over a grizzly which separates in plus and minus oduct, the over-size going to a No. 27 gyratory crusher, the largest type e. The undersize and crusher product are conveyed to the secondary coarse hing department by four 60" pan feeders and two 60" conveyors. The above irtment contains a 60-ton crane, with 10-ton auxiliary hoist.

The secondary coarse crushing plant consists of three No. 8 gyratory hers, six sets of 72"x20" Garfield roughing rolls, two elevators, twelve con- rs for circulation and transporting the ore to the fine crushing department, 25-ton crane. The capacity is 16,000 tons of approximately 5/8" size. Adja- to this department is a 9,000-ton coarse ore bin, with overhead tracks, which sed when the primary crushing plant is down for repairs. This bin has six eyors and one hundred and two steel apron feeders for transferring the erial to the secondary coarse crushing department.

Miscellaneous buildings at the Arthur plant consist of substations, machine), boiler shop, oil house, compressor building, warehouse, carpenter shop, dry, pattern storage building, general offices, telephone and emergency ital building, dormitory, mess house, lumber shed, heating plant, assay office, office, scale house, and houses for employees.

Initial Water Supply.—The main pumping plant, called Plant No. 2, is situ- l immediately east of the Magna mill and at the end of the Utah & Salt Lake al, which brings the water from Utah Lake about forty miles from the plant. canal has been enlarged sufficiently to deliver 100 second feet of water to nt No. 2.

The equipment in this plant consists of one 22,000 gal. capacity, single stage, trifugal pump driven by a 250-h. p. induction motor; one 10,000-gal. capacity, gle stage, centrifugal pump, driven by a 150-h. p. induction motor; one 5,000- capacity, single stage, centrifugal pump driven by a 100-h. p. induction or, all three of which pump direct into the Magna 5,500,000-gal. concrete d reservoir above the Magna mill, through 700 ft. of 30" wooden stave pipe against a 30 ft. head; three 5,000-gal. capacity, single stage, centrifugal pumps, h driven by a 250-h. p. induction motor; one 10,000-gal. capacity single stage, trifugal pump driven by a 450-h. p. induction motor, all pumping direct to Arthur mill 2,000,000-gal. reservoir through 6,300 ft. of 30" and 42" wooden e pipe line against a head of 135 ft. The total capacity of this plant to the gna mill is 37,000 gals. per minute, and to the Arthur mill, 25,000 gals. per ute.

The reserve pumping plant No. 1 is used in whole or part when the main nping plant No. 2 is out of primary water. This reserve pumping plant is ated 1,500 ft. N. E. of the Magna mill, and includes 6 Byron Jackson centri- al pumps, each of 10,000 gals. capacity. These pumps, having a combined acity of 60,000 gals. per minute, deliver the water through two 42" wooden e pipe lines, each 1,800 ft. in length, against a 235 ft. head, into the 5,500,000- reservoir.

In order to insure a sufficient supply of mill water at all times, and as a tection against unforseen accidents on the Utah & Salt Lake canal which uld cut off the supply of primary water from that source, practically a dupli- e water supply is being constructed, and in connection with this work there s purchased 1,325 acres of land lying about nine miles east of the plants. The ography of this land is such that it forms a natural reservoir for the drainage m higher lands, but nevertheless, its elevation is sufficient so that the storage ter can flow by gravity to the lower pumping plant at Magna through a canal nstructed for that purpose. There is also under consideration the construc- n of a ditch from the Surplus canal to this natural reservoir, which will require umping plant of low head, and after this work is completed it is believed that water supply for the Utah Copper Co. for milling purposes will be such as make practically impossible any combination of circumstances that would

necessitate the closing down of the mills or even any reduction in their capac because of water shortage.

Bingham & Garfield Railway.

Inc. July, 1908, in Utah. Cap., $6,515,000; $100 par. Controlled by t Utah Copper Co., through ownership of the entire share capital.

The mileage at the end of the year 1918 is shown in the table below:

Main line and branches between and in the vicinity of Garfield and Bingham	37.136	miles
Yard and siding tracks, including all the terminals	52.769	"
Additional tracks leased to Utah Copper Co	43.458	"
Total length of tracks	133.363	"

The average grade for the Main line is about 2%; the maximum grade 2.5%, with curves compensated .04 of a foot per degree of curvature. The are 4 tunnels with an aggregate length of 4,821', all driven 18' wide and 22' hig the longest being 2,085.11'. There are 3 steel viaducts with an aggregate leng of 2,000' containing about 3,000 tons of steel; the longest, across Carr Fo being 690' long and 190' high.

The road equipment owned and operated by this company at the end of th year 1918 consisted of the following: 7-Mallet engines, each weighing 228.5 to on drivers; 1 consolidated engine, weighing 87 tons on drivers; 12 switch engine 647 Hopper bottom steel ore cars, 50 drop bottom side dump steel general serv gondola cars, 149 steel concentrate cars, making a total of 846 cars each of ton nominal capacity with 10% excess allowance for overload; 3 steel flat cars 50 tons capacity; 8 wooden flat cars of 25 tons capacity; 4 steel frame pow cars, of 50 tons capacity; 1 tool box car; 1 kitchen box car; 16 outfit cars. caboose cars; 9 steel tank cars of 7,000 gallons capacity each; 1 Jordan spreade one 120-ton wrecking crane; 1 scale testing car; 1 locomotive crane; 4 passen coaches; 1 business car.

The cost of the complete line was upwards of $6,000,000. The first tra load of ore, about 2,600 tons, was taken down the main line on September 1 1911, and regular passenger and freight service was started the following mo ing. In 1918 the line handled an average of 34,081 tons of freight and 1,0 passengers daily.

Production from Concentrates:

Year	Tons Treated	Cost Per Ton Mine Cts.	Cost Per Ton Mill Cts.	Total (a) Dollar	% Cu.	% Rec'd	% Cu. in Conc.	Lbs. Cu. Rec'd p. t. Ore	Net Prod'n Lbs. Cu	Cost—Cts. per Lb (b)
1910...	4,340,245	40.97	46.68	1.1738	1.54	66.55	27.28	20.51	85,644,511	8.089
1911...	4,080,801	44.79	41.68	1.1725	1.51	69.53	25.62	21.03	98,436,224	7.865
1912...	5,315,321	42.33	41.58	1.1239	1.36	66.32	20.75	18.09	91,366,337	9.024
1913...	7,519,392	32.88	36.76	0.9761	1.25	63.95	17.31	15.95	113,942,834	9.498
1914...	6,470,166	32.32	35.36	0.9550	1.42	66.04	18.19	18.82	115,690,445	8.131
1915...	8,494,300	24.41	34.02	0.8624	1.43	64.13	19.17	18.39	148,397,006	7.56
1916...	10,994,000	27.81	37.82	0.9355	1.43	62.34	18.71	17.90	186,915,000	8.116
1917...	12,542,000	44.46	69.30	1.4170	1.34	61.10	16.61	16.33	194,612,305	11.940
1918...	12,160,700	53.70	92.77	1.7630	1.23	65.11	16.08	15.97	184,460,168	15.361
1919(1Q)	1,526,500	.....	.....	.....	1.27	74.70	.....	.....	28,971,089	13.72(c)
(2Q)	1,242,500	.....	.....	.....	1.35	81.80	.....	.....	28,046,978	11.59(c)
(3Q)	1,397,400	.....	.....	.....	1.16	76.20	.....	.....	25,269,679	14.39
(4Q)	1,372,300	.....	.....	.....	1.25	81.56	.....	.....	27,965,470	16.47

(a) Includes transportation, all fixed, general and maintenance charges. (b) After allowances for smelter deductions, and crediting value of gold and silver recovered, including miscellaneous income. (c) Excluding Federal taxes, and without credit for gold, or miscellaneous income. In 1916, transportation cost 27.92c. per ton, and in 1918, 29.85c.

The average price received in 1919 was 17.9c. per lb., and costs 11.7c. Production in 1918 also included 467,596 oz. silver at 97.42c. and 49.2

compared with 483,281 oz. silver at 82.165c. and 48,614 oz. gold in 1917. ious metals in 1919 were 28,907 oz. gold and 263,721 oz. silver.

Monthly Output:

th	1919	1918	1917	1916	1915
ary.....	10,500,000	12,613,380	13,913,811	11,999,910	8,009,646
uary.....	10,335,000	11,994,960	13,459,829	11,849,972	8,202,467
h.....	8,366,000	16,179,831	15,512,676	12,714,651	10,203,882
.....	9,420,000	16,690,883	17,231,512	14,557,282	12,015,148
.....	9,125,000	17,294,291	19,262,856	15,950,215	14,053,765
.....	9,528,000	17,779,609	19,909,097	18,000,000	14,730,912
.....	8,405,863	16,021,766	18,127,154	20,302,228	14,641,009
ist.....	8,640,000	19,920,947	18,796,012	20,315,440	15,966,543
.....	8,220,092	17,369,230	17,839,378	20,462,256	14,159,289
ber.....	9,525,700	18,643,472	18,022,665	20,325,520	16,004,607
.....	9,482,451	16,443,042	16,468,323	16,421,192	13,722,723
.....	9,005,591	13,217,178	16,311,805	13,976,533	14,497,485

ncrease of ore reserves for 1918 was 2,288,000 tons in excess of tonnage d. Much additional ore can and will be developed.

Total amount of capping removed was 4,064,091 cu. yards. The total area which stripping operations has been conducted was 258.67 acres and the l area stripped was 132.16 acres.

The average cost of mining concentrating ore, including the proper appor- nent of all fixed and general charges for the year 1918 was 53.70c. per ton, hich 10.16c. represents charges for stripping and 6.69c. for development. actual direct cost was 42.85c. per ton as compared with 36.88c. per ton he previous year.

Utah Copper is still the brightest star in the Hayden-Stone-Jackling galaxy, its aggressive and brilliantly competent management promises to keep the any in its present enviable position.

AH METAL & TUNNEL CO. UTAH

Mine office: Bingham, Utah.

Officers: B. B. Lawrence, pres.-gen. mgr.; Jas. E. Rothwell, v. p.; W. . Dillaway, treas., with Walter B. Farmer, Wm. H. Coolidge, Henry G. am, and L. E. Stoddard, directors. W. H. Hendrickson, mgr.

Inc. May, 1914, in Maine. **Cap.**, $800,000; $1 par; increased from $500,- to $725,000, to purchase Bingham-New Haven C. & G. Mng. Co.; again ased in April, 1919, to $800,000; 750,000 shares issued; 100,000 set aside for ersion of $750,000 7% bonds; in August, 1919, 50,000 shares of this block sold at $50 a share to a syndicate composed of L. E. Stoddard, W. H. idge, H. G. Lapham, and F. H. Prince. Company converted $375,000 of onds into stock, exchanged $225,000 for a like amount of 6% bonds which ired April 1, 1919, and at present has about $150,000 bonds in its treasury. re-financing will enable the company to pay off a floating debt of about 00, and leave the company approximately $120,000 for mining operations. Commonwealth Trust Co., Boston, and Registrar & Transfer Co., New York, ifer agents. International Trust Co., Boston, and Empire Trust Co., New ; registrars. Company acquired Bingham-New Haven C. & G. Mng. Co., xchange of share for share. Listed on Boston Stock Exchange; traded on York Curb. Stock sold at $1 to $10.50 in 1915. Price range $1¼ to $3 18; $1 to $5⅛ in 1919. Annual meeting, first Monday in May.

Company is a reorganization of the Utah Metal Mining Co., itself a con- ation of the Bingham Central, Bingham Standard, and Bingham Metal ng Co.

A dividend of 50c. per share was paid in August, 1916; 80c. in 1917. In 1¼c. was paid April 1.

Comparative Balance Sheet, years ending December 31:

Assets.	1918	1917
Property account	$1,777,107	$1,784,3
Prepaid accounts	1,489	2,8
Cash	1,009	43,0
Supplies	60,029	92,6
Accounts receivable	14,743	98,3
Total	$1,854,374	$2,020,6

Liabilities.	1918	1917
Capital stock	$700,000	$691,5
Bonds	233,500	220,5
Accounts payable	45,923	51,0
Notes payable	35,436	.....
Surplus	839,518	1,057,6
Total	$1,854,374	$2,020,6

Gross revenue in 1919 was $94,521, of which $59,909 was from comm operations. Expenses were $96,458.

Property: is extensive, covering 3,539 acres, including 139 acres tim land in Bingham district, adoining holdings of Utah Cons. and Utah Co Co. (Boston Con.), and extending across the range to Middle Canyon, o Tooele side. The company drove a transportation and drainage tunnel Big Tunnel, 11,500′ through and 2,300′ below the crest of the range, from Tooele to Bingham Canyon (Carr Fork). This gives direct short transporta to Tooele and Garfield and develops a large flow—2,000,000 gals. per day water, part of which is sold to the Garfield mill of the Utah Copper Co. company having an income of $30,000 a year from this.

The Bingham or Carr Fork holdings include the Bingham Central & E ham Standard groups, an area in which the various mineral bearing limes beds of the camp are cut by the Saginaw-Burning Moscow and Nast veins crossed by the Old Jordan fault. The claims on the Tooele side show si limestones, cut by fissures, but the development work there has not thus far sh commercial orebodies, as it has on the Bingham side.

In November, 1914, the company started crosscut exploration from the drainage tunnel at 8,200′ from the Tooele portal. In March, 1915, 1,300′ from Bingham portal, the latter work encountered mineralized ground, and on up 70′, an orebody 25′ thick was cut. Drifting disclosed a second orebody and above the first, and later a third orebody, already opened and mine the Bingham New Haven Co., was cut. At present there are five prod orebodies on the combined properties. One copper ore shoot 300′ belo B. N. H. tunnel has been proven for over 200′.

The transportation tunnel is 8x9′ in the clear, double-tracked, with grade. It develops the mineral bearing limestone and veins at depths of 3 900′ below any other workings.

Development: on the Utah Metal includes besides the 11,490′ tra tation and drainage tunnel, and the workings therefrom, extensive tunnel de ment on the Bingham Central and Standard group, embracing the 4,000′ 700′ Saginaw, 2,000′ Whitlay, 2,000′ Jeff Davis, 400′ Deem, 950′ Mtn. Mai Amelia and lesser tunnels, all showing ore at various points. On the T side, the Middle Canyon group has one 5,000′ tunnel, another 1,700′ and a 500′ long.

New work in 1918 amounted to about 10,000′. The ground already o and the orebodies indicate the existence of similar other depos lo nt of been developed.

t 00-ton mill using the Callow system of t

Production:

Tons Ore,	Lbs. Lead,	Lbs. Copper,	Oz. Gold,	Oz. Silver,	Value Gross
....	1,176,063	74,115	29	32,696	$94,521
....	1,187,114	207,059	940	61,502	$190,516
....	5,348,610	659,127	4,612	242,003	884,688
..... 71,402	6,301,670	1,761,520	17,934	388,757	1,499,268
....	9,860,089	2,873,815	16,914	475,894	1,386,845

he 1919 output included 70,750 lb. of zinc.
n October, 1917, a five years' contract was arranged with the International ting Co. for Utah Metal ore, the price to be the average for the week pre- g receipt of the ore.

The Bingham-New Haven property includes 26 claims, 500 acres adjoin- he Utah Consolidated on the S. E., includes the Zelnora mine near the of Carr Fork. Claims show 3 fault fissures in porphyry and a contact it 3′ to 8′ in width, between quartz-porphyry and limestone. The copper verages 3.5% copper, $6 in gold and silver and about 12% excess iron. The ore averages 20% lead, $7 in gold and silver and 1.5% copper, ores being pyrite, galena and sphalerite. The main ore supply is from 3 beds of tone, which strike E. W. and dip N. Company now mining 2 deposits of r, 2 of lead and one of complex ore.

Development: by tunnels with a blind shaft starting 900′ from the l of the lowest tunnel, there being a vertical distance of 1,200′ between the st and lowest workings. The 1,030′ lower tunnel cuts a wide fissure vein, g assays of about 3% copper, 2.3 oz. silver, and $2.50 gold per ton. Terminal upper tunnel was moved to the lower tunnel and mine is operated through tter. The shaft is now down 320′ below the 500′, or Highland Boy level. rosscuts have been driven 200′ and 320′ below the tunnel level to cut a tly found orebody which averages 6′ in width where cut. Estimated 2-3 ore reserves in sight. Mine has several miles of workings with an aerial connecting with loading bins on the Copper Belt railroad.

Equipment: includes electric power, air compressor and 175-ton mill, ped with jigs, Wilfley and Diester tables, vanners and ball mill for fine ing.

Summary: the year 1918 was not profitable for the **Utah Metal** com- **Regular** mining operations ceased during the period of negotiations re- ng apex rights, but expensive development work was necessary to open up rove apex claims. The adjoining Utah Cons. was the other claimant. It lecided in December, 1918, to reach a settlement without having recourse gation. This settlement gave the Utah Metal & Tunnel Co. unrestricted to follow all beddings found on the westerly part of the Bingham-New ground downward extralaterally, in and under the Utah Cons. ground, ut regard to apexes, and also full mining rights in a segment of ground between the boundary line separating the properties and the southerly of the Utah Cons. workings, a space about 2,000′ long and 1,100′ wide. as part of the agreement the Utah M. & T. Co. transferred to the Utah certain causes of action and claims for damages it had against the Utah Mining Co., another neighboring property.

TORIA CONSOLIDATED MINING CO. **UTAH**

wned by Bingham Mines Co., which see.

TERN MINING & MILLING CO. **UTAH**

ile. Is a subsidiary of the Homestake T. & C. Co., which see.

Officers: J. H. Hurd, sec., 219 Douglas Ave., Salt Lake City. Controlled hn B. Taylor, 521 Atlas Block, Salt Lake City, Utah. E. D. Haskins,

, 1897, and reorganized 1905 in Utah. **Cap.**, $300,000; shares $1 par; with 2 assessments levied; issued $200,000. Is a close corporation, shareholders.

claims, 19 patented, 215 acres, in the Pine Canyon section

of the Bingham district, on the western slope of the Oquirrh Mountains. T claims are developed by numerous tunnels, and show the same limestone be cut by mineralized fissures, which have made the bonanza orebodies of the U Cons. and other properties on the east side of the range.

YOSEMITE MINES CO. UTA

Controlled by Bingham Mines Co., which see.

PARK CITY DISTRICT.

AMERICAN FLAG MINING CO. UT

Office: 815 Newhouse Bldg., Salt Lake City, Utah. **Mine office:** P City, Summit county, Utah.

Officers: Geo. H. Rathman, pres., treas. and gen mgr.; Wm. M. Cor v. p. and mgr.; John Cain, sec.; F. V. Bodfish, supt.

Inc. 1902, in West Virginia. **Cap.**, $500,000, increased to $1,000,000 re-incorporation in Nevada, 1910; shares $1 par; assessable; fully issued.

American Flag property is leased to the Park City Mines Co., which s

In 1918, reported in hands of receiver, with claims against it of approx mately $200,000.

ANCHOR MINING CO. UTA

Idle several years. **Office:** Calumet, Mich.

Officers: John D. Cuddihy, pres.; F. W. Taylor, sec.-treas., and He L. Baer, directors.

Inc. June, 1908, in Michigan. **Cap.**, $150,000; shares $25 par; issue 1,800. Annual meeting, second Tuesday in June.

Lands: 9 claims, patented, 131 acres; in the Snake Creek district, on half mine south of Daly-Judge mine, near Park City. **Company** is the su cessor of the Wolverine Mining Co.

BIG FOUR EXPLORATION CO. UTA

Property reported sold early in 1918 for $35,000. No details. Compa was described in Vol. XIII.

BOSTON ACME MINES CORPORATION UTA

Edward Wischmeyer, Jr., pres.; Harry Niles, v. p.; M. K. Tavenner, s all of Baltimore.

Said to have a three-quarter interest in the Boston-Utah Mng. Co. In M an attempt was made to acquire control of the Morgan-Crescent Mng. C which company claims the Boston Acme Mines Corp. did not live up to the co tract and has forfeited all rights on Morgan-Crescent.

BOSTON-UTAH MINING CO. UTA

Geo. T. Stenhouse, mng. director. Control held by St. Petersburg capitalists.

Property: in the Morgan mining district, the supposed northerly tension of the Park City ore zone, shows native copper in fissure on a co between flat dipping limestone beds and a granite hanging wall. See Bo Acme Mines Corp.

BROADWATER MILLS CO. UTA

Company dissolved, mill dismantled. Described in Vol. XIII.

CALIFORNIA COMSTOCK CONS. MNG. CO. UTA

Property sold to Silver King Cons. Mng. Co., which see. Described in XIII.

CONKLING MINING CO. UTA

Mine office: Park City, Summit county, Utah.

Officers: Col. Nicholas Treweek, pres.; Wm. C. Hall, v. p.; Ge Lund, sec.; J. [illegible] Burch, treas.; preceding, and Margaret Treweek, dir tors.

Inc. Sep[illegible] in Utah [illegible] $500,000; shares $1 par; assess Is a close cor[illegible] 25% [illegible] ord by Silver King Coalition M Company.

Property: [illegible] railroad, shows gold, copper a lead ores, deve[illegible] lands of the Silver King. C

ıy brought suit against the Silver King Coalition Mines Co. for illegal ex-ction of $575,000 in ore from Elephant stope, and in January, 1919, the Cir-t Court of Appeals at St. Louis decided in favor of plaintiff, awarding dam-s of $542,000, with accrued interest, approximately $600,000. In December, 9, the Silver King Coalition announced that all litigation in the district had n settled.

.LY JUDGE EXTENSION MINING CO. **UTAH**

Park City, Utah.

Officers: Mrs. Clarissa Whitehill, pres.; E. Waddanfs, v. p.; S. L. Rad-, sec.-treas.; with S. Lewis, and Henry Spriggs, directors.

Inc. in Utah. **Cap.**, $600,000; shares 10c par.

Property: 8 claims, 140 acres, partly patented, at Park City developed 700′ tunnel and 2 shafts, said to show copper-lead-silver ore in fissure veins.

LY-JUDGE MINING CO. **UTAH**

Reorganized in 1916 as the Judge Mining & Smelting Co., which see.

LY MINING CO. **UTAH**

Office: 1003 Boston Bldg., Salt Lake City, Utah.

Officers: Col. E. A. Wall, pres.; Geo. W. Parks, sec.

Inc. in Utah. **Cap.**, $4,000,000; issued $3.000,000; $20 par; assessable. ed on Salt Lake Exchange.

Dividends: paid $2,925,000 to 1897. Dividends resumed in 1917, when)00 was paid: in 1918, $75,000; in 1919, $97,000 to October 1. On January 2, , 10c was paid. The grand total is $3,142,000.

Property: in Uintah district, Summit county, 8 claims and an interest 4 claims of the Ontario Silver Co. claims; also an interest in 17 claims of the r West Co., and 195½ acres owned jointly with the Ontario Silver Mng. total acreage 316, of which all are patented.

Ore: silver-lead-gold and copper in fissure veins in quartzite. The erty is an old one, and at last accounts had 2,300′ of shafts and much unex-ed ground between the surface and 1,700′ levels. Work has been carried on mittently during the past few years. Ore assays from 45 to 80 oz. silver, 15% lead, and $0.75 to $1.50 gold per ton; shipments are about 500 tons thly of ore of this character.

.Y WEST MINING CO. **UTAH**

Office: 1101 Deseret Bank Bldg., Salt Lake City, Utah. **Mine office:** City, Summit county, Utah.

Officers: G. W. Lambourne, pres.; Geo. G. Brooks, v. p.; with H. M. emetz, M. C. Fox, and O. N. Friendly, directors. S. G. Taylor, treas.; A. H. ody, sec. O. N. Friendly, gen. supt.; G. R. McKay, mine supt.

nc. Feb. 14, 1902, in Colorado. **Cap.**, $3,600,000; increased to $5,000,000 18; shares $20 par. Owns a 20% stock interest in the Little Bell Mining an adjoining property. National City Bank, Salt Lake City, and First Na- Bank, Boston, registrars. American Trust Co., Boston, transfer agent. listed on Boston and on Salt Lake Exchanges.

n 1918, ore sales returned $184,593; other income totaled $2,753, which, balance on hand, January 1, 1918, equalled $217,565. Expenditures were)38, leaving balance on hand, January, 1919, $23,626.

)ividends: 30c quarterly reduced to 15c. in 1913; total to end of 1916 6.606,000. Nothing was paid in 1914, 1915, 1916, 1917, or 1918.

ompany is a large silver-lead producer, copper being a by-product.

roperty: the Daly West and Quincy mines with 50 claims, patented, :res in the Park City district. The ores are a complex of argentiferous zinc and iron sulphides, occurring in fissures, and as replacement deposits iestone. Ores are declining in value with depth. Production formerly y divided between smelting and concentrating ore, is now mainly the latter. roperty has 3 principal veins, of 4 to 6′ minimum and up to 40′ maximum Upper workings are practically worked out, lower workings show con- Owing to fire, no work was done, 1914-1915, but operations were

the main shaft is 2,300′ deep, and the mine has about

15 miles of workings, an average of nearly 1 mile of new ground being opened yearly. Connection was made, October, 1909, with the 3-mile Ontario drainage tunnel, on the 2,100′ level for the use of which company pays $750 monthly rental.

Equipment: includes hoists and air-compressor. The 350-ton concentrator was destroyed by fire December, 1913. A new 600-ton mill was built and went into commission January, 1915. Plant includes a flotation unit with capacity of 30 tons of dry slime per day.

Production: recent shipments have been as follows: 20,344 tons in 1913; 24,341 tons in 1914; 13,620 tons in 1915; 9,980 tons in 1916.

Property, though an old one, has much new territory yet to be prospected and the known ore shoots give indications of going to greater depths.

The present management took control March 1, 1918; for several years previous to this time the mine had not been operated to best advantage, and only such development work done as was necessary for immediate ore extraction. The new management decided on a more aggressive line of development work and also to mill the ore at the Judge Mng. & Smg. Co.'s plant; this necessitated the driving of a 1,000′ crosscut.

JUDGE MINING & SMELTING CO. UTAH

Office: 1101-3 Deseret Bank Bldg., Salt Lake City, Utah. **Mine** P. O.: Park City, Summit county, Utah.

Officers: G. M. Lambourne, pres. and gen. mgr.; M. C. Fox, v. p.; S. G. Taylor, treas.; A. H. Peabody, sec. O. N. Friendly, gen. supt.

Inc. 1901, in New Jersey, as the Daly Judge Mining Co. Reorganized 1916, under present name. **Cap.,** $300,000; shares $1 par; increased March, 1916, to $500,000; 480,000 shares issued. Stock listed on Salt Lake Exchange.

Dividends: in 1916, $435,000; in 1917, $480,000; in 1918, $240,000. In March, 1919, $60,000. Total dividends to 1919, $2,310,000. Rate in 1918 was 12½c per share, quarterly. Balance of $148,385 in treasury, January 1, 1919. Total receipts from ore sales in 1918, $701,401, not including receipts from the zinc plant, $360,241, or sundry receipts, $28,700. Profit in 1919 was $208,385.

Property: company has valuable holdings, about 1,100 acres patented ground, covering 11,000′ of a fissure vein system, in Park City district, adjacent to the Daly West mine. Is a large producer of silver-lead ores with much zinc and a small amount of copper.

Development: to 2,500′ level by main drainage tunnel. New work in 1918 amounted to 5,761′ of which 10.98% is on the Daly vein, 64.65% on the Back vein, 24.37% on the Middle vein. The depth ranged from 300 to 1,400′. In 1917, the development definitely established the existence of an ore zone not previously known containing one of the largest deposits of shipping ore ever found in the mine.

The Snake Creek tunnel, driven 14,500′ to the property line, was completed early in 1916; it will unwater the mines at greater depth and provide transportation. It is to be extended later for further exploration of the property.

Equipment: includes 400-h. p. electric hoist, compressor and 500-ton wet concentrating plant with flotation unit for treatment of slimes, making a zinc and lead product, also an electrolytic plant producing 99.95% zinc.

Production:	1916	1917
Crude ore sold, tons	4,164	7,247
Residues, tons	....	....
Ore concentrated	61,787	58,186
Ore mined, tons	65,951	65,427

	Silver oz.	Gold oz.	Lead lb.	Zinc lb.	Copper lb.
To 1916	5,622,420	11,800	116,601,381	86,937,150	2,984,875
1916	477,852	535	8,114,627	5,153,049	341,198
1917	585,680	532	7,919,720	.....	428,000
1918	508,434	490	7,931,566	.....	371,036
1919	410,307	402	6,989,908	1,262,760	276,926

The company's progress in zinc production is of interest. As ore contracts ired in April, 1916, zinc concentrate was stored. By February 1, 1917, a 15- electrolytic plant of good design, was erected and started. In 1916 the mill le 6,129 tons of concentrate, assaying 44.58% zinc, 4.38% lead, 6.54% iron, 21.47 oz. silver. In 1917, and 1918, zinc production was considerably cur- :d. in 1918, only about one-third capacity was attained.

The discovery of high-grade mill ore in the footwall of the Daly vein was most notable result of 1919 development: work for the year totaled 2,976' 43,107 tons of ore were mined.

ARNS-KEITH MINING CO. **UTAH**

Out of business, property conveyed to the Silver King Coalition Mines Co. Park City, which see.

YSTONE MINING CO. **UTAH**

Offices: 163 S. Main St., Salt Lake City, Utah, and 32 Broadway, New k.

Officers: H. G. McMillan, pres.; Ernest Bamberger, v. p. and treas., ı John Dern, E. O. J. Hanke, C. W. Saacke, Alfred Frank, John McGinnis, ctors. L. B. McCornick, sec.; Herbert Cohen, sec.-treas.; J. L. Tilton, asst.

Inc. Sept. 12, 1902, in Wyoming. **Cap.**, $700,000; shares $1 par; out- ıding $500,000; assessable; last assessment 2c, December, 1915. Capital to increased to $1,000,000, at last accounts. Transfer office: J. L. Tilton, 32 adway, New York. Empire Trust Co., New York, registrar. Listed on Salt e Exchange and on New York Curb as a prospect.

Property: 16 patented claims, 66 acres, in Unitah mining district, 3 es S. W. of Park City, said to show silver-lead ore.

Development: 225' vertical shaft and 700' tunnel, work of former years, king the winze from tunnel level during 1916.

The property was rehabilitated in 1916, compressor and motor installed and loration started. A suit against the Kearns-Keith Mng. Co. and the Silver g Coalition Mines Co., asking $1,500,000 damages for alleged unlawful ex- tion of ore was pending, June, 1916, but in December, 1919, the Silver King lition announced that all disputes in the district had been settled.

TLE BELL CONSOLIDATED MINING CO. **UTAH**

Office: Newhouse Bldg., Salt Lake City, Utah. **Mine office:** Park City, ımmit county, Utah. Solon Spiro, pres. and gen. mgr.; S. M. Bamberger, ; Joe Kemp, supt.

Inc. 1902, in Wyoming. **Cap.**, $1,500,000; shares $5 par; non-assessable; issued. Began payment of 5c. quarterly dividends, November, 1909, and o and including September 2, 1910, had paid 4 quarterly dividends of $15,000 . Shares listed on Salt Lake Stock Exchange; 20% of stock owned by Daly st Mng. Co.

Property: 30 claims, patented, in Park City district. **Development:** ex- ive, showing deposits of lead-silver ore.

Equipment: includes steam power, with hoist and air compressor. tric power is taken from the Knight plant at Provo. The old 100-ton mill he Fortuna Mining Co., at Bingham Canyon, was bought 1910, and re- ted at Park City. Worked intermittently. No recent information.

RTIN GOLD AND SILVER MINING CO. **UTAH**

Address: C. F. Johnson, 201 Ness Bldg., Salt Lake City, Utah.

Property: 9 claims, unpatented, located on west side of Thaynes can- near Park City.

ILDRIVER MINING CO. **UTAH**

Is a subsidiary of the Ontario Silver Mng. Co., 163 So. Main St., Salt e City, Utah.

Officers: W. Mont. Ferry, pres.; Herbert Cohen, sec.-treas.

Inc. Oct. 2, 1902. **Cap.**, $600,000; shares $2 par; assessable; 287,450 issued. Stock listed on the Salt Lake Exchange.

Property: 13 claims in Park City mining district, Summit county, shows ad-gold-copper ore, developed to depth of 600' by shaft and drifts.

Development: by shaft to 700′ depth. Most recent development s to have opened a vein from 1′ to 3′ in width and assaying more than $40 per t

Equipment: includes electric hoist and compressor driven by 7½-h motor. Reported on by Edward R. Zalinski. Management is confident of find commercial ore.

THREE KINGS SILVER MINING CO. UTA

Name changed to Three Kings Cons. Mining Co., which see.

VERDUN MINING CO. UTA

Address: Box I, Park City, Utah.

Officers: W. J. Buck, pres.; J. L. Kearns, sec.; R. T. Kimball, trea with C. F. Wherrit, and Geo. Evans, directors.

Inc. 1917, in Utah. **Cap.,** $50,000; 5c par; issued 400,000 shares.

Property: 5 claims and lease and bond on three others in Park C district, said to show silver, copper, gold ore in a contact deposit, assaying copper, and 2½ to 12 oz. silver per ton.

Development: 250′ tunnel. Property is a prospect.

TINTIC MINING DISTRICT

Ore was first found in the Tintic district, 60 miles S. of Salt Lake City, 1869, and production started the following year. Since that time the district been a steady producer; its output to the end of 1916 was approximately $ 000,000, in silver, gold, lead, and copper.

The U. S. Geological Survey published a report on the Tintic district in 1 but copies are no longer available for distribution. A more recent report been published giving the results of later studies. Professional Paper 107, titled "Geology and Ore Deposits of the Tintic Mining District, Utah," Waldemar Lindgren and G. F. Laughlin, with a historical review by V Heikes.

See "East Tintic District," by L. H. Goodwin, Eng. & Mng. Journal Ja uary 10, 1920.

ADDIE MINING CO. UTA

Address: 333 Judge Bldg., Salt Lake City, Utah.

Officers: G. C. Lambert, pres.; H. B. Cole, sec.

Inc. in Utah. **Cap.,** $30,000; 10c par; assessable.

Property: 5 silver-lead claims in Tintic district, Juab county.

Development: includes a tunnel and two shafts, reopened 1920.

AMERICAN MINES SYNDICATE UTA

Office: Houghton, Mich. **Mine office:** Eureka, Juab county, Utah.

Officers: Walter Fitch, pres.; J. H. Rice, v. p.; Wm. P. Seager, trea preceding officers, Cecil Fitch and Exilda Fitch, directors.

Inc. 1907, in Arizona. **Cap.,** $100,000; shares $100 par; paid in, $8 share; issued, $86,350. Is a holding company, controlling the Chief Consol Mining Co. through ownership of 361,000 shares.

AMERICAN STAR MINING CO. UTA

Office: 403 Dooly Bldg., Salt Lake City, Utah. **Mine office:** Eu Juab county, Utah.

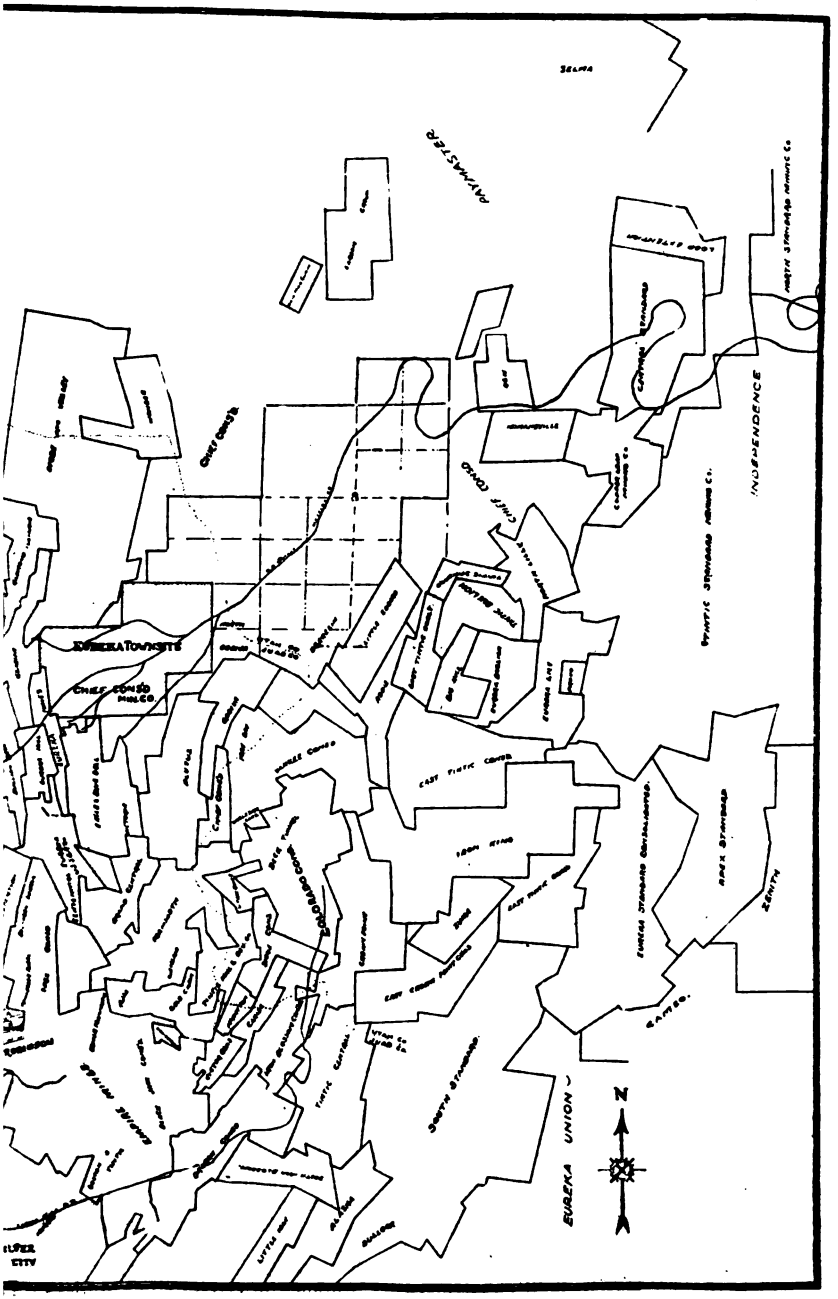
Officers: Imer Pett, pres. and gen. mgr.; Geo. E. Davis, v. p.; F R. Sands, sec.-treas., with Jas. P. Graves and Thos. P. Billings, directors.

Inc. 1909, in Utah. **Cap.,** $1,000,000; shares $1 par; issued 70 shares.

Property: 2 claims, 15 acres, between the Victoria and Chief Co dated mines, and touching the Plutus on the east and Eagle & Blue Bell west. Mine has about 1,000′ of workings, made from the 900′ level, 1,00 the 1,350′ level and about 600′ from the 1,875′ level of the Eagle & Blu mine, and is developing through the Eagle & Blue Bell, in 1919. Workings an ore channel of about 60′ width. Property considered promising.

APEX STANDARD MINING CO. UTA

Officers: Lewis Merriman, pres.-mgr., Eureka, Utah; Frank K v. p.; S. S. Pond, sec.-treas., with F. W. Brock and Hugh Hefferman, d



MINING PROPERTIES OF TINTIC DISTRICT, UTAH

new concrete-lined shaft, No. 2, was 1,000′ deep in January, 1920; it is planned to sink this shaft to the 2,000′ level. In 1918, new work totaled 15,672′, of which 4,048′ was on Plutus ground. Ore was produced from all levels from the 600′ to the 1,800′ level. New work in 1919 amounted to 25,937′.

The most important feature of the work during the first quarter, 1919, was the discovery of ore in the 1,052 drift, which has been running for a long time exploring the ground easterly from the mine. This discovery was on the Alabama claim of the Plutus Mining Co.; the management regards it as establishing a new ore channel, and as giving assurance of a second mine.

Equipment: the plant has three 150-h. p. boilers, with mechanical stokers, a hoist and 2 air compressors. The double-cylinder hoist has 6′ balanced drums, 1⅛″ steel cable, and operates 2 triple-deck cages in balance, carrying 1-ton cars, to depth of one-half mile. Buildings include a power plant, housing the boilers, hoists and air compressors; a machine shop, carpenter shop, and blacksmithy, all of steel frame. Late in 1919 there were 450 men employed.

Production:

	Ore, tons	Copper, lb.	Lead, lb.	Zinc, lb.	Gold, oz.	Silver, oz.	Value Net
1919.....	63,726	15,574	5,979,588	.....	3,753	2,757,533	$2,343,927
1918.....	66,019	4,137	7,906,831	14,597	4,100	2,354,798	1,869,819
1917.....	59,950	....	10,780,540	600,236	9,175	1,534,907	1,554,714
1916.....	83,606	1,795	18,439,153	879,410	8,331	1,739,004	1,315,442
1915.....	36,412	5,648	8,232,606	622,465	4,634	403,854	309,136
1914.....	40,667	237,901	5,974,008	71,665	6,337	665,947	324,299
1913.....	51,866	117,328	2,597,091	.....	4,806.	1,030,132	381,267
1912.....	33,072	.....	1,141,222	.....	7,838	969,907	509,436
1911.....	8,063	.....	825,551	.....	389	306,362	117,585
1910.....	8,841	.....	800,802	.....	584	531,483	217,050

Gross average value ore in 1919 was $55.57 per ton and $36.78 net; in 1918 $45.07 and $28.49; in 1917, $40.12, and $25.93, respectively.

For 1919 the average gold content was 0.0589 oz., silver, 43.272 oz., lead (in lead ore) 11.92%, copper, 1.186%. Average New York price received for metals was 112.6c. for silver, 5.92c. for lead, 18.31c. for copper.

Chief Consolidated is a valuable property, the largest silver producer in Utah, and is under excellent management.

COLORADO CONSOLIDATED MINES CO. UTAH

Office: Provo, Utah.

Officers: Jesse Knight, pres.-mgr.; J. William Knight, v. p.; W. Lester Mangum, sec.-treas., with R. E. Allen, J. S. Smith, K. S. Jordan and A. M. Knight, directors. Controlled by Knight Investment Co.

Is a consolidation of the Beck Tunnel Cons. Mng. Co. and Colorado Mng. Co.

Inc. April, 1916. **Cap.**, 2,500,000 shares; 10c par; stock in old companies exchanged share for share. Listed on Salt Lake Exchange.

Dividends of $675,000 have been paid by the Beck Tunnel and $2,600,000 by the Colorado Cons.

Property: 28 claims, near the Sioux mines, in the Tintic district, Utah county, contains large deposits of low-grade ore carrying silver-gold, lead and copper values.

Development: main shaft is 2,000′ deep and will be sunk to water level. In 1919, the 1,900′ level was being explored; no ore has been found to date on this level.

COLORADO MINING CO. UTAH

Merged April, 1916, with the Beck Tunnel Cons. Mng. Co. and now called the Colorado Cons. Mines Co., which see.

COPPER LEAF MINING CO. UTAH

Mine in the Tintic district.

Officers: J. C. Die[illegible], Utah; J. E. Mayer, of Salt Lake City; J. W. Taylor, mgr., of [illegible] Pierpont and Alex. Hedquist, of Provo.

Inc. 1916, in Utah. **Cap.**, 600,000 shares; $1 par. Cash on hand, Jan., 19, reported as $19,000.

Property: several claims in the Tintic mining district.

Development: vertical shaft which reached the 1,250′ level in Oct., 1919. cploratory work is being done on the 1,000′ and 1,200′ levels.

ROESUS MNG. CO. **UTAH**

Succeeded by Eureka Croesus Mining Co.

ROWN POINT MINING CO. **UTAH**

Officers: Jos. Worthlin, pres.; J. F. Greer, sec.-treas.; John Roundy, n. mgr., Provo, Utah, with E. B. Kimball and Jos. Berry, directors.

Inc. 1907, in Utah. **Cap.**, $100,000; 10c par; assessable. Last assessment, per share due August 15, 1919. Listed on Salt Lake Exchange.

Property: 8 claims, 5 patented, in Tintic district. **Ore:** silver-lead. Delopment by 1,000′ shaft and 4,100′ of tunneling. Workings totaled 6,875′, pt., 1919. **Equipment:** includes a hoist and compressor. Funds for delopment raised by assessments.

& B. MINES CO. **UTAH**

Officers: C. H. Blanchard, pres., 766 First Ave., Salt Lake City; Wm. Dickson, v. p.; A. C. Ellis, sec.; with Pat Donnelly, and Chas. P. Brooks, dictors, all of Salt Lake City. L. H. Farnsworth, treas.

Inc. in Nevada. **Cap.**, $200,000; shares, 10c par; outstanding, 1,130,000 ares; listed on Boston Curb.

Property: 63 claims, in the North Tintic mining district, said to have ld, silver, lead and copper ore. The claims are in 2 groups, the D. & B. oup of 30 claims has a 200′ shaft and several hundred feet of workings. The & K. group has a 90′ and also a 200′ shaft. Property is a prospect. The stock s been profusely advertised by Orem & Co., Boston, Mass.

ESERET MOUNTAIN MINES CO. **UTAH**

Office: 409 Atlas Bldg., Salt Lake City.

Officers: W. Mont Ferry, pres.; D. H. Livingston, v. p.; Wm. D. Livgston, sec.; S. J. Truman, treas., with J. W. Mellen, J. H. Turner and I. D. ines, directors. D. E. McPherson, supt.

Cap., 1,000,000 shares; 500,000 reserved for treasury.

Property: 12 claims, 250 acres in the West Tintic mining district, Juab unty, said to show a contact vein, between limestone and porphyry, 12′ wide, rrying copper ore that assays better than 3%.

Development: by 300′ new incline shaft and an old shaft 218′ deep, ifts, stopes and raises. Plans continuing shaft to 500′ level. The 300′ level)sscut cut the vein in 1917, but owing to war conditions, mine was shut down til early in 1919, when shaft was unwatered to the 300′ level, and development)rk resumed.

RAGON CONSOLIDATED MINING CO. **UTAH**

Office: care Knight Investment Co., Provo, Utah. Mine near Tintic, ab county, Utah.

Officers: Jesse Knight, pres.; J. Will Knight, v. p.; W. Lester Manm, sec.-treas.; R. E. Allen and L. E. Ritter, directors; E. R. Higginson, supt.

Inc. 1911, in Utah. **Cap.**, $2,000,000; $1 par; issued 1,750,000; 250.000 treasury. Stock listed in Salt Lake City.

Initial dividend of 1c a share declared February 20, 1917, and continued quarly during 1917 and 1918. Is heaviest shipper in the Tintic district, as ore is)-grade pyrite used as a flux by smelters.

Property: 28 claims, patented, 122 acres, comprising the Dragon and vernor groups in Tintic district. The Governor group has 2,000′ or more the big Iron Blossom fissure in limestone, from which the great production that and the Sioux mines has come. The Dragon group shipped 100 tons per y of iron ore to the U. S. smeltery, for a long time. The Governor ground s a rich orebody of copper-silver ore developed by drifts from the Iron Blosn on the 300′, 600′, 800′ and 1,000′ levels, showing a 20′ vein with 0.5 to 10% per and 20 to 50 oz. silver. Part of the property is worked through the Black

In the tunnel connecting the workings with the Iron Blossom property, large bodies of low-grade ore were encountered in 1915.

Equipment: includes electric pump on 1,000′ level which secures water supply of the Knight-Christensen mill, and a hoist.

Production: 1,743 tons in 1914, yielding 44,006 oz. silver, 135,814 lb. copper, 57,552 lb. lead and 432.37 oz. gold; 7,804 tons in 1915, yielding 102,143 oz. silver, 490,750 lb. copper, 14,766 lb. lead and 2,559 oz. gold. Later figures not available.

Shipping 260 tons daily, 1919.

EAST CROWN POINT MINING CO. UTAH

Address: Provo, Utah.

Officers: R. A. Badger, pres.; H. C. Jex, sec.

Inc. 1907, in Utah. Cap., $100,000; shares 10c par; assessable; last assessment, ½c a share, delinquent October 4, 1919. Listed on Salt Lake Exchange.

Property: 9 silver-lead claims in Tintic district, Juab county, Utah. Idle for some time, but planning to resume work.

EAST STANDARD MINING CO. UTAH

Officers: Fred C. Allen, pres.; Isaac Isaacson, v. p.; M. C. Morris, sec.-treas., with J. Frank Quist, and Gus Wickman, directors.

Inc. 1919, in Utah. Cap., $100,000; 10c par; 600,000 issued.

Property: 9 claims, adjoining the Tintic Standard on N. E., in East Tintic district, Juab county, formerly known as the White Track. Management states that a shaft will be sunk to 1,000′ depth.

EAST TINTIC COALITION MINING CO. UTAH

Address: Provo, Utah.

Officers: John M. Bestelmeyer, pres.; H. G. Blumenthal, v. p.; A. Bestelmeyer, sec.-treas., with D. R. Beebe, and H. C. Hicks, directors.

Cap., $75,000; shares 5c par. Listed on Salt Lake Exchange. In July, 1919, company stated that it had $26,312 in cash and no debts.

Property: 3 patented claims, located just W. of the Eureka Bullion, said to have gold-silver-lead ore.

Development: 225′ tunnel, and two incline shafts, one 142′, and one 127′ deep. In July, 1919, started work on a new shaft. Is a prospect.

Equipment: newly installed, includes a head-frame, electric hoist, compressor and drills.

EAST TINTIC DEVELOPMENT CO. UTAH

Property bought, 1916, by Eureka Lilly Mining Co., which see.

EMPIRE MINES CO. UTAH

Address: Jesse Knight, Provo, Utah.

Inc. 1907, in Utah. Cap., 3,000,000 shares; 5c par. Listed on Salt Lake Exchange.

Is a merger of the Black Jack, Boston & Tintic, Central Mammoth, Lower Mammoth, Garnet, Old Colony and Eureka, Manhattan and Opex Consolidated mining companies, all controlled by the Knight Investment Co.

In April, 1917, the property of the Carisa Gold & Copper Mng. Co. of Maine at Mammoth, Utah, was bought for $115,000.

Property: over 700 acres in the Tintic district, Utah, east of Silver City and south of Eureka.

Practically all the work done since the consolidation has been carried on through the Lower Mammoth shaft, the main work late in 1919, being on the 1,800′ level, where a 3′ vein of good copper ore was cut in Black Jack group.

EUREKA BULLION MINING CO. UTAH

Address: J. M. Bestelmeyer, mgr., Provo, Utah.

Officers: H. C. Hicks, pres.; J. M. Bestelmeyer, v. p.; August Bestelmeyer, sec.-treas, with N. C. Hicks, and H. G. Blumenthal, directors.

Inc. 1916, in Utah. Cap., $50,000; shares 5c par; assessable. Listed on Salt Lake Exchange.

In January, 1920, company formed the Tintic Silver Mining Co., with capital of $150,000.

Property: 7 patented claims and 2 unpatented claims, formerly ab[illegible]

Grutli Mining Co., were bought at sheriff's sale, 1916, for $8,960. Claims are he East Tintic district, W. of the Tintic Standard property, and are said to w a 50' vein on surface with a limestone porphyry contact.

Development: by 800' shaft reported to show quartz in a cave 150' ;, 50'-75' high and 75' wide at 500', with manganese. A drift on the 800' l is said to have opened a 4' vein of ore in June, 1919, with assays 9 to 20% l. 23 to 70 oz. silver, and about $2 gold per ton. A winze is being sunk below level to cut two intersecting fissures.

Equipment: includes compressor, 60-h. p. steam boiler, hoist, etc.

REKA CROESUS MINING CO. OF NEW YORK **UTAH**

Controls or owns the Eureka Utah Mining Co. of Salt Lake City. E. L. res, pres.

Cap., $1,500,000; shares $1 par.

Property: the Huebner mine, at Eureka, Juab county, Utah, has shipped e high-grade lead-silver ore. Reported in 1919, that a 250-ton mill would be ted.

REKA HILL MINING CO. **UTAH**

Office: Deseret National Bank Bldg., Salt Lake City, Utah. **Mine e:** Eureka, Juab county, Utah.

Officers: Moylan C. Fox, pres.; Waldemar Van Cott, v. p.; Jas. E. key, sec., with Ed. W. Packard, directors. Jackson C. McChrystal, managing .; Chas. Weisbaker, supt.

Inc. Nov. 12, 1875, in Utah. **Cap.,** $1,000,000; shares $100 par. Is a e corporation, credited with having paid $2,000,000 in dividends. Paid $1 lend, 1916. Annual meeting, third Tuesday in February.

Property: 5 claims, 27 acres, patented, also a 25-acre millsite and 150 s miscellaneous lands, in the Tintic district, adjoins the Bullion-Beck and tennial Eureka. The Eureka Hill mine has a 1,500' main working shaft and it 30 miles of workings. Orebodies are lenticular deposits, carrying cuprite, achite and enargite, with average values of about 1.4% copper, 6% lead, 25 ilver, and $3 gold per ton. Mine worked for 45 years, but shut down, 1911, only old workings mined by lessees since then. Produced many millions of r-lead ore from above 1,000' level. Deep development in future will be from cent mines.

Knight-Dern interests, 1916, leased tailing dumps of Eureka Hill, reported ntain 200,000 tons of ore, averaging $4.50 per ton. Lessees were shipping in 1919.

REKA KING MINING CO. **UTAH**

Directors: Ray Van Cott, Judge Bldg., Salt Lake City; Geo. M. Chiulos, . Moreton; Geo. B. Bywater, and F. J. Sylvester.

Property: in Tintic mining district. In June, 1919, consolidated with Paymaster Mines Co. The company will spend $50,000 in development work ne 1,200' level.

REKA LILLY MINING CO. **UTAH**

(Succeeds East Tintic Development Co.)

Office: Judge Bldg., Salt Lake City, Utah. **Mine office:** Eureka, Utah.

Officers: N. F. Snyder, pres.; Thos. Barrett, v. p.; with Elmer Holder- and Jos. Galigher, directors. Gideon Snyder, sec.-treas. Grant Snyder, New York, supt.

Inc. 1907, in Utah. **Cap.,** $1,300,000; shares $1 par; assessable; No. 9 sment, 1c per share, was called in June, 1919; last assessment, 1c a share, quent September 15, 1919; outstanding, 1,300,000 shares. Listed on Salt Exchange. Company is a consolidation of the Lilly and Provo mining anies.

Property: Eureka Lilly mine, 8 claims, 6 patented, in the East Tintic district, adjoining the Tintic Standard mine on the west and including h mine of the East Tintic Dev. Co., bought in 1916, from which con- high-grade silver-lead ore was mined years ago.

lopment: by 1,660' incline shaft, which passes through broken o depth of 1,200', where it enters the underlying quartzite, the ground

is cut by N. 10° E. and E.-W. fissures, and ore occurs at intersections. On the 1,400′ level these fissures have so far shown no large bodies of commercial ore. On the 1,660′ level a fissure shows 5″ to 8″ of copper-silver-gold ore and a drift on the vein. Driving on 1,660′ level and sinking shaft in February, 1920.

Produced over $150,000 worth of ore, running 42% lead and 31 oz. silver per ton, from above the 200′ level.

EUREKA METALLURGICAL CO. UTAH

Addres: Eureka, Utah.

Officers: M. M. McChrystal, pres.; R. V. Smith, v. p. and gen. mgr.; Thos. McCormick, treas.; Judge E. Pike, sec.; above, with J. Westerdahl, directors. C. M. Oakes, asst. mgr.

Inc. 1917, in Utah. **Cap.,** $500,000; shares $1 par.

The company was organized to conduct a general metallurgical business on the strength of patents of R. V. Smith for treating carbonate lead-zinc ores by flotation. Operates a small mill at Eureka.

EUREKA MINES CO. UTAH

Address: John H. McChrystal, gen. mgr, Eureka, Utah.

Officers: Wm. R. Wallace, pres. and gen. mgr.; Jackson C. McChrystal, v. p.; J. E. Berkley, sec.; H. J. Wallace, treas., with John H. McChrystal, directors.

Inc. 1916, in Utah. **Cap.,** $100,000; shares 10c par. Listed on Salt Lake Exchange.

Property: in the Tintic district, is bounded by the Chief Consolidated, Gemini, Centennial, Eureka and Eagle and Blue Bell mines.

Ore: silver-lead of milling grade, averaging about 6 oz. silver and 4% lead with occasional zones of enrichment.

Development: mine has been opened up through the deep workings of the Gemini on the 900′ to 1,500′ levels. Shipments are reported to carry 7 oz. silver and 9% lead and to average $70 to $80 a ton. At last report, lessee had found good ore on the 1,000′ level and company work was being done on the 1,100′ level.

EUREKA STANDARD MINING CO. UTAH

Address: F. G. Richmond, mgr., Salt Lake City.

Property: 14 claims, about 280 acres, in the East Tintic district, formerly known as the Montana group. Shows several large outcrops.

Development: by 500′ 3-compartment shaft. Work on property was resumed in 1919, and a 1,500′ shaft started.

FARRAGUT MINING & MILLING CO. UTAH

Address: care Ashby S. Thatcher, Boston Blk., Salt Lake City.

Property: the Admiral Farragut group of claims in the North Tintic district, near Eureka, developed by a 265′ shaft, which was to be sunk to 500′. No recent returns; probably idle.

GEMINI MINING CO. UTAH

Office: 723-4 Kearns Bldg., Salt Lake City, Utah. **Mine office:** Eureka, Juab county, Utah.

Officers: E. W. Packard, pres.; Jackson H. McChrystal, v. p. and mgr.; J. E. Berkley, sec.; E. O. Howard, treas., with W. Van Cott, directors. John H. McChrystal, supt.

Cap., 5,000 shares, $100 par. **Dividends:** to 1918, totaled $482 per share. In 1916, $16 per share was paid and in 1917 $20 per share.

Property: the Gemini is a silver-lead mine with accessory copper in shoots. There are 3 fissure veins, in an ore-channel about 450′ wide, transversely by a number of cross-fissures, making a rather complex system orebodies, the main fissure, of 15 to 20′ width, having a S. E. dip, with shoots raking to the north. Ore in the upper workings averages about lead and 40 oz. silver, while the bottom level, at 1,600′, shows a 20′ vein

The Gemini has been a regular producer since 1886. Management, like many tah, extremely reticent about giving any information.

DIVA MINING CO. **UTAH**

Office: 735 Kearns Bldg., Salt Lake City, Utah. **Mine office:** Eureka,) county, Utah.

Officers: E. W. Packard, pres.; J. C. McChrystal, v. p. and gen. mgr.; . Berkley, sec.; E. O. Howard, treas.

Cap., $1,000,000; $1 par. In 1919, 144,000 treasury shares offered to ic at 30c. Financial statement for 1918 showed receipts from ore sales, 260; expenditures included $20,502 paid lessees and $14,029 for development. ı on hand, January 1, 1919, $4,112.

Property: 64 acres of patented claims in Tintic district. Only leasing for some years, company not operating on account of settlement of estates.

Development: by 1,200′ shaft, with a winze 150′ below that level. New in 1918 amounted to 1,057′. Good lead-silver ore is said to have been ed on the 1,300′ and 1,350′ levels.

Equipment: 250-h. p. hoist, compressor, 100-ton concentrator, ore bins, lings, etc.

From 1908 to April 1, 1917, production was 13,701 tons of crude ore and tons of concentrate, worth $805,687. In 1916 zinc and silver-lead ores ed $93,000, mostly from 700′ level. In 1918, ore mined totaled 1,800 tons, age value, $37.13 per ton.

.D CHAIN MINING CO. **UTAH**

Provo, Utah. **Mine office:** Mammoth, Juab county, Utah.

Officers: C. E. Loose, pres. and gen. mgr.; J. T. Farrar, v. p.; P. G. rson, sec.-treas., with G. Simmons and John R. Turloes, directors. W. D. e, supt.

nc. Dec., 1910, in Utah. **Cap.,** $250,000; shares 25c par. Listed on Salt Exchange.

Dividends: to date, $130,000. Company absorbed the Ajax Mining Co., to have paid upwards of $1,000,000 in dividends.

roperty: the Gold Chain group and Ajax mine in the Tintic district. lopment on the 1,500′ level opened an orebody averaging 15 to 20 oz. silver, 50% lead and $2 to $3 gold per ton.

Development: new work in 1919, was being done from the 1,800′ level Empire Mines Co. Lessees are working on the level above.

Equipment: hoist, 17-drill compressor, and electric motors.

ND CENTRAL MINING CO. **UTAH**

Office: Provo, Utah. **Mine office:** Mammoth, Juab county, Utah.

Officers: Jos. T. Farrar, pres.; H. L. Holbrook, v. p.; Preston G. Peter- ec.-treas.; Col. Edwin C. Loose, gen. mgr.; W. D. Loose, supt.

nc. Feb., 1902, in Colorado. **Cap.,** $600,000; increased 1909 from $250,- hares $1 par, non-assessable; issued 600,000. Stock listed on Salt Lake Ex- e.

Dividends: in 1914, 15c per share; in 1915, 2½c; in 1916, 8c; in 1917, in 1918. 12c. Total dividends to 1919, $1,802,000. In April, 1919, 4c was

roperty: the Grand Central is the deepest mine of the Tintic district. oins the Centennial Eureka and is opened to the 2,600′ level, carrying a ith an orebody 200′ wide in places and of low average grade, though it is rgest orebody in the Tintic camp. A second ore shoot, 700′ west of the e, and with parallel strike, was opened on the 2,000′ and 2,100′ levels. This ot averages 15 to 20% copper on the 2,380′ level and has been opened up 1,600′ level for a distance of 1,200′, showing a width of 50 to 100′. At nt the ore is bunchy, requiring careful sorting. Mine producing from the the 2,300′ levels, inclusive.

ipment: includes hoist, tramway and electric power. Mill to be ed after the Knight Christensen plant has proved successful.

uction: 117 cars or about 5,500 tons ore in first quarter of 1919.

rty and management good.

v. p. and supt.; Col. R. M. Wilkinson, sec., with Earl McIntyre, and R. E. Mark directors.

Inc. 1881, in Utah. **Cap.**, $10,000,000; shares $25 par. Reincorporated Dec. 5, 1906, in Nevada. **Cap.**, $1,000,000; shares $2.50 par. Controls the Cleveland Mining Co., through ownership of 70% of capital stock. Annual meeting, first Tuesday in February.

Dividends: 5c per share in 1913, 5c in 1915, 25c in 1916, and $1 in 1917; total to date, $2,820,000.

As a result of 9 years' litigation, a judgment in favor of the Grand Central Mining Co. was rendered, 1910, against the Mammoth Mining Co., and necessitated the levying of a 10c assessment, 1910, the first in the history of the company. Assessment No. 2, 5c a share, was payable in March, 1919, to provide money for further development work.

Property: 19 claims, in Tintic distrct. Mine opened about 1870, is undeveloped extensively and has a 2,300' main shaft, the deepest in the Tintic camp. Irregular shoots and chimneys of gold, silver, and copper ores occur.

Equipment: includes complete plant, installed in 1910. About 50 men employed.

Production: 36.000 tons in 1914; 26,000 tons in 1915; 36.000 tons in 1916; 24,000 tons to July, 1917; about 18,000 tons in 1918. Dumps said to contain over 250,000 tons.

MAMMOTH No. 2 MINING & MILLING CO. UTAH

Idle. **Office:** 409 Hooper Bldg., Salt Lake City, Utah. Mine at Mammoth, Juab county, Utah.

Officers: Wm. H. McIntyre, pres.; Samuel McIntyre, v. p. and treas.; Isaac Jennings, sec.

Inc. 1900, in Utah. **Cap.**, $300,000; $1 par; assessable; fully issued.

Property: 2 claims, patented, adjoining the Mammoth Mining Co. shows lead and copper ores.

MAY DAY MINING & MILLING CO. UTAH

Address: 515 Dooly Block, Salt Lake City, Utah. **Mine office:** Eureka, Juab county, Utah.

Officers: John Dern, pres.; M. P. Braffet, v. p.; A. Reeves, sec.; W. S. McCornick, treas., with J. C. Dick, directors.

Inc. 1896, in Utah. **Cap.**, $200,000; shares 25c par; assessable; all outstanding. Stock transferred at company's office. Annual meeting, first Monday in April. Listed on Salt Lake City Exchange.

Balance sheet for year ended March 31, 1919, shows $9,289 received from sales, $16,122 from two assessments, $1,582 from sundries, a total of $27,... Expenses totaled $27,271. Dividends total $300,000.

Property: 6 claims, 5 patented, 60 acres, in the Tintic mining district.

Ore: zinc, silver and lead in limestone.

Development: by 1,100' vertical shaft and 1,500' tunnel. The mine has been practically out of ore several times: at one time the supply was so low that stock dropped to 1c per share: the larger part of its dividends has been paid since then.

Equipment: includes 50-h. p. electric hoist and compressor, capacity 250 cu. ft.

Production: for year ending March 31, 1917, 1,360 tons lead ore, valued at $40,980; 569 tons zinc ore valued at $18,378 for year ending March 31, 1... 591 tons lead ore, valued at $9,126 and 18 tons gold ore, valued at $163.

Development work is being carried on with the hope of finding new ore bodies. Part of the property is leased, and company itself leases part of the Chief Consolidated ground.

MONO DEVELOPMENT CO. UTAH

Address: J. H. Cook, pres., or Matt Gisborn, Salt Lake City. Mine at Dry Canyon, near Ophir, Salt Lake county, Utah. Stock assessed a share.

Property: a group of claims, 300 acres, noted in 1872-3 for its high grade silver ore. Claims are near the following producing mines: Mono...

, Thad Stevens, Kearsarge and Eureka Ophir. A new wagon road was built tober, 1917, from Dry Canyon to the railway; heretofore ore was hauled 9 es to Stockton.

Developed: by 2,500′ tunnel. No recent information; probably idle.

)RTH BECK MINING CO. **UTAH**

Address: E. J. Radatz, 19 Haxton Place, Salt Lake City, Utah.

Property: in northwestern part of Tintic, adjoining Centennial-Eureka, Gemini, developed by shaft 1,450′ deep in January, 1920, to be sunk to 1,600′. eached zone was opened at 1,200′. Mine is fully equipped.

Management does not reply to requests for information.

)RTH SCRANTON MINING CO. **UTAH**

Address: H. B. Merrihew, Box 355, Lehi, Utah.

Officers: H. B. Merrihew, pres.-mgr.; B. C. Lott, v. p.; F. R. Heidech, sec.-treas., with D. H. Cox, directors.

Inc. May, 1905, in Utah. **Cap.,** $100,000; shares 10c par; assessable; 000 issued. Operating expenses in 1916 were $1,684.

Property: 10 unpatented claims, 200 acres, on west slope of Tintic ge, in North Tintic district, Utah, 3½ miles by good road from rail-l. Group shows outcrops of silver-bearing zinc-lead ore in a well-ned fissure in dolomitic limestone. **Ore:** consists of 6 to 8″ streaks, re-ed to carry 23% lead and 6 oz. silver per ton.

Development: by 2 tunnels and winzes with total workings of 2,300′. nel No. 1 exposes 18% zinc ore at depth of 40′. Tunnel No. 2 shows ore as-ng 74% lead and 54 oz. silver, at depth of 75′. While not in commercial ıtity, this ore warrants further development to reach the main fissure. The re has been followed down for 200′.

Is a prospect.

RTH STANDARD MINING CO. **UTAH**

Address: 230 Judge Bldg., Salt Lake City, Utah.

Officers: Dr. C. F. Wilcox, pres.; John Dorius, sec.-treas.; J. H. Man-v. p. and mgr. Cap., $100,000; par 10c. Stock is listed on Salt Lake Exge. Assessable; assessment No. 1, 1c a share, called October, 1919.

Property: 22 claims, north of the Tintic Standard at Eureka, Juab ty. Company is sinking a 2-compartment shaft, which had reached a depth 0′ in October, 1919.

Equipment: includes electric hoist, and a compressor.

)EN-TINTIC LEASING CO. **UTAH**

Has a lease on part of property of Tintic Central Mining & Milling Co., h see.

) SUSAN MINING CO. **UTAH**

Mail returned, 1918, from former address, 411 Felt Bldg., Salt Lake City,

)fficers: W. H. Simmons, pres.; P. F. Thompson, v. p.; E. D. R. Thomp-sec.-treas.-mgr., with F. A. Druehl, directors.

nc. 1899, in Utah. **Cap.,** 400,000 shares; 10c par; 257,572 shares out-ing. Annual meeting, first Monday in January.

Property: 3 patented claims, 25 acres in Tintic mining district, Juab y, shows gold-silver lead ore in fissure veins in porphyry and monzonite. oped to depth of 300′ by 1,500′ tunnel. The mine, at last accounts was ed by lessees on a royalty basis.

X CONSOLIDATED MINES CO. **UTAH**

s a part of Empire Mines Co., which see.

IR HILL CONSOLIDATED MINING CO. **UTAH**

)ffice: Miner Bldg., Butte, Mont. **Mine office:** Ophir, Tooele county,

)fficers: Wm. A. Clark, pres.; W. C. Siderfin, sec.; M. H. Hartman, ngr., with Chas. W. Clark, directors. A. G. Swanson, mine supt.; F. Wel-, mill supt.; E. Bowman, engr. Company is managed as a close corpora-

)roperty: one-half mile north of Ophir, carries the 5′ Top-vein, the

20′ Big vein, the Middle vein 10′, the Copper vein 8′, and the Blue vein, 6′ thick and from 10′-100′ wide.

Ore: contains argentiferous galena, with pyrite, averaging 8% lead and 10 oz. silver per ton; also some copper and zinc ores. Ore occur as replacements in argillaceous limestone and shale, in 3 clearly defined shoots, known as the Wild Delirium, Miner's Delight and Western Stope.

Development: an 1,800′ incline shaft, with the usual levels and stopes, also a transportation tunnel nearly 1 mile long, through which all ore is taken. This tunnel intersected the vein on the 1,300′ level; it also drains the mine at depth.

Equipment: includes a steam plant, not operating, and a hoist; there is a gravity tramway from the mine to the 200-ton mill.

Production: averages about 200 tons daily of lead-silver ore, with a little gold and 2½% copper. Concentrates run about 10-20 oz. silver and 10-12% lead per ton. The property is an excellent one. A branch of the Salt Lake Route known as the St. John & Ophir R. R. Co. was built to the property in 1912.

In 1919, mine produced 33,895 tons of ore, yielding $705,856 gross, or $155,63[illegible] net. Ore contained 373,435 oz. silver, 6,595,743 lb. lead and 210,241 lbs. copper.

OPHIR KING GOLD MINING CO. UTAH

Mine near Ophir, Tooele county, Utah.

Inc. November, 1917, in Utah. **Cap.**, $10,000; shares 2c par; assessable.

Lands: 30 acres, patented, 9 miles from railroad, adjoining the Ophir Hill and Cliff Mining Co.'s properties carry auriferous and argentiferous copper and lead ores. Mine has 400′ tunnel, with some crosscutting and several shallow shafts. Property and equipment were sold at sheriff's sale in November, 1914, to John B. Holmes, for $1,750, to satisfy a judgment obtained by Holmes.

OPHIR METALS CO. UTAH

Address: W. B. Farmer, Ophir, Tooele county, Utah.

Inc. 1919, in Utah.

Property: that of the Lion Hill Consolidated Mines Co., 640 acres in the Ophir section of the Tintic district, carrying silver-lead ore in fissure veins in limestone.

Development: by over 5,000′ of shafts, tunnels, and drifts. A tunnel is to be driven 500′ below the old workings.

OPHIR QUEEN MINING CO. UTAH

S. Crawford, Cedar River, Mich., controls property.

OPHIR SILVER MINES CO. UTAH

Officers: Guy R. La Coste, pres., 21 Mining Exchange, Salt Lake City; O. D. Coughten, v. p.; E. W. Toole, sec.-treas., with C. M. Beck, directors.

Inc. Nov., 1919, in Utah. **Cap.**, $100.000; par 10c; 600,000 shares in treasury.

Property: 15 claims, in Ophir district, Tooele county, adjoining the Ophir Hill property, said to show a well-defined vein of silver-lead ore. Present development, mainly tunnels, is estimated to have cost $30,000. Management plans to continue the 630′ tunnel to the shale-lime-porphyry contact.

OPHIR-UTAH MINING CO. UTAH

Idle. **Office:** Salt Lake City, Utah. Mine near Ophir, Tooele county, Utah G. G. Schliep, pres.; C. L. Olson, sec.-treas.

Inc. Feb. 13, 1909, in Utah. **Cap.**, $250,000; 25c par.

Lands: 7 claims, 9 miles from railroad, show copper and lead ores. Has several buildings and a hoist.

OPOHONGO MINING CO. UTAH

Office: Provo, Utah.

Officers: Wm. Hatfield, pres. and mgr.; J. H. Hatfield, v. p.; J. W. Hatfield, sec-treas.; F. E. Birch, mgr.

Inc. 1908, in Utah. **Cap.**, $25[illegible] shares 25c par; assessable. Assessment No. 4, [illegible] share, le[illegible] 1919. Shares are listed on the Salt Lake Stock [illegible]

Dividend [illegible] and t[illegible]rations in 1911-12, and one [illegible]

anuary 30, 1913, a total of $80,907 to 1916. Stock is listed on the Salt Lake ıange.

Property: 3 claims, patented, in the vicinity of the Black Jack and Ajax s.

Development: by shafts and tunnels, with over 2,000′ of workings, to ı of 1,800′. The mine is operated jointly with the Gold Chain, with which :onnected on the 300′ level, and hoisting is through the Black Jack shaft. The level shows an 18′ orebody, said to give assays up to 10% copper and $60 per ton. The 700′ level shows this same ore shoot. Present development ainly in the winze below the 1,800′ level, down 75′ in favorable ground.

Equipment: owned jointly with the Gold Chain, includes an air com- ıor.

Production: has been intermittent since it began in 1909. The recent ısment was levied with the idea of providing money to start work.

ORD CONSOLIDATED MINING CO. **UTAH**

Eureka, Utah. James Crooks, pres.; Geo. W. Owen, sec.-treas.; C. H. ggs, mgr.

Inc. June, 1909, in Utah. **Cap.,** $25,000; shares 5c par; assessable.

Lands: 9 claims, patented, show copper and lead ores. Levied an as- nent of one-half cent, early 1911, to pay indebtedness incurred through ıtion. No work has been done since patent to property was issued.

ION QUEEN MINING CO. **UTAH**

Address: Provo, Utah. **Mine office:** Dividend, Utah.

Officers: Thos. Pierpont, pres.-mgr.; J. William Knight, v. p.; J. C. , sec.-treas., with Andrew Sutherland, supt., and Wm. Scowcroft, directors.

Property: 16 claims, in East Tintic district. Management plans sink- ı 3-compartment shaft to 500′ level.

TUS MINING CO. **UTAH**

Controlled through stock ownership by Chief Consolidated Mng. Co.

Address: Eureka, Juab county, Utah.

Inc. 1907, in Utah. **Cap.,** $100,000; shares 10c par; fully issued; assess- Last assessment of 1 ct. per share delinquent October 21, 1919. Absorbed Tetro Mining Co., January, 1909. Shares are listed on the Salt Lake Stock ıange.

Property: 14 claims, patented, including the Tetro group of 3 claims, which the Tetro Mining Co. paid $18,000 in dividends. Mine carries erous and argentiferous lead and copper ores, developed by a 600′ shaft, 3,700′ of tunnels, and 1,250′ of other workings. Is being developed by Cons. Mining Co.

VO MINING CO. **UTAH**

Address: Provo, Utah.

Officers: Jos. S. Berry, pres.; J. W. Farrer, v. p.; D. W. Conover, sec.- . with Geo. H. Naylor, W. J. Tregonning, and J. A. Barclay, directors.

Inc. Feb. 28, 1887, in Utah. **Cap.,** $100,000; 10c par; assessable; 837,440 d. Listed on Salt Lake Exchange.

Property: 3 patented claims at North Tintic, adjoining the Tintic Stand- Lead-silver-zinc ore occurs in pockets. Development by 300′ shaft. As any was without funds, control passed to a new syndicate late in 1919, paid 9c. a share for the stock.

EN ISABELLA MINES CO. **UTAH**

Officers: Alex. Caldwell, pres., Eureka, Tooele county, Utah; Alex. Irvine, v. p.; S. R. Thurman, sec.-treas., with Daniel Caldwell and Bert man, directors.

Inc. 1916, in California. **Cap.,** $50,000.

Property: 14 claims adjoining the Sharp mine, Tintic district, and car- the extension of the Sharp vein. The Sharp mine while under 2-year bond to Mr. Alex. Caldwell produced 15 carloads of silver-lead ore, to $20 per ton. At last accounts, 1918, the company was planning on the property.

RAYMOND-ILLINOIS MINING CO. UTAH

Office: 312 McCornick Bldg., Salt Lake City, Utah. Mine is at Eureka, Juab county, Utah.

Officers: F. J. Hagenbarth, pres. and mgr.; J. M. Wheeler, v. p.; J. C. Lynch, treas., and Thos. Kearns, directors; M. B. Johnson, sec.

Inc. 1905, in Utah. **Cap.,** $450.000; shares $1 par; assessable. Assessments of one-half cent a share fell due May 7, and June 29, 1917.

Property: 15 patented claims, in the Tintic district, shows fissures and replacements in limestone. Developed by about 1 mile of tunnels and a 1,50[illegible] vertical shaft, which as yet have shown but little ore. The bottom workings are wet. Diamond drilling was done, 1909-10, from the bottom of the shaft. Idle since 1914.

RICHMOND & ANACONDA CONSOLIDATED MINING CO. UTAH

See Uncle Sam Consolidated Mining Co.

RIDGE & VALLEY MINING CO. UTAH

Address: 723 Kearns Bldg., Salt Lake City, Utah. **Mine office:** Eureka, Juab county, Utah.

Officers: Wm. R. Wallace, pres.; Jackson C. McChrystal, v. p.-mgr.; J. E. Berkley, sec.; H. J. Wallace, treas.; J. H. McChrystal, supt., with Sarah H. McChrystal, directors.

Cap., $1,000,000; originally $150,000, increased 1915 to $500.000 and in 1916 to present amount; par, 50c.; issued 500,000 shares.

Property: 39 claims, 443 acres, adjoining the Gemini property, and operated through the Gemini shaft for many years. Ores carry lead-silver-copper-gold values.

Development: by 1,800' shaft, and extensive workings. Recent development work on the 1,800 foot level is claimed to be satisfactory. In 1[illegible] 4,000 tons of ore shipped sold for $14,721, giving net profits of $4,240. In January 1919, 700 tons ore were shipped.

SCRANTON LEASING CO. UTAH

Address: care Wade & Funkel, Scranton mine, Eureka, Utah. Operates under lease the Scranton mine at North Tintic, Utah. Produces lead and zinc ores from new discovery on surface and from Magazine tunnel. Employs 52 men.

In 15 months, to July, 1917, the output was 6,000 tons, containing 20% lead and 32% zinc. Shipments were made in 1918; no later information available.

SCRANTON MINING & SMELTING CO. UTAH

Offices: McIntyre Bldg., Salt Lake City and Scranton, Tooele county, Utah.

Officers: T. G. Wolf, pres.; H. A. Knapp, treas., with B. H. Throop, of Scranton, Pa., R. J. Deighton, sec.-mgr., and Wm. H. Bramel, Salt Lake City, directors.

Cap., $30,000; shares $1 par.

Property: in the North Tintic district, is an old producer of silver, lead and zinc ore. The company operated the mine until 1915, and the stopes were pretty thoroughly worked out.

SELMA MINES CO. UTAH

Office: Kearns Bldg., Salt Lake City, Utah. **Mine office:** Knightsville, Juab county.

Officers: J. C. Jenson, pres. and gen. mgr.; L. C. Peterson, v. p.; O. Carlson, sec.-treas., with R. A. Brown and Chas. Biers, directors.

Inc. Dec., 1909, in Utah, as successor of Selma Consolidated Mining Co. **Cap.,** $50,000; shares 5c par; assessable, except 50,000; 740,000 outstanding. Last assessment, half cent a share, was levied in March, 1919. Statement made in June, 1917, showed current assets of $13,655, and current liabilities, $[illegible]. Miners have taken half of their wages in shares.

Property: 34 claims, unpatented, near the Lehi Tintic mine, supposed to carry the northern extension of the mineral zone of the Colorado mine. 3 miles from a railway. The property has a lime-porphyry contact, with 3 principal fracture zones carrying silver-lead-copper ore.

Development: by 210′ three-compartment shaft, and tunnels showing ied ground with occasional bunches of good ore. The old company ided about $75,000 on development. Workings total 2,650′, including els 80, 900, and 1,400′ long, opening ground to depth of 1,000′. **Equip-**: includes electric power and electric hoist.

UX CONS. MNG. CO. **UTAH**

Succeeded by Sioux Mines Co., which see.

UX MINES CO. **UTAH**

s a reorganization of Sioux Cons., fully described in Vol. XIII.

Address: Provo, Utah.

Officers: Reed Smoot, pres.; R. L. Anderberg, sec., with Jesse Knight, Lester Mangum, and K. S. Gordon, directors.

Inc. 1917, in Utah. **Cap.**, $100,000; par 10c; outstanding, 498,470.

Property: 6 patented claims, 47 acres, in Tintic district, said to show -lead ore.

Development: by shaft to the 1,000′ level. In April, 1916, the company ned work; sank the shaft from 600′ to 1,000′ level. Drifts for about 500′ n the 800′ and 1,000′ levels in search of the continuation of the orebody l in the Iron Blossom, failed to find commercial ore. Considerable quartz found and management believes that ore will be found at greater depth.

TH IRON BLOSSOM MINING CO. **UTAH**

Robinson, Juab county, Utah. George Jones, pres.; T. L. Schofield, sec.-

Inc. 1908, in Utah. **Cap.**, $100,000; shares 10c par; assessable; outstand-241,000. Listed in Salt Lake City.

Property: 4 claims in the Tintic mining district, showing silver-lead ore.

TH STANDARD MINING CO. **UTAH**

Address: 422 Judge Bldg., Salt Lake City.

Officers: E. J. Raddatz, pres.-treas.; W. I. Snyder, v. p.

Cap., 1,300,000 shares; assessable; last assessment ¼c a share, was l in June, 1919. Listed on Salt Lake Exchange. Company is a consolida- of United Tintic Mines and the South Standard Mining Co.

Property: 47 claims, in Juab and Utah counties, includes the Montreal, c Combination, Tintic Empire, and Bullock groups.

NSEA CONSOLIDATED MINING CO. **UTAH**

Office: Knight Bldg., Provo, Utah.

Officers: Jesse Knight, pres.; R. E. Allen, sec.-treas.

nc. in Utah. **Cap.**, $100,000; shares 10c par; 999,798 outstanding; as-ble. Listed on Salt Lake Exchange.

Owns 145 acres in Tintic mining district, said to show silver-lead ore. Prop- closed. Lessees working the dumps, at last account.

NSEA EXTENSION MINING CO. **UTAH**

Has passed on. Described in Vol. XIII.

MPSON-QUINCY CONSOLIDATED MINING CO. **UTAH**

Reorganized 1915, as New Quincy Mining Company, which see.

TIC BULLION MINING CO. **UTAH**

Officers: John M. Bestelmeyer, pres., Provo, Utah; T. Nicholes, v. p.; Hicks, sec.; August Bestelmeyer, treas., with Samuel Bennett, directors.

nc. 1919,in Utah. **Cap.**, $75,000; 5c par.

Property: located in East Tintic mining district, adjoining Eureka on.

TIC CENTRAL MINING & MILLING CO. **UTAH**

Property under lease to Ogden Tintic Leasing Co.

Office: Provo, Utah. **Mine address:** T. T. Holdaway, Knightsville, Juab y, Utah. J. T. Farrer, pres.; R. L. Anderberg, sec.-treas.

nc. June, 1907, in Utah. **Cap.**, $50,000; shares 5c par; assessable; all d. Three assessments yearly of one-half cent a share. Last assessment, alf cent a share, delinquent October 17, 1919. Stock listed on Salt Lake ange.

Property: 20 claims, covering ground adjacent to the Iron Blossom in

the Tintic district and supposedly carrying the extension of the ore-bearing fissures of that mine. These fissures are in limestone and are cut by porphyry, carrying irregular orebodies. Work is being done through the Iron Blossom mine.

Development: includes a 1,038′ shaft with extensive workings on the 870′, 920′ and 1,020′ levels. In 1917 some lead-silver ore was opened on the 900′ level.

TINTIC CHIEF MINING CO. UTAH

Office: Provo, Utah.

Officers: H. C. Hicks, pres.; J. M. Bestelmeyer, v. p.; August Bestelmeyer, with E. A. Peay, and N. C. Hicks, directors.

Inc. July, 1919, in Utah. **Cap.,** $75.000.

Property: located in Tintic mining district, Juab county.

TINTIC COALITION MINES CO. UTAH

Frank Hornberg, pres. and mgr.

Property: located in south end of the Tintic district several miles S. E. of Silver City, said to show lead-silver ore. Developed by 1,800′ tunnel. Company has done no shipping since 1912. A part of the property has been worked by lessees in recent years but company resumed operations in 1919.

TINTIC COMBINATION MINING CO. UTAH

Consolidated with Tintic Empire and Bullock companies to form United Tintic mines, now dead, the property passing to the Tintic Tunnel Co.

TINTIC CO. UTAH

Office: 734 Fifth Ave., New York. **Mine office:** Bingham Canyon, Salt Lake county, Utah.

Officers: E. B. Schley, pres.; Kenneth B. Schley, v. p.; E. Richter, sec.-treas.; C. G. Raynor, asst. sec.-treas.

Inc. 1903 in Maine. **Cap.,** $2,700,000; shares $3 par; issued $2,700,000. Original cap., $3,000,000; shares $5 par, increased, 1906, to $4,000,000, with an outstanding issue of $3,500,000 stock in 700,000 shares of $5 par, which was then reduced 1909, to $2,100,000, by cutting the par value from $5 to $3 and was immediately thereafter increased to present amount of $2,700,000.

Bonds: $500,000 authorized, at 6%, convertible into stock, of which $422,900 is outstanding, this bond issue having been made to liquidate a floating debt. The company is a securities-holding corporation only, and was the parent company of the Tintic Mining & Development Co., Yampa Smelting Co. and West Mountain Tramway Co. See Tintic M. & D. Co.

TINTIC-DAVIS MINING CO. UTAH

C. M. Morris, pres., 813 E. 1 S., Salt Lake City; Geo. H. Taylor, mgr.

Inc. in 1919.

Property: located in North Tintic mining district, adjoins Chief Consolidated. In October, 1919, machinery was added, and a head-frame built. Details of operations not available.

TINTIC DELAWARE MINING CO. UTAH

Address: Provo, Utah.

Officers: Joseph Hatch, pres., Heber, Utah; W. R. Wherritt, v. p.; J. Holdaway, Provo, sec.-treas., with W. D. Clark, J. H. Ekker, E. H. Ekker, S. Ness, directors.

Inc. in Utah. **Cap.,** $100.000; increased June, 1919, to $200,000; 10c par. Listed on Salt Lake Exchange.

Property: 8 claims, in West Tintic, 12 miles from Dunbar, Juab county, contains lead and silver ore. Developing during recent years.

TINTIC DELMAR MINING CO. UTAH

Office: Snow Bldg., Provo, Utah. **Mine office:** Eureka, Juab county, Utah.

Officers: Lewis Merriman, pres.; Andrew Madsen, v. p.; Harvey Cook, sec.-treas., with C. W. Reed and T. Boardman, directors.

Inc. March 27, 1909, in Utah. **Cap.,** $100,000; shares 10c par.

Property: 20 claims, partly patented, in the North Tintic district.

h limestones occur with geologic conditions like those of Centennial Eureka

Development: by 350′ tunnel, to be extended to crosscut formation, h shows stringers of quartz carrying ore said to give good assay values in , lead and copper where 2 large cross breaks intersect. A 114′ winze en- tered fissures opened by a drift, 100′ below the tunnel, reported to show ore ing 300 oz. silver, some gold, lead and a little copper in a shoot encased in grade ore.

Property reported on favorably by C. A. Porter of the Utah Copper Co. by Prof. J. E. Tallmadge. No recent report of operations received. Is a ising mining gamble.

TIC DRAIN TUNNEL CO. **UTAH**

Address: Provo, Juab county, Utah.

Officers: Jesse Knight, pres.; W. L. Mangum, sec.-treas., with J. S. h, E. F. Birch, Henry Barney, A. M. Knight, K. S. Jordan, R. E. Allen, and Jordan, directors. Listed on Salt Lake Exchange.

Organized in September, 1917, to drive a 5½ mile adit from Goshen valley to nt near Silver City, for drainage of adjacent mines and sale of water for ution. In September, 1919, tunnel was in 3,400′ and advancing about 10′ —no timbering required at that time. Company owns 300 claims along the -of-way.

TIC EMPIRE MINING CO. **UTAH**

Address: Eureka, Utah.

Officers: Theo. Nicholes, pres.; L. E. Chipman, v. p.; H. J. Fitzgerald, reas.; with H. E. Phelps, and Orson Keeler, directors

Cap., $125,000; 10c par; 625,000 issued.

Property: is in the North Tintic mining district, near Eureka, between Lehi-Tintic and the Tintic Paymaster. A shaft was started in Septem- 1919, and was 100′ deep in January, 1920, and a 280′ tunnel driven; 36% and 7 oz. silver ore was uncovered on the surface. Equipment being lled.

TIC MILLING CO. **UTAH**

Address: Provo, Utah.

Officers: Jesse Knight, pres.; J. S. Smith, mgr.; W. L. Mangum, sec.- ; T. P. Holt, gen. supt.

nc. in Utah. Cap., 1,000,000 shares, 3c par; assessable. The purpose e company is to provide a process and a mill for treating low-grade ores e locality, hitherto found valueless. The mill employs the Holt-Dern and t-Christensen roasting furnaces and leaching. Operations began March, the mill treating 200 tons daily, mostly from the Iron Blossom and Dragon lidated mines. About $60,000 in silver bullion is produced monthly. Bul- ssays 90% copper and carries from 600 to 2,000 oz. silver per ton.

riefly the process is: crusher, 4 sets of rolls, 11 roasting furnaces; four n leaching tanks, and scrap iron precipitating boxes. The charge for ng is a mixture of oxide and sulphide ores, coal dust, and salt. This ss is amenable to the low-grade silver-copper-gold ores of the district.

TIC MINING & DEVELOPMENT CO. **UTAH**

roperty sold to Utah Cons. Mining Co., and company dissolved. Described l. XIII.

TIC PAYMASTER MINES CO. **UTAH**

Officers. W I. Snyder, pres., Eureka, Utah; J. W. Knight, v. p.; H. yder, sec.-gen. mgr., with W. Scowcroft and R. E. Allen, treas., directors.

nc. 1919, in Utah. Cap., $1,000,000; 50c par; issued, 600,000 shares.

roperty: a consolidation of about 1,700 acres, including the Eureka located in the Tintic mining district, between the Lehi Tintic and the

evelopment: on the Eureka King, a 500′ shaft, which is to be sunk 1,000′ level, cut No. 1 vein in lime and quartzite January, 1920. It was mineralized.

Equipment: electric power, 52-h. p. motor-driven hoist, 46′ head-frame 52-h. p. 5-drill compressor, automatic bucket dump, and all surface accessories

TINTIC PRIZE WINNER MINING CO. UTAH

Address: Springville, Utah.

Officers: H. Straw, pres.; Edw. Bingelson, v. p.; W. B. McPherson sec.-treas., with Mel Chase, and Earl Bissell.

Inc. July, 1919, in Utah. **Cap.,** $100,000; par $10.

Property: in Tintic district, Juab county.

TINTIC QUADRANGLE MINING CO. UTAH

Officers: Geo. Horton, pres.; Samuel Bennett, v. p.; Geo. F. Tilson sec.-treas., with C. S. Goddard and Geo. Horton, Jr., directors.

Inc. about Oct., 1919. **Cap.,** $100,000; par 10c.

TINTIC STANDARD MINING CO. UTAH

Office: 422 Judge Bldg., Salt Lake City, Utah. **Mine office:** Eureka Juab county, Utah.

Officers: E. J. Raddatz, pres.-treas.-gen mgr.; W. I. Snyder, v. p.; L. E. Stohr, sec., with Willard Scowcroft, and Ira I. Travis, directors. John Wessdahl, supt.

Inc. Oct. 2, 1907, in Utah. **Cap.,** $1,300,000; $1 par; assessable; issued 1,175,000. Has levied 19 assessments of ½c. each up to 1916. Stock listed Salt Lake Exchange. Annual meeting, January 10.

Dividends: initial of 20c paid June 23, 1917, and 40c during that year. Four quarterlies of 8c. each, plus extra of 15c. paid in 1919. Eleven in all to date equal to $1,140,658. Net profits in 1918 were $638,944.

Property: 95 claims, 1,760 acres, of which 15 claims, 300 acres, are patented, covers a long stretch on the ore zone. In November, 1919, company started suit against the Chief Cons. concerning ownership of the White Wing No. 5 claim.

Geology: mine shows limestone, quartzite, and porphyry, carrying two sure veins with N.-S. strike and dip of 55° E. in limestone. Ore comes in a north-south fault fissure at contact of shale with underlying quartzite.

Ore: a fine-grained aggregate of galena and tetrahedrite, plus a little pyrite, in barite and quartz, and is reported to assay from a trace to 50% lead, 1 to 105 oz. silver, and $1 to $15 gold per ton. The management reports the main orebody as 200′ wide.

Development: one 1,450′ three-compartment main working shaft and about 8,000′ of drifts, etc. The second shaft, 1,700′ south of main shaft is also 1,450′ deep and connects with the other. Both shafts show shipping ore. Ore developed is on the 1,250 and 1,350′ levels.

Equipment: includes a 100-h. p. steam plant, with an 80-h. p. double cylinder, hoist, good for 1,500′ depth. Also double-drum hoist with 300-h. p. motor and an 800 cu. ft. compressor with 150-h. p. motor.

Production: in 1919, about 50,000 tons of ore. Total from 1915-'18 inclusive, 58,495 dry tons that yielded 1,900,000 oz. silver, 7,900,000 lb. lead, 750,000 lb. copper, and 1,582 oz. gold.

TINTIC STAR MINING CO. UTAH

Jesse M. Harms, mgr.

Inc. 1918, in Utah. **Cap.,** $100,000; 10c par.

Property: 4 miles S. E. of the Tintic Delaware near Dunbar, Juab county, said to show copper-silver ore. Driving a tunnel in 1919.

TINTIC TUNNEL CO. UTAH

Letters returned unanswered July, 1917, from Newhouse Bldg., Salt Lake City. No recent information; probably idle.

Officers: L. A. Martin, mgr., with F. C. Richmond, D. R. Beebe, E. Smith, B. D. Lyon, H. J. Fitzgerald, R. J. Evans, D. F. Davis and C. E. Moss directors.

Inc. 1916, in Utah. **Cap.,** $2,000,000.

The company planned to drain the E. and S. ends of the Tintic district by means of a 5-mile tunnel. It has absorbed the holdings of the United Tintic

:s, which was a consolidation of the Tintic Combination, the Tintic Empire Bullock Companies.

Property: 28 claims, about 600 acres, in the Tintic district, near Eureka, to show 4 parallel veins in an ore zone, or channel, that lies east of the imoth-Grand Central and the Centennial-Eureka ore zones. The claims are cated as to give approximately 2 miles on this vein system.

Ore: carries copper, lead, silver and gold values. The veins vary greatly idth, but are generally of small size, the Bullock vein, in which work has centered, showing a maximum width of about 4'. The ore in this vein runs in iron and carries about $20 per ton in copper, lead and silver.

Development: principally on the old Bullock property, includes shafts 0', 215' and 102' and several old tunnels. **Equipment:** includes a small n plant and hoist.

Excess of water and high cost of mining have presumably caused cessation ork.

TIC UNION MINING CO. **UTAH**

Officers: Willard Scowcroft, pres., Ogden, Utah; W. I. Snyder, v. p.; . Snyder, sec.-treas., with Gideon Snyder, and J. W. Scowcroft, directors. Inc. 1919, in Utah. **Cap.,** $1,000,000; 50c par.

Property: 22 claims, located in southern part of East Tintic district. pany plans exploration work.

TIC WINCHESTER MINING CO. **UTAH**

Address: L. N. Ellsworth, Tintic, Eureka county, Utah.

Officers: G. F. Tilson, pres.; William Haws, v. p.; L. N. Ellsworth, reas., with S. Trotter and H. B. Cole, directors.

Inc. Dec., 1919, in Utah, to engage in general mining business.

TIC ZENITH MINING CO. **UTAH**

Office: Eureka, Utah.

Geo. A. Udall, and A. W. Larson, of Eureka, reported as heavy stockholders. . Hurley, supt.

Property: located in eastern part of Tintic mining district, Juab county. pany will sink a 2-compartment shaft, 1920.

TIC ZINC CO. **UTAH**

Has passed away. Described in Vol. XIII.

LE SAM CONSOLIDATED MINING CO. **UTAH**

Office: 515 Dooly Block, Salt Lake City, Utah. **Mine office:** Eureka, county, Utah.

Officers: Hon. John Dern, pres.; M. P. Braffet, v. p.; Frank D. Kimball, ; Fred. C. Dern, sec.; J. C. Dick, gen. mgr.; W. P. Carter, supt.

Inc. June 29, 1900, in Utah. **Cap.,** $750,000; shares $1 par; assessable; ased August 21, 1912, from $500,000; issued, $550,000, with 1 assessment l. The company formerly owned a 50% stock interest, 400,000 shares, in May Day Mining & Milling Co., which stock was distributed 1910, to share- rs, as a stock dividend. The Richmond & Anaconda Mining Co., adjoining, absorbed 1912, by the Uncle Sam.

Shares are listed on the Salt Lake Exchange. Annual meeting, first Mon- n June.

Regular dividend rate was 2 cts. per share monthly, changed June, 1910, to quarterly, with an extra dividend of 3 cts., December, 1910, dividends for having been 19 cts. per share; total dividends to April, 1913, were $470,000; since. Assessment of 1c. a share was levied on April 22, 1920.

The annual statement for year ended May 31, 1918, shows: ore sales realized ; balance from 1917, was $1,554; assessment No. 2, $5,494, other $558, ng $13,095. Expenses totaleo $12,103, leaving $992 cash balance.

Property: 4 claims, patented, in Tintic district, including the Humbug which is the principal property, producing mainly auriferous silver- ore of both smelting and milling grades. A good orebody was de- ed in the western part of the property. **Equipment:** is electrical.

Production: in 1916, 25 tons zinc ore and 265 tons lead ore.

ast report states that company expects to do development on west part of

Equipment: hydro-electric power and 100-ton flotation plant.

Production: 131,911 lb.; fine copper in 1905; 304,377 lb. copper and 1,[illegible] oz. silver in 1906; 425,367 lbs. copper and 2,292 oz. silver in 1907. Inactive from November, 1907, until October, 1915, when experiments with the flotation process were started. Shipments from October, 1915, to January, 1916, about [illegible] tons, claimed to run 10% copper and 1 oz. silver per ton. In 1918, mine produced 509,654 lb. copper and 2,056 oz. silver.

VERMONT COPPER CO. VERMONT

Office: 50 E. 42nd St., New York. **Mine office:** South Strafford, Orange county, Vt. A. Heckscher, pres.; G. E. Parks, sec.; N. O. Lawton, gen. supt.

Inc. 1906, in Arizona. **Cap.,** $1,000,000. Is successor of Elizabeth Copper Co., and later took over the Strafford Mining Co. and the Sharon Power Company. On account of low price of copper, operations ceased May 1, 1[illegible] and company was put in hands of Ralph E. Pierson, Bethel, Vt., as receiver.

Property: the Elizabeth and Foster copper mines, 9 miles from Pompanoosue, and 10 miles from Sharon, the nearest rail station. The Elizabeth mine was opened 1793, to get pyrrhotite with which to make copperas and at one time had quite an extensive plant for roasting the ore, leaching and making copperas. Early in the nineteenth century the Vermont Copperas Co. operated the mine and is said to have made as much as 6,000,000 lb. of copperas, beginning with a small incidental production of copper about 1830, when it was found that the ore carried an average of about 3 per cent. copper as chalcopyrite disseminated in pyrrhotite. Six different smelters have been built on the property at various times, the last one in 1916, for pyritic smelting.

Geology: a lens of pyrite ore, wedging out at the bottom, occurs in foliated quartz mica-schist. The orebody has been mined for 700′ in length and opened up for more than 2,000′ in length, ranging from 15′ to 60′ in width. Management estimates upwards of 500,000 tons of ore in sight, consisting of pyrrhotite carrying chalcopyrite, and with average assay of 2¼% copper. Diamond-drill borings, made 1909-1916 show ore to continue for 250′ deeper below the present workings.

Development: by a 1,340′ tunnel with back of 225′, and an 800′ inclined blind shaft. The dumps carry about 50,000 tons of discarded ore, a large part of it said to average 1.75 per cent. copper.

A 500-h. p. hydro-electric power station on the White river, transmits current 9 miles to the mine and works. There also is a small steam plant and an air compressor at the mine. Electric haulage is used underground.

After an idleness of several years the property was reopened in 1916, the smelter remodelled for pyritic smelting and the mill equipped for flotation. Metallurgically, the smelter operated successfully under the supervision of Prof. George A. Guess of the University of Toronto, but operations were discontinued on account of the cost and trouble in hauling in fuel and flux.

The flotation process worked successfully on this ore. The ore is a base pyrrhotite carrying disseminated chalcopyrite and assays about 2.25% copper. The mill produces concentrates assaying 18% to 24% copper, with tails running from .2% to .3%. Another unit added in 1919, increased the daily capacity of the mill to 200 tons. Hardinge mills are used for grinding and Callow cells for flotation.

Production: in 1918, 300,000 lb. copper, and 35 oz. silver.

VIRGINIA

ALLEGHANY ORE & IRON CO. VIRGINIA

Address: care H. B. Spackman, pres., Buena Vista, Va.; Arcade Bldg., Philadelphia, Pa.; and Coatesville, Pa. The Lukens Steel Co. owns [illegible] capital stock.

Property: iron ore mines at Oriskany, Va., having an annual output of 225,000 tons. The iron furnaces have an annual output of 100,000 [illegible] quarries have an output of 50,000 tons limestone.

IERICAN CHEMICAL & INDUSTRIAL CO. **VIRGINIA**

Address: Philadelphia, Pa.

Reported in March, 1919, that company had bought property of the Crimora nganese Corp., which see.

IERICAN RUTILE CO. **VIRGINIA**

Address: 622 F. St., N. W. Washington, D. C. W. M. Slater, pres.

Inc. in Virginia. **Cap.,** $100,000; $100 par; issued $97,500.

Property: 550 acres at Roseland, Nelson county. Rutile containing % titanium oxide, and ilmenite are mined from open-cut workings.

Equipment: includes power and milling machinery to handle about 100 s daily, also a 2,500′ aerial tram. The mill is equipped with crushers, stamps, rr classifier, tables, and a magnetic separator.

Production: 260 tons of rutile concentrate in 1918 was sold for $39,150. l 444 tons of ilmenite concentrate for $11,100.

IMINIUS CHEMICAL CO., INC. **VIRGINIA**

Operated by Grasselli Chemical Co.

Office: 44 Pine St., New York. J. Frederick Kernochan, pres.; T. Mc- vern, mgr., Mineral, Louisa county, Va., at last accounts.

Cap., $10,000.

Property: shows a large lens of pyrite in ancient schistose rocks. The was 30′ to 50′ wide and persisted below the 1,200′ level.

Development: a new 60° incline shaft being sunk in 1919 (down 750′ August), and connected at 700′ with the old workings.

Equipment: steam power, hoist, compressors, and 350-ton concentrat- mill.

BIN BRANCH MINING CO. **VIRGINIA**

Office: 1015 Fidelity Bldg., Baltimore, Md. **Mine office:** Dumfries, nce William county, Va. Is owned by the American Agricultural Chemical mpany.

Property: has a large lenticular body of iron pyrites carrying up to e-fourths of 1% copper recovered as a by-product after roasting.

Development: by 1,200′ vertical shaft. **Equipment:** includes steam hoist, compressor, and a 200-ton mill. Employs 150 men.

IMORA MANGANESE CORPORATION **VIRGINIA**

Office: 30 E. 42nd St., New York, and Crimora, Augusta county, Va.

Directors: Geo. C. Allen, pres.; Geo. Burnham, Jr., v. p.; Walter Whet- e, sec.-treas.; A. M. Yonge, gen. mgr.

Inc. Sept. 29, 1914, in Virginia. **Cap.,** $1,000,000; shares $100 par; all standing. **Transfer office:** Security Transfer & Registrar Co., New k. Annual meeting, last Monday in September.

Bonds: authorized and issued $500,000 1st mtge. 6% sinking fund gold ds, due 1929.

Property: 946 acres, including the Crimora mine, 2 miles east of Cri- a station, on the Norfolk & Western R. R. The mine was first opened in 7 and acquired by present company in 1914. Deposit consists of manganese- masses of various sizes scattered through a clay basin, ½ mile long, several dred yards wide and 200′ deep. The ore is hard and consists of psilomelane pyrolusite. Percentage of ore to clay varies considerably, from 2 to 20% ore to the clay, by volume. Ore assays 42 to 48% manganese. (See U. S. S. Bull., No. 427, pp. 58-61, pp 101, 270.)

Development: formerly by underground workings, now done with two 36 Marion steam-shovels. Management claims 1,000,000 tons ore proven, probable reserves of 3,000,000 tons.

Equipment: electric power, and a 200-ton mill, which started operating June, 1916. Management anticipated a yearly production of 15,000 to 25,000 ons ore.

The property was closed down in March, 1919, and reported sold to the erican Chemical and Industrial Co., Philadelphia.

In August, 1919, A. W. Blakemore, of 40 Central St., Boston, attorney for mittee bondholders committee advertised that those who wished to know

The Valznico mine has a fissure vein in schist, dipping 75° S. E. and pitching N. 40° E. The ore is a complex sulphide, containing 4% lead, 12% zinc and silver, copper, gold and iron.

Development: by 250′ vertical shaft and 2,400′ of workings. **Equipment:** hoist, compressor, pump, steam plant and 50-ton concentrating mill.

Production: in 1916 was 2,300 tons of ore, averaging 4% lead and 12% zinc. Company does not reply to requests for information.

VIRGINIA MINING CO. VIRGINIA

Controlled through stock ownership by General Chemical Co. Operates the Gossan pyrrhotite mines at Monarat, Carroll county, Va. W. S. Smith, supt.

Two mines are worked, the old Huey pit, 200′ deep, and the Bombarger, both by open cut methods. They are located about 2,000′ apart on the same vein which varies up to 60′ in width and is enclosed in mica schist. The ore contains about ½% copper and 30% sulphur, and is shipped 48 miles to Prince, Va., where it is milled and the product burned to make sulphuric acid.

During 1918-'19 about 100,000 yards of overburden was removed, exposing a three-year ore supply. About 100 men are normally employed.

VIRGINIA SMELTING CO. VIRGINIA

Office: 131 State St., Boston, Mass. **Works office:** West Norfolk, Norfolk county, Va.

Officers: W. E. C. Eustis, pres.; A. H. Eustis, v. p.; F. A. Eustis, sec.-treas. W. B. Durant, engr.

Inc. November 10, 1909, in Maine, as successor of Eustis Smelting Works. **Cap.,** $1,000,000; shares $100 par; in $500,000 preferred and $500,000 common stock. Annual meeting, first Tuesday in October.

Company owns the Eustis Smelting Works, or Norfolk smelter, on tidewater, near Norfolk, with railroad facilities to all points. The situation is favorable for custom smelting; as more coal is shipped from this vicinity than from any other center in North America and traffic commands favorable inward rates on return cargoes. The location also insures the best coke for metallurgical use, on advantageous terms. Ore received from vessels is unloaded by machinery into standard railway cars, with facilities to set aside any desired portion as a sample car, standing on a separate track. The unloader has a maximum capacity of 1,000 tons in 24 hours. Loaded cars containing ore are hauled by locomotives upon trestles, and ore and coke dumped into storage bins having capacity for 25,000 tons of ore.

The smelter has a single water-jacket blast furnace of 600 tons daily capacity, using sea water for the jackets. The plant does a general custom business in smelting iron bearing ore from Sherbrooke, Quebec, Canada. The smelting works contain 2 Dwight-Lloyd sintering machines; one operates on copper matte in connection with the blast furnace, the other treats the leached residue and pyrite cinder to produce sinter, which is shipped to pig iron blast furnaces. The leaching department contains a Ramen-Beskow chloridizing furnace, a Holt-Dern chloridizing furnaces, and a precipitating plant. In order to prevent the sulphur smoke from becoming a nuisance to the surrounding farmers, the plant has developed a complete system for washing the gases, and the manufacture of liquid sulphur dioxide from them.

The smelting department of the works is operated under a lease on a royalty basis, by the Norfolk Smelting Co., a New York corporation.

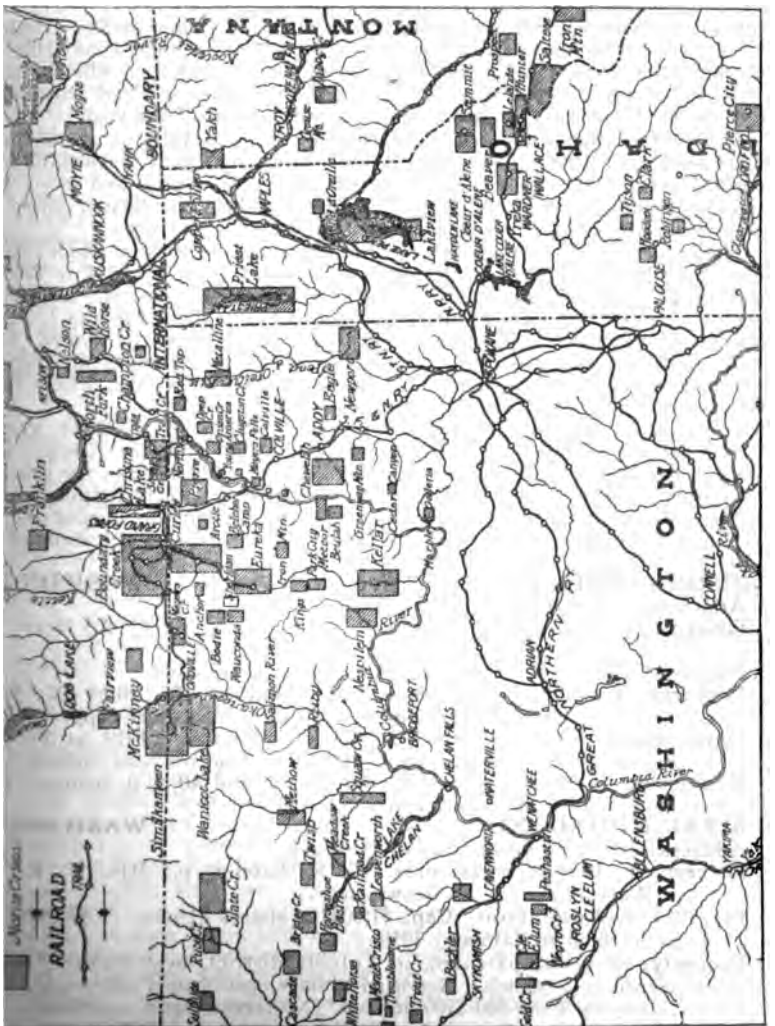
VIRGINIA ZINC & CHEMICAL CORPORATION, LTD. VIRGINIA

Liquidated. Properties acquired by the Virginia Consolidated Chemical Corporation, which see.

WASHINGTON

Spokane is the natural center for the mining districts of eastern Washington, as well as the Coeur d'Alene region, and Seattle for western Washington, but the descriptions are arranged alphabetically for greater convenience of reference.

The value of the metals mined in Washington in 1919, was $959,000, a rease of $518,000 from that of 1918. No zinc ore was marketed. The copper out in the Chewelah district, Stevens county, was somewhat less than in 1918. there was a marked decrease in the shipments of siliceous ore from the ublic district, in Ferry county. Most of the ore and concentrate from the



MINING DISTRICTS OF NORTHEASTERN WASHINGTON, NORTHERN IDAHO AND BRITISH COLUMBIA

of Washington was smelted at Tacoma, Wash.; Trail, B. C.; Midvale, and Northport, Wash. The plant at Grand Forks, British Columbia, was n June, and [illegible] at Greenwood, British Columbia, was idle through- year. [illegible] Northport, Wash., was idle several months on of the [illegible] mine in Idaho during most of the year.

The price of silver increased to about $1.12 an ounce, but the average price of copper, lead, and zinc were even less than those of 1918.

The gold output decreased from $304,658 in 1918, to about $280,000 in 1919, a decrease of nearly 8 per cent. Nearly all the gold came from the Republic district, but there was a distinct decrease in ores amalgamated throughout the State. From the Republic district approximately 25,600 tons of siliceous ore were shipped during the year, as compared with 42,275 tons in 1918. The mines of the district were closed on October 9, as a result of a labor strike. The principal shippers from the district were the Last Chance, Quilp, Knob Hill, Spoil, and Lone Pine mines. The Quilp mine, which had been idle for years, produced the largest output of gold. The Lone Pine-Surprise-Pearl group, which was formerly the largest producer, was idle during most of the year.

The silver output decreased from 310,093 ounces in 1918, to approximately 299,000 ounces in 1919. The value of the output increased from $310,000 to about $333,000. Nearly half the silver came from copper ores, and most of the remainder from ores from the Republic district. The Consolidated Mines Co. in the Springdale district, made several shipments of silver ore.

The copper output decreased from 1,922,406 pounds in 1918, to about 1,371,000 pounds in 1919. The value of the output decreased from $474,834 to $240,[illegible]. The United Copper mine, in the Chewelah district, was as usual, the largest producer of copper. Ore rich in silver was mined below the 1,300-foot level, and shipments of crude ore and concentrate averaged about 350 tons a month. Other notable shipments of copper ore came from the Sunset mine, near Index, Snohomish county, and the Loon Lake mine, north of Spokane, where a flotation plant was operated.

The mine output of lead decreased from 5,271,815 pounds in 1918, to about 1,700,000 pounds in 1919. Most of the product came from the Electric Point property, near Northport, in Stevens county, which was idle most of the year. As the company resumed mining in November, the output is largely estimated.

The only dividend paid by a metal mine in Washington during the first eleven months of 1919 was that of the Electric Point mine, which amounted to $23,790.*

ADDISON COPPER CO. **WASHINGTON**

Address: Keller, Ferry county, Wash.

Officers: Geo. R. Hodges, pres.; R. B. Smith, v. p.; C. A. Gray, sec.-treas.-mgr.

Inc. in Washington. **Cap.,** $75,000; 5c par; assessable.

Property: 5 claims, unpatented, and a millsite, 75 miles N. W. of Spokane, and four miles N. E. of Keller, said to show lead-silver-copper ore.

Development: by tunnels and 150′ shaft. In October, 1919, at 307′ in portal of new tunnel, a 2′ vein of $66 copper-silver-lead ore was opened.

Equipment: includes three-drill compressor and 40-h. p. boiler. Company developing in 1919, employing 7 men.

ADMIRAL MINING CO. **WASHINGTON**

Address: Rookery Bldg., Spokane, Wash.

Officers: T. H. Greenway, pres.; T. R. Tate, v. p.; Mrs. T. R. Tate, treas.; Chas. Warsth, sec.; J. R. Brown, mgr.

Inc. 1914, in Washington. **Cap.,** $1,50,000; shares $1 par. A $75,000 additional issue was authorized in January, 1919.

Property: 65 acres, patented, in Colville district, near Valley, Stevens county, developed by 3 tunnels. Reported to have opened up a silver-copper vein 18″-8′ wide, assaying from $30-$100 per ton. No recent report available.

ADVANCE MINING CO. **WASHINGTON**

Address: Spokane, Wash.

Officers: Frank Johnson, pres.; H. T. [illegible], v. p.; A. M. [illegible], treas., with W. F. Johnson, C. G. Staple, A. [illegible], and W. H. Wiscombe, directors.

Cap., $2,000,000; $1 par.

* Above statements from [illegible]

Property: 9 claims in Beulah district, Ferry county. **Development:** tunnels 400′ and 1,400′ long.

ICHAN BEE SILVER-LEAD MINING CO. **WASHINGTON**

Office: 401 Jamieson Bldg., Spokane, Wash.

Officers: H. M. Howard, pres.-mgr.; Emma S. Stephan, v. p.; Dr. B. F. osser, sec.-treas. with Dr. C. S. Kalb and H. Schwitzer, directors. J. Currie, ɔt., Fruitland, Wash.

Inc. August 1, 1916, in Washington. **Cap.,** $100,000; shares 10c par; 1,000 outstanding.

Property: 8 patented claims, 160 acres, in Deertail district, Stevens ıntv, 25 miles W. of Springdale.

Ore: occurs as a contact deposit in granite. Three veins under develop- nt, said to give assays of about 44 oz. silver and 20% lead.

Development: by tunnels crosscutting property through main working ınel to ascertain value and extent of ore. Management expected to finish ; work in July, 1919. A small flotation plant was erected early in 1920.

.ASKAN COPPER RIVER MINING CO. **WASHINGTON**

Address: Everett, Snohomish county, Wash.

Inc. in 1917 to develop gold mines in Alaska. **Cap.,** $2,000,000. In- porators: E. B. McGill, T. M. Williams and Dr. C. A. Mead.

No recent information.

.LIANCE MINING CO. **WASHINGTON**

Address: 622 Old National Bank Bldg., Spokane, Wash.

Officers: M. C. Hunter, pres.; F. H. Hunter, v. p.; W. W. Gifford, sec.- ıs., with J. M. Lloyd and S. S. Frantz, directors.

Inc. September 9, 1913, in Washington. **Cap.,** $1,500,000, shares $1 par, ıtanding $1,303,288; assessable, not exceeding 5 assessments of 5 mills each r. Bonds authorized $100,000, outstanding $32,400. In 1914 the company ‹ over for $171,000 the property of the Anaconda Gold Mng. & Reduction Co., ing $120,000 in Alliance stock, and assuming an indebtedness of $51,000 for remainder.

Property: 7 claims, 5 patented, 100 acres, in the Eureka mining dis- ; Republic, Wash., adjoining the property of the Republic mine, and said to r 3,500′ along the strike of the Republic vein, 12′ to 30′ wide, and the Princess . 2′ to 10′ wide.

Early development of the properties was done when only high-grade ore shipped, and the Alliance Co. acquired the holdings of 4 different companies the purpose of mining and milling the low grade ore. The veins are de- ped to a depth of 600′ by a 385′ tunnel and a 400′ winze, with total workings .000′.

Equipment: includes gasoline hoist and a 3-drill compressor. No work rted since organization.

PINE MINING & MILLING CO. **WASHINGTON**

Address: Alaska Bldg., Seattle, Wash.

Officers: J. H. Starbird, pres.-mgr.; H. C. Ash, sec.-treas.; with M. R. **bird** and T. P. Revelle, directors.

Cap., $50,000; $100 par.

Property: four lode claims and one placer claim on Negro creek, Chelan ty, said to show a vein 1½′ to 3½′ wide of free milling gold ore.

Development: several tunnels, 100′ to 200′ in length. Is a prospect.

LGAMATED GOLD MINES CO. **WASHINGTON**

Officers: C. R. Hesseltine, pres., 756 New York Block, Seattle, Wash.; G. Litherland, v. p.; J. E. Reynolds, sec.

Cap., $2,000,000; $1 par; assessable to 10c.

Property: the Blewett mine, 7 claims, and two millsites, on E. slope of ıdes, Chelan county, said to show well defined fissure veins in serpentine gold ore, containing a small amount of silver.

Develo [illegible] 000′ of tunnels. **Equipment:** includes 20-stamp mill [illegible] Credited with past production of over $1,000,000.

[illegible] idle.

AMAZON MINE **WASHINGTON**

J. Oppenheimer, owner, Chewelah.

Property: 3 claims, patented, 51 acres, 5 miles N. W. of Chewelah, said to show a vein uncovered for 2,200'. Ore said to assay about 2½ oz. silver, 2% copper, and up to 2½ oz. gold per ton.

Developed by several tunnels, to depth of 300' with 1,330' of workings.

Production in 1918, 187 tons ore; total production, 725 tons. Idle in 1919.

AMERICAN FLAG MINE **WASHINGTON**

Owned by Maurice Snyder, and W. D. Hoover, of Aberdeen, Wash.

Property: at Sheridan, Okanogan county, 11 miles W. of Republic, Ferry county, said to show silver-gold ore that assays $10 to $200 per ton, valu[e] mainly in silver.

Development: by tunnels and 100' shaft.

AMERICAN MINERALS PRODUCTION CO. **WASHINGTON**

Address: 140 S. Dearborn St., Chicago, Ill.

Officers: H. F. Wierum, gen. mgr.; H. L. Griswold, supt., Valley, Wash.

Cap., $1,500,000; $1 par.

Property: in Stevens county, Wash., has a large bedded deposit of magnesite, dipping 40 to 70°. The enclosing rocks are slates, schists and quartzites; the deposits being replacements of dolomite by magnesite. These deposits of crystalline magnesite, a few miles west of Valley in Stevens county, discovered in the summer of 1916, excel in size and purity any known deposits of this material.

Development: by quarries. The crude magnesite is shipped to Irvin, Wash., where it is dead-burned, on toll, and shipped thence to steel works and refractories trade.

Company states there are 300,000 to 500,000 tons shipping grade in sight; quarries have a monthly capacity of 12,000 tons, and the calcining plant at Irvin, 6,500 tons monthly.

Production: in 1918, the company mined 67,855 tons of crude magnesite, analyzing approximately Mg CO_3, 91%; CaO, 1.90%; SiO_2, 2.50%. Total dead-burned shipped East amounted to 17,664 tons.

AMERICAN REDUCTION CO. **WASHINGTON**

Address: Republic, Ferry county, Wash.

Inc. in 1915 by F. R. Clark, of Spokane; P. N. Clark and G. F. Sommer.

The property of the North Wash. Power & Reduction Co., which had been held by a receiver for 2 years, was purchased together with adjoining holdings.

Equipment: includes concentrator, mill, and power plant. Idle for two years.

AMERICAN TUNGSTEN CONS. CORP'N. **WASHINGTON**

Company a reorganization, 1912, of the Germania Mng. Co. Cap., $1,000,000 shares $1 par.

The Germania Co., composed principally of German investors, was organized 14 years ago to develop the Roselle mine, 25 miles west of Springdale, Stevens county. It is said that $500,000 was spent in driving tunnels, in the concentrator and buildings. In 1911 the company became involved in litigation, finally going into bankruptcy.

In January, 1916, eastern interests, represented by F. T. Hamshaw, of Seattle, obtained a lease and bond on the properties held by the Corporation and started operations. Holdings include the Germania and Roselle mines. Development, consisting of a 200' shaft and 3 tunnels with 3,000' of work, is said to have exposed a considerable tonnage of ore. Property sold by Alien Property Custodian in October, 1919, along with the Roselle Mining Co.

APACHE MINING CO. **WASHINGTON**

Address: 1408 Pioneer Bldg., St. Paul, Minn. **Mine address:** Newport, Wash. Leased to Beggs and Ostrasky.

Officers: F. A. Day, pres., Fairmont, Minn.; F. A. Hoyt, v.-p.; W. Evans, sec.-treas., with J. C. Wilson and G. B. Hoyt, directors.

Inc. 1904, in Washington. Cap., $1,000,000; $1 par; issued $[illegible]

Property: 6 unpatented claims, 90 acres, at Nespelem, Okanogan nty, said to show gold, silver ore in a quartz vein in granite.
Development: 75′ shaft and 300′ tunnel.

'EX MINING CO. **WASHINGTON**
Address: James P. Blaine, superintendent, Chesaw, Okanogan county, ash.
Property: the Ben Harrison mine, showing fissure veins carrying gold-er-copper ores. Developed by a shaft with gasoline hoist. Mine intermit-tly operated. No recent information.

'OLLO CONS. GOLD MINING CO. **WASHINGTON**
Mine office: Republic, Wash.
Officers: H. D. Clark, pres.; E. C. M. Hall, sec.; H. B. Ives, treas.; of New Haven, Conn. T. J. Howell, mgr.
Cap., $1,500,000; 50c par.
Property: 9 claims, patented, 165 acres, in Ferry county, 10 miles S. E. Republic, show gold, silver, lead and zinc ore. Said to have made shipments ling $200,000. No recent returns.

ADIUM COPPER MINING CO. **WASHINGTON**
Officers: C. A. Maxwell, pres., Puyallup, Wash. J. C. Wright, gen. r.
Property: 67 acres in Carbon river district, Pierce county, said to w copper, gold, and silver ore.
Development: over 1,300′ of tunnels. **Equipment:** includes a stamp- and electric power plant.

K MINES CO. **WASHINGTON**
A reorganization of the Ark Group Mng. & Milling Co., Ltd., described in . XIII.
Address: Spokane, Wash. **Mine address:** Kettle Falls, Wash.
Officers: J. J. Budd, pres.-mgr.; H. L. Nelson, v. p.; O. L. Budd, sec.-s.; directors, J. J. Budd, H. Karlsten, W. P. Maurer, and Dr. H. Hornby.
Inc. 1918, in Washington. **Cap., $375,000;** par 25c; assessable in treas- 500,000 fully paid shares, and 400,000 paid up to 15c.; 600,000 shares given property.
Property: 10 claims, the Silver Queen group, 3 miles S. of Kettle Falls, ens county. Ore occurs in contact between granite and lime with S. W. e and dip of 45°. Vein reported to be from 30 to 60′ wide, traceable for ¾ mile.
Development: by shafts, 3 tunnels, longest being 800′ and a 150′ up-. This work has shown copper ore containing silver values but silver-lead also occurs near face of tunnel, with back of 300′ with hanging wall not yet Equipped with steam power, air compressor and 2 air drills. The Wash-on property has been under development for several years.
Company also owns 3 gold claims in the Kootenai district, British Columbia.

LINGTON SILVER MINING CO. **WASHINGTON**
H. S. Stoolfire Mgr., Sherwood Bldg., Spokane. Company was formerly Arlington Mng. Co., but was reincorporated in March, 1918, under present e.
Property: 10 claims, near Ruby, Wash., developed to the 450′ level. is said to assay $30 per ton in gold and silver. Small shipments made in

RELIA CROWN CO. **WASHINGTON**
Office: P. O. Box 187, Seattle, Wash. treas. and
mgr.; A. E. Coxhead, v. p.; H. M. Geo. C.
ple and C. E. Horton, trustees.
Inc. in Washington. **Cap.,** $10,000 sable;
d $8,137,600.
Property: 36 claims, 730 acres and
of Lucerne, Chelan county, Wash.
and molybdenite mines, having 8 tu
several open cuts. The Crown Prin

to develop 2,000 tons ore. The Silver Trail silver-lead mine has a 6′ fissure vein. Tunnel No. 3, on the copper vein, shows 4 ore shoots, of 4 to 8′ width, carrying ore said to give average assays of 15.5% copper and $8.65 gold and silver per ton.

Equipment: includes hydraulic plant, air-compressor, machine shop, engine house, saw-mill, warehouse and 3 cabins. The mill has 2 crushers, rolls and a Schull concentrator.

AURORA COPPER MINING CO. **WASHINGTON**

Inactive. Conrad Wolfle, pres., Symons Block, Spokane, Wash.

AZURITE COPPER CO. **WASHINGTON**

Office: 80 Broadway, New York.

Officers: C. H. Ballard, pres.; W. G. Hughes, v. p.; Wm. Tensan, sec.; W. T. Behire, treas.

Inc. December, 1916, in Delaware. **Cap.,** $3,000,000; par $1; 2,600,000 shares issued.

Property: a prospect in Whatcom county. Claims show gold and copper ore.

BEAD LAKE GOLD-COPPER MINING CO. **WASHINGTON**

Address: 608 Hyde Bldg., Spokane, Wash.

Officers: G. C. Geisler, pres., E. 1111 Augusta Ave., Spokane, Wash.; C. C. Wilt, v. p.; W. E. Allen, sec.-treas.-mgr.

Cap., $3,000,000; $1 par; assessable.

Property: several hundred acres in the Newport district, Pend Oreille county, Wash., carrying veins of silver-lead, and copper ore. In December, 1919, company bought the Conquest mine for $20,000. The Comstock mine has been previously acquired for $2,500.

Development: by over 5,000′ of tunnels and 600′ of shafts, which it claimed, has blocked out sufficient ore to justify the installation in 1919 of a 100-ton concentrator, moved from the Western Union mine in Idaho. The plant includes a flotation unit.

BEECHER GOLD MINING CO. **WASHINGTON**

Address: Orient, Wash. Alex A. Anderson, mgr.

Property: the Beecher mine near Orient, Ferry county, in which gold quartz ore occurs in stringers.

Idle since 1917.

BELCHER MINING CO. **WASHINGTON**

Property was reported to have been bought, 1918, by Frank Babcock, Ione, Wash., for $50,000, payable in instalments over a period of two years.

Property: the Belcher claim N. of Republic, Ferry county, shows regular replacement deposits of pyrite associated with garnet, epidote, tremolite and magnetite in marble and interbedded shale, etc., intruded and metamorphosed by monzonite porphyry dikes and sheets.

Development: by 3 tunnels showing sulphide orebody 5′-20′ thick. A dip plane (see Bull. 550 U. S. G. S., 1914, pp. 167, 175, 179). Over 5,000′ of work has been done.

A 1,000′ aerial tram connects the tunnels with ore bins on the railroad. Water, brought 2,000′ from Lambert creek, through a steel pipe, generates electric power, supplemented by a gasoline auxiliary plant.

Equipment: includes an air compressor and power drills.

Property, reopened May, 1911, shipped low-grade gold-bearing pyritic ore per ore to Granby smelter. In 1917, reported to have shipped 3,000 tons assaying 6% copper and $1 gold.

BENDER METALS MILLING CO. **WASHINGTON**

Officers: Henry Bender, pres.; B. W. Johnson, sec.; Robt. Bender, treas., all of Toledo, Ohio. J. W. Douglas, v. p., Spokane, Wash.

Cap., $30,000; par $25. Early in 1918, the company finished converting an old stamp-mill in the Oroville district, Stevens county, into a flotation mill to treat ore from the nearby Rich Bar, and Caaba mines. No recent information.

'N HUR LEASING CO. **WASHINGTON**

Dissolved.

Address: S. P. Domer, 623 Rookery Bldg., Spokane, Wash.

Company was a co-partnership formed to operate the Ben Hur mine at Re-lic, Ferry county, Wash., under lease.

Property: the Little King and Queen claims on Gold Hill, developed 300' shaft, showing gold, silver, and copper ore. Equipped with steam power, ipressor, etc. New plant installed, 1913. Property was intermittently worked, 1-12, and drifting done on the 200' and 400' levels. Mine was operated under e by Cons. Mining & Smelting Co. of Canada, Ltd., during 1914-15, but 'n up early in 1916. Lessees worked the mine; made small shipments in 1919. Vol. X, of the Copper Handbook.

UE LEDGE MINING & MILLING CO. **WASHINGTON**

Officers: Geo. W. Steele, pres., 355 Head St., San Francisco; Geo. A. mook, v. p.; Wm. R. Rae, sec., all of San Francisco; Geo. A. Steele, asst. Keller, Wash.; Louis Reiss, treas., Cheney, Wash.

Cap., $175,000; 10c par, assessable.

Property: 5 claims, 3 patented, in Ferry county, 4½ miles E. of Keller, to show silver bearing copper and gold ore in a 2' to 6' vein that outcrops 600'.

Development: tunnels and shafts, total 1,255'. Idle many years.

JESTAR MINING CO. **WASHINGTON**

Address: Chewelah, Wash.

Officers: L. R. Nestos, pres.; H. C. Moltern, v. p.; Fred W. Dickey, treas., with Wm. Boyd and S. F. Doran, directors.

Inc. 1906. **Cap.,** $1,600,000; $1 par; 990,000 issued.

Property: 8 claims, 1 patented, N. W. of Chewelah, Stevens county, to carry silver-lead ore. Idle several years.

IANZA MINE **WASHINGTON**

Property: 200 acres, located 3 miles from Bossburg, Stevens county, ı. The mine, an old-time producer, said to have had an output of $1,000,- ınd idle for 15 years, was reopened in 1915 by lessees, who started shipping -lead ore to the Trail smelter. Reported in 1918, that property was under ar lease and bond to Geo. Vervaeke, that $20,000 in ore had been shipped nodern machinery added.

)eveloped: by 450' incline shaft to 700' level, and a total of over 3,000' 'ground workings. All ore above 600' level has been stoped. See U. S. G. S. tin 550, p. 63.

TON-AMERICAN MINING CO. **WASHINGTON**

)ffice: 217 Commerce Bldg., Everett, Wash. **Mine office:** Monte), Snohomish county, Wash.

)fficers: H. D. Cowden, pres.; C. A. Riddle, v. p.; L. E. Engel, sec.; Boston, treas., with J. H. Adams, P. E. Low, E. Garber and H. B. Cow- lirectors. D. R. Kyes, supt.

ompany is not a reorganization of the United Mining Co., Nevada, which ut stockholders of the United Mining Co., with few exceptions, have more ın **equal** proportional holding in the Boston-American Mng. Co.

ıc. in 1913, in Washington. **Cap.,** $2,000,000; $1 par; 1,600 400,000 preferred; 1,344,200 common and 293,450 preferred iss nancial statement, January 1, 1917, showed: receipts for 19 **litures,** $68,928; balance on hand, $38,750.

roperty: 88 claims, 26 patented, and 4 patented mill si Wash., said to show a dike of low-grade ore 300' wide, cu with streaks of ore from a few inches to 4' in width. Ore ilver, copper, zinc and arsenic. Mineralized zone said to ha rkings over a length of 750' and to show for 5,000' on surf

evelopment: 14 tunnels, the longest, 1,850', is 1,400' b **tunnel.** Total underground workings about 19,600'. d to have proven up five distinct ledges at depths from the ges being regular, well defined, true fissure veins. Mar

to have 120,000 tons ore blocked out and to have shipped 18 carloads ore that assayed $29 per ton in gold, silver and copper, 8% arsenic and 2½% zinc.

The mine was examined by I. H. White, of Butte, Mont., who is quoted as having reported that there is more than enough ore blocked out to warrant the construction of a 200-ton mill.

Company's former literature considered grossly misleading and creating an unfavorable impression, which can only be remedied by frank statements of operations and economical development. No recent returns; probably idle.

BOUNDARY GOLD CO. **WASHINGTON**

Officers: I. D. Sperry, pres.-treas., Glacier, Wash.; Geo. G. Gilchrist, sec., 747 Gas & Electric Bldg., Denver, Colo.

Cap., $1,000,000; $1 par.

Property: 5 claims patented, on S. E. slope of Bear mountain, Whatcom county, said to show free milling gold ore with small values in silver.

Development: by 1,000′ of tunnels. **Equipment:** includes 76-h. p. water wheel, 10-stamp mill, 3-drill compressor, and 2,600′ aerial tram.

Total shipments to 1918, reported about $225,000.

BOUNDARY RED MOUNTAIN MINING CO. **WASHINGTON**

Address: Reno, Nev.

Officers: Geo. Wingfield, pres.; E. A. Julian, gen. mgr.; C. F. Burton, sec.-treas. Stock is closely held.

A. H. Westall, supt., Sardis, B. C. Control purchased June, 1916, by George Wingfield and associates.

Property: in Whatcom county, shows a fissure vein containing an ore shoot developed for 750′ and averaging 4′ in width, of $20 ore.

Development: carried on intermittently since 1889, is by tunnels. A crosscut tunnel driven 500′ below upper tunnel has a 500′ drift on the vein whose width and values are larger than above; new tunnel started, 1919, is 75′ lower.

Equipment: includes a hydro-electric plant and a 10-stamp mill.

BRUCE CREEK MINES CO. **WASHINGTON**

Officers: Bob Mabry, pres.-mgr., Hutton Bldg., Spokane, Wash.; J. F. Dillard, v. p.; E. A. Mabry, sec.-treas.

Inc. in Washington. **Cap.,** $100,000; 10c par; assessable.

Property: 120 acres, leased from the State, in Stevens county, 16 mi. N. E. of Colville. Mine is said to have a contact deposit, between limestone and granite, with silver-bearing lead ore and a little zinc blende.

Development: by tunnels and open cuts. **Equipment:** includes gasoline engine and compressor. Was developing late in 1918; no later report.

BUNKER HILL MINING & SMELTING CO. **WASHINGTON**

Dissolved. Was successor of Bunker Hill-Sullivan Copper Mng. Co. and operated near Reiter, Wash. Described in Volume XIII.

Mining property and other assets were purchased by the Western Coal & Mining Co. in June, 1917, and the mine is described under that title.

BUTTE-CHEWELAH COPPER CO. **WASHINGTON**

Address: J. O. Gillice, pres., Paulsen Bldg., Spokane, Wash.; F. M. [illegible] v. p.; P. L. Eberhardt, sec.-treas., with G. B. Harrington and R. J. Davis (gen. mgr.), directors, at last accounts.

Inc. March, 1913, in Washington. **Cap.,** $1,000,000; shares $1 par; fully paid and non-assessable; 500,000 issued.

Property: 4 claims, 75 acres, in the Valley mining district, shows veins in sedimentaries close to a diabase intrusion; average strike N. 25° E. and dip 60°. Ore contains chalcopyrite and gray copper in a gangue of quartz, calcite and spathic iron. At 100′ in depth the vein is said to be 6′ wide and the ore to average 2 to 5% copper, 1 to 5 oz. in silver and 50 cents to $1 in gold per ton.

Developed by 100′ winze, reported all in ore, a 300′ shaft and 125′ [illegible]. Equipment includes a hoist and air-compressor. No recent report, probably [illegible].

CAREY MINING & MILLING CO. **WASHINGTON**

P. P. Rooney, mgr. Company has lease and bond on the Phil Sheridan and other claims in Sheridan camp, Ferry county, near Toroda, said to show [illegible]

ein of silver ore with some gold and copper. Developed by 400′ shaft. In 1917 company built a flotation plant. One car of ore shipped is said to have returned $2,800. No recent returns.

ASCADIA MINING & DEVELOPMENT CO. WASHINGTON

Mine office: Toledo, Wash.

Officers: E. A. Sessions, pres., 212 Abington Bldg., Portland, Ore.; V. A. Gray, v. p.; W. D. Scott, sec.-treas., with M. A. Poppleton, J. P. Finley, eo. S. Reid, F. H. Dowler, directors. J. F. Hartley, asst. sec.

Inc. March 12, 1887, in Washington. **Cap.,** $6,000,000; shares $1 par; 1,164,615 in treasury.

Property: 108 claims, 2,170 acres; 330 patented in St. Helens mining istrict on the divide at the head of the Toutle river in Cowlitz, Lewis and kamania counties, includes the Polar Star and Minnie Lee groups. Properties ow fissure veins in grano-diorite, running N. E.-S. W. and dipping 40-60°. he copper ore, which carries gold and silver, occurs in shoots, 2-12′ thick and)-100′ long. This ore is said to average 17.9% copper, 24.85% iron, 10.75% lica, 4% aluminum, 1.2% lime, 34.5% sulphur, 5.68% antimony, 0.8% zinc and 05% nickel.

Development: 5,000′ of work including 300′ to 700′ tunnels with about 500′ on ore. About 100,000 tons of shipping ore has been mined and put on the mp, waiting for cheaper transportation. The mines are 16 miles from a railad over a heavy grade. Property has been under development in a small way r 19 years past.

Examined and reported on by Prof. F. L. Barker, Robt. E. Hanley and B. Wilson.

AYWASH MINING CO. WASHINGTON

Officers: L. H. Prather, pres., Tacoma; W. R. Weisel, v. p.; D. L. ylor, treas., both of Kennewick, Wash.; S. S. Callahan, sec., Twisp, Wash., th W. Wood, directors.

Cap., $1,000,000; par $1; assessable to 10 mills.

Property: 3 claims on Methow river, and 5 claims on Goat creek, both oups near Mazama, Okanogan county, are said to show silver and gold-bearing oper ore. The ore from the Goat Creek group said to assay $33 to $54, and t of the 3 claim groups $8 to $32 in copper, with a little gold and silver.

Development: shallow shafts and 3 tunnels, longest, 250′.

Management thinks it has a good prospect, but only assessment work has n done recently, as company expects a railway to be built soon that will give ap transportation.

IATTERBOY MINING CO. WASHINGTON

Office: Dayton, Wash.

Officers: A. D. Monnett, pres.; Judge C. F. Meller, sec.-treas.; J. C. nard, mgr.; J. J. O'Connor, supt.

Property: the Lucille Dreyfus mine, including 8 claims, 1½ miles S. Danville, reported in 1917, as held by Virginia Mining Co., and operated under 50,000 lease and bond by A. A. Dunphy and associates, of Spokane. Said to e a 7′ vein with gold value ranging from $6 to $17 per ton.

The Chatterboy Co. is driving a tunnel to cut the vein at a depth of 8 itional depth of 500′. Company also has an option on the adjoining he Minnehaha Mining Co.

ELAN CONSOLIDATED COPPER CO. WASHI

Michael J. Corcoran, asst. sec.-treas., 180 Broadway, New York. **Operating office:** 811 Lowman Bldg., Seattle, Wash. **Mi** venworth, Chelan county, Wash.

Officers: F. D. Wilsey, v. p.; Thos. J. Higgins, sec.-treas., W Bristol, Edw. W. Kuhn, A. T. La Vallette, J. L. Jurey and Louis tees.

Inc. May, 1906, in Wash. **Cap.,** $12,000,000; $10 par; issued. ranty Trust Co., New York, registrar. Annual meeting, first . Company absorbed the Red Mountain Gold & Reduction Co., Mng. Co. and a large number of individual mining properties.

COPPER KNOB MINING CO. **WASHINGTON**

Officers: Wm. H. Stevens, pres., Hillyard, Wash.; with J. S. Meyers, J. T. Brunskill, Laurier, Wash.; J. E. Winters, and E. O. Conner, Spokane, directors.

Cap., $100,000; par 10c; non-assessable.

Property: 7 claims, unpatented, near Laurier, said to show copper ore with small precious metal content. Has a 60′ shaft. In 1918, a crosscut then being driven showed a little ore.

COPPER QUEEN MINING CO. **WASHINGTON**

Property taken over by Copper King Mining Co. and a new company organized under title of King Mining Co., which see.

COPPER WORLD EXTENSION MINING CO. **WASHINGTON**

Address: Loomis, Okanogan county, Wash. Walter A. Boyle, pres.; Edw. H. Caylor, v. p.; Alfred F. Carman, sec.-treas.

Property leased to C. Dempster & Sons, New York (R. C. Dempster, supt.) who are said to have spent $80,000 for equipment and development work to end of 1919.

Inc. January 11, 1904, in Washington. **Cap.,** $1,500,000; shares $1 par.

Property: 8 claims, 160 acres, on Palmer mountain, in the Wannacut lake district. The ore is pyrrhotite containing copper and occurs in lenticular masses in a schistose formation opened by a 335′ 2-compartment shaft, with 800′ workings of 2,000′. Diamond-drilling being done in 1920.

In 1917-18, shipments amounted to 3,500 tons ore, assaying 4% copper, 6 oz. silver, and 0.025 oz. gold per ton.

Equipment: includes steam plant, with 40 h. p. hoists and 4-drill air compressor. A 2-mile Riblet aerial tram was completed in 1919; capacity, 40 tons in 24 hours. Employs 14 men.

COPPER WORLD GOLD MG. & SM. CO. **WASHINGTON**

Office: 401 Columbia Bldg., Spokane, Wash. **Mine office:** Loomis, Okanogan county, Wash. Jerome L. Drumheller, pres. and mgr.; John Wentworth, v. p. and supt.; S. A. Child, sec.-treas.

Inc. in Washington. **Cap.,** $3,000,000; shares $1 par, non-assessable.

Property: 2 claims, patented, lying between the Copper World Extension on the east and the Leadville mine on the west, on Palmer mountain, 3 miles N. E. of Loomis. The mine has several short tunnels and shallow shafts and a 135′ two-compartment incline shaft, having a 125′ crosscut.

This and adjoining property, Copper World Extension (which see), are under 5-year lease to C. Dempster & Sons, New York.

CRESCENT MINING CO., LTD. **WASHINGTON**

Company is a reorganization of the Crescent C. Mng. Co.

Office: at last accounts, 201 Lindsey Bldg., Winnipeg, Manitoba, Can. **Mine office:** Twisp, Okanogan county, Wash.

Officers: D. C. McFee, pres.; C. H. McNaughton, v. p.; J. H. Sutherland, sec.-treas., with F. J. Carr, D. D. Young and D. Munroe, directors. G. A. Creighton, mgr.

Cap., $3,000,000; unsubscribed stock, $1,291,786; $1 par.

Property: 48 claims, about 960 acres, and a mill-site on the east side of Cascade Range, in Okanogan county, about 100 miles S. W. of the Great Ore occurs in fissure veins, carrying chalcopyrite, bornite and quartz. Main development by tunnel over 900′ long. A good deal of graphite is mixed with the ore.

Equipment: includes a turbine, electric plant, air drill, saw-mill, buildings and miners' lodgings. Management does not reply to requests for information.

CRYSTAL MINE **WASHINGTON**

Property: 40-acre mining group 35 miles W. of Lincoln, in Lincoln county. Developed by 200′ shaft.

Reported under option to E. S. Campbell and associates for $200,000.

DEER TRAIL NO. 2 MINES **WASHINGTON**

The mines were notable producers 25 years ago, with a credited yield of

,000,000. Ore carries silver, with some lead. 200,000 tons of $10 ore are ported on the dump and in stopes. Mine has 2 miles of workings.

Reported under a lease and bond in 1918 to W. A. Corey, of the Finch estate.

IAMOND R. MINING CO. **WASHINGTON**

Officers: R. A. Hutchinson, pres.; W. H. Crawford, v. p.; E. S. Camp-ll, sec.-treas., 311 Hyde Bldg., Spokane; Oscar DeCamp, supt., with T. S. utchinson, directors.

Cap., $100,000; 10c par.

Property: 6 claims, patented, in Pend Oreille county, one mile from etaline, said to have argentiferous lead-zinc ore assaying 7% lead, 10% zinc, d 1 to 3 oz. silver. In 1918, company claimed to have 15,000 tons milling ore dump and in the mine.

Development: by tunnels. Lessees are said to have made small ship-nts of 60% lead ore. No recent information.

OMINION SILVER LEAD CO. **WASHINGTON**

Officers: early in 1918 were, W. H. Linney, pres., 2805 Summit Blvd., okane; Roy C. Lammers, v. p.-treas.; Roy H. Clarke, sec., all of Spokane.

Inc., 1919, in Washington. **Cap.,** $100,000; par $10; non-assessable. Owing litigation property has been idle for several years. Company was organized work Old Dominion group, operated for many years by G. B. Dennis, Spokane, d Peck Bros., Chicago. Property sold at sheriff's sale, 1916. Bought by W. Linney, who formed present company. Peck Bros. then brought suit and n the case in the lower court, but company has appealed.

Property: Old Dominion group, 2 miles E. of Colville, said to show h-grade silver-lead ore. Developed by tunnel to depth of 800', with 17,000' al workings. Mine first opened in 1865, has produced 3,061 tons of ore worth 2,536.

)UBLE EAGLE MINING CO. **WASHINGTON**

Officers: M. Kulzer, pres., Valley, Wash.; W. S. Rose, v. p.; E. E. wards, sec., Valley, with J. L. Dirks, W. H. Button, and A. Morrison, di-tors.

Cap., $1,000,000; $1 par.

Property: 4 claims, and 200 acres leased land in Stevens county, 12 es W. of Valley, said to show silver-lead-copper ore.

Development: by tunnels. At last account company was driving a 0' tunnel to cut the vein at 700' depth. Several cars of ore have been shipped.

)UBLE HEADER MINING CO. **WASHINGTON**

Officers: Geo. M. Quinn, pres.; L. C. Shuff, sec.-treas.; with E. Moore, . Kennedy, and E. Smith, directors. Reported in November, 1918, that prop-was being operated by a close corporation, the Jenkins-Hammond Co., with nk C. Hammond, mgr.

Inc. 1914, in Washington. **Cap.,** $1,500,000; $1 par; 1,174,326 issued. nual meeting, first Tuesday in June.

Property: 7 claims, 120 acres, 1½ miles S. of Nespelem, Wash. Exam-by A. O. Ingalls and others. Claims cover a quartz vein in granite, dip-50° N. E., with N. W.-S. E. course.

Development: by 80' vertical and 125' incline shafts, workings totaling 0'. InNovember, 1918, rich ore was reported cut in a band paralleling the r-grade ore. A 100-ton flotation mill has been installed in which an 80% very is reported.

TCH MILLER MINING & SMELTING CO. **WASHINGTON**

H. P. Fogh, pres. and agent for majority stockholders, 1403 Howell St., tle. Wash. Geo. H. Law, sec.-treas.

Cap., $2,000,000; shares $1 par; all issued; 1,000,000 shares in escrow fo ars. Majority of stock is held by an ore contract association, which mad ear contract for output, the Dutch Miller to get 40% of earnings as royalty half to apply on 500,500 shares optioned to the association.

Property: 2 patented claims, on summit of range, 12 miles south o comish, Wash., formerly worked by the Seattle-Boston Copper Co. Claim an orebody in a vein in granodiorite. Ore is chalcopyrite with tourmalin

and quartz, and is high-grade. Mine lacks transportation facilities and ... tramway must be installed to get ore to the wagon-road.

Examined by W. H. Weed. Inactive for several years, but company ... alive.

EAGLE PEAK COPPER MINING CO. WASHINGTON

Mine office: Longmire, Pierce county, Wash. **Main office:** Tacoma, Washington.

Officers: R. H. Wheelock, pres., Ashford, Wash.; J. E. Walker, v. p.-mgr.; M. A. Long, sec.-treas., with G. W. Anderson and A. Lundin, directors.

Inc. 1908 in Washington. **Cap.,** $150,000; $1 par; issued, 130,000. Annual meeting, September 10.

Property: claims, 40 acres in Cascade mining district, 14 miles ... railroad, in the heart of the Tatoosh range, near Mt. Tacoma. Claims ... fissure veins in granite with ore carrying bornite and chalcocite and sul... average 17% copper, $4 gold and some silver.

Development: by tunnel. **Equipment:** includes 25-h. p. power ... air compressor and 4 buildings. Reported, 1919, that a small mill will be ...

ECLIPSE CONS. MG. & INVESTMENT CO. WASHINGTON

Address: 528 New York Bldg., Seattle, Wash.

Officers: Robert Dahl, pres., John E. Newall, v. p.; John B. Van Dyke, sec., with Andrew Chilberg, directors.

Inc. 1906, in Washington. **Cap.,** $3,000,000; $1 par; $2,000,000 in ... given for the property.

Lands: 9 claims, unpatented, and a mill site.

Mine has 3 tunnels and a shaft on a fissure vein in slate, carrying ... gold and silver, claimed to assay $61.50 per ton. Workings total 1,825'. ... agement estimates 90,000 tons ore blocked out, March, 1919. Water power ... the Stillaguamish river develops 830 h. p. by turbine. The concentrator, ... at 300 tons daily capacity, has tank room for cyanide treatment. A compr... of 600 cu. ft. capacity has recently been added.

ELECTRIC POINT MINING CO. WASHINGTON

Address: Roy A. Young, pres.-gen. mgr., Northport, Wash. ... Dodds, supt., Cummings, Wash.

Officers: J. E. Yoder, v. p.; F. A. Turner, sec.; F. T. McColl... treas., with L. C. Jesseph and R. A. Young, directors.

Cap., $1,000,000; $1 par; 793,000 shares issued. One quarter ... owned by Walter J. Nicholls, Spokane. Financial statement shows ... loss in 1918 of $25,917. Cash reserve, December 31, 1918, reported as $14...

Dividends: initial on Jan. 31, 1916; last, of 3c a share, was paid ... 22, 1919, making total of $301,530.

Property: 13 claims, 245 acres, unpatented, 20 miles E. of Nort... Stevens county, and 13 miles from Boundary, the shipping point. Mine ... top of a mountain, 4,000 to 5,000' high.

Ore: a low grade lead ore mainly carbonate that occurs in chim... of variable size. Shipments run about 25% lead.

Development: to 800' level by tunnels and shaft. Reserves are ... ficially estimated as 25,000 tons of 30% ore, plus 2,000 tons in bunkers at ... terminal. In October, 1919, it was reported that a new chimney of ore, 80' ... had been developed.

Equipment: includes a 2½ mile aerial tram, from mine to Lead... and another section to be built to Wood Spur; orebins and suitable mining ...

Production: in 1917, shipments totaled 16,310 tons ore; in 1918, ... tons were shipped, returning $241,138.

Property was idle for several months in 1919. Future of the mine ... depend on the possibility of finding a market for the ore. Reported, ... 1919, that the U. S. S. R. & M. Co. at Midvale, Utah, had arranged to ... entire output. If the ore carried 30% lead, and the metal is 6 cents a ... equal to $18 per ton of ore, and charges are $3 per ton for treatment and ... for freight, the profit will be $6.20 per ton.

LIZABETH GOLD HILL MINING CO. **WASHINGTON**

Address: North Yakima, Yakima county, Wash.

Officers: L. L. Matterson, pres.; P. J. Eschbach, v. p.; Frank X Nagler, :-treas., with Jos. Feser, Thos. Hope, E. P. Sanford and Rudolph Mayer, ectors.

Inc. 1900, in Washington. **Cap.,** $1,000,000; $1 par. Annual meeting ond Monday in March.

Property: 14 claims, unpatented, 200 acres, adjoining the Blue Bell mine the north, about 65 miles N. W. of North Yakima, in the Summit district, ws a number of orebodies in granite, carrying gold-silver-lead-copper ores, h 1,600′ of workings.

Ore reserves: estimated by management, 150,000 tons of ore, with ,000 tons blocked out for stoping, averaging $40 per ton, which figures are essive.

Equipment: includes steam and water power, and a small sawmill, with erial for a 10-stamp mill on the ground. Idle since 1917.

PIRE MOLYBDENITE M. & M. CO. **WASHINGTON**

Address: M. B. Le Page, sec., 621 S. Adams St., Spokane, Wash.

Officers: T. Le Page, pres.; D. J. Whelan, v. p.; Fred Le Page, treas., A. G. Clark, directors.

Cap., $100,000; shares 10c par.

Property: 8 claims, unpatented, on Molybdenite peak, Metaline dis- Pend Oreille county, 11 miles from Ione. Claims carry molybdenite ore has been worked in a small way for several years, and some shipments e.

'ORITE GOLD & COPPER MINING CO. **WASHINGTON**

Probably dead. See Vol. XII.

Mine at Nighthawk, Okanogan county, Wash.

. & C. GOLD MINING CO. **WASHINGTON**

Officers: S. A. McCay, pres.; M. J. Luby, v. p.; J. J. Hennessy, treas.- ; Mary Hennessy, sec., with Martin Woldson, directors, all of Spokane.

Cap., $250,000; shares 25c par.

Property: 53 acres, 2½ miles N. W. of Rockcut, Ferry county, has silver ore.

Development: 170′ shaft, with about 1,000′ of workings. **Equipment:** les gasoline hoist and compressor. Small shipments were made to Granby r in 1918. No later information.

T THOUGHT MINING CO. **WASHINGTON**

ucceeded by Cons. First Thought Mines Co., which see.

RENCE-RAE COPPER CO. **WASHINGTON**

ddress: Index, Snohomish county, Wash. N. Rudebeck, mgr.; Fred supt.

roperty: on Copper mountain, about 4 miles E. of Index, has a tun- owing a 10′ paystreak of chalcopyrite in the Margurite vein and assay of sample taken across 6′ of the vein averages 12 oz. silver, 18.5% copper, iron, 7.2% silica, and 35.8% sulphur. Idle.

'K MINING CO. **WASHINGTON**

ldress: Chewelah, Wash.

ficers: A. C. Weary, pres.; W. B. Stuart, sec.-treas.-mgr., with Wm. son, directors.

p., $80,000; 5c par.

operty: 4 claims, 80 acres, near Chewelah, said to show copper-lead quartz vein. Developed by 120′ shaft. A prospect.

NA FARM MINING CO. **WASHINGTON**

dress: Dr. W. J. Keyes, sec., Fernwell Bldg., Spokane, Wash.

operty: 6 claims, in Stevens county, 16 miles S. E. of Northport, show lead-silver-gold ore.

velopment: by open-cuts and 200′ tunnel. No recent report.

GLADSTONE MOUNTAIN MINING CO. **WASHINGTON**

Address: 201 Sherwood Bldg., Spokane, Wash. **Mine office:** Northport, Wash.

Officers: F. T. McCollough, pres.; T. S. Lane, v. p.; W. J. Nichols, mgr.-sec.-treas., with J. A. Welch and H. M. Stephens, directors. D. D. Dodd, supt.

Inc. August, 1916, in Washington. **Cap.,** 1,500,000 shares, 10c par; non-assessable; 1,201,056 outstanding; 100,000 shares sold 1917 at 15c per share.

Property: 16 claims, 11 surveyed for patent, 291 acres, situated 20 miles E. of Northport, and but 900′ from Electric Point mine, the claims almost surrounding that property.

Geology: vertical chamber or so-called "chimney" deposits in limestone. Ore contains lead as carbonate, 1 oz. silver, trace of gold. Sulphides were opened in 1919.

Development: by Setting Sun shaft 275′ with drifts at 50, 100, 200 and 260′; total openings, 450′. Shaft and drifts show pay-shoot 120′ long with workable width, of carbonate lead ore. Also has 120′ Lone Star shaft with ore.

About $35,000 has been spent on the property.

Equipment: 15-h. p. gasoline hoist.

Production: in 1917 shipped 22 cars of 15 to 18% lead ore netting $12,000. Closed down in 1917, owing to lack of funds, but was reopened in 1919 and by October, carbonate and sulphide ore had been found carrying up to 8% lead. Is a speculative proposition.

GRANT CONSOLIDATED COPPER MINING CO. **WASHINGTON**

Officers: at last accounts, C. H. Clodius, pres., Ritzville, Wash.; MacDonald, v. p.; J. A. MacLean, sec.-treas., Spokane.

Inc. 1907, in Washington. **Cap.,** $1,650,000.

Property: 14 claims, on Copper mountain, 9 miles from Chesaw, Okanogan county, developed by an open cut and tunnel planned to be driven 1,500′, cutting 2 strong veins carrying medium-grade chalcopyrite in considerable quantities. Shipments said to have returned about 6% copper and $3 gold per ton.

Equipment: includes two 80-h. p. boilers and an air compressor. Letters neither answered nor returned. Presumably idle.

GREAT METALS MINING & MILLING CO. **WASHINGTON**

Address: Nespelem, Okanogan county, Wash. E. C. Williamson, mgr.; Albert Nelson, supt.

Property: in the Nespelem district, also reported to have leased property from the Double-Header Mining Co., which see. At depth of 200′ in September, 1919, a foot of $20 and five feet of $15 ore had been opened in company's mine.

Equipment: includes a gravity concentration and flotation mill, treating 80 tons of silver ore and 10 tons of lead ore daily, at last account.

GREAT NORTHERN MINING CO. **WASHINGTON**

Address: Jos. Rosslaw, Hyde Bldg., Spokane, part owner in 1918.

Property: 4 patented claims, on San Poil river, Ferry county, 15 miles from Kellar, said to show gold-copper ore, with some nickel and cobalt. In 1918, workings totalled 1,850′.

GWINN MINING CO. **WASHINGTON**

Property said to have been acquired by Hall Creek Mining & Milling Co. in 1919.

Address: Meteor, Ferry county, Wash. Peter Proff, mgr. at last accounts.

Property: a group of claims in the Meteor or Covada district, showing fissure veins in sedimentary rocks cut by diorite and carrying complex ore said to average about $16 per ton in gold, silver, copper and lead.

Development: by shafts and tunnels, said to have blocked out considerable low-grade ore which is being treated in a 50-ton concentrator. Company erected a dam on Hall creek for its hydro-electric plant.

ALL CREEK MINING & MILLING CO. **WASHINGTON**

Officers: at last accounts, M. W. Merritt, pres.; Peter Proff, Jr., sec.-as.-mgr., Rosalie, Wash.

Inc. in Washington. **Cap.,** $1,000,000: shares $1 par.

Property: 240 acres including the Gwinn mine and group of claims, ows a fissure vein carrying gold-copper ore, developed by 400′ shaft. (See vinn Mng. Co.)

Equipment: includes steam plant and water power, hoist and 4-drill irbanks compressor. Has a 75-ton concentration mill, driven by electric power.

No recent returns; presumably idle.

AMMOND MINING CO. **WASHINGTON**

Dead. Former property, the Great Excelsior mine.

This was an attempt to work a $4 gold deposit. See Vol. XIII for details.

CLA COPPER-SILVER MNG. & MLG. CO. **WASHINGTON**

Chewelah, Wash.

Officers: J. C. Argall, pres., Spokane; Howard McPhee, v. p.; V. R. ar. sec.-treas.; Fred F. Foster, supt., with C. W. Linscott, directors.

Property: 11 claims 3½ miles N. E. of Chewelah and S. of the United er Copper Co. Claims show 4 ledges, the main vein varying from 6 to wide, traceable by cuts and pits for nearly a mile and averaging 5.4% cop-, $1 in gold and $1.80 in silver.

Developed: by a 75′ tunnel and a 150 vertical shaft. **Equipment:** in-les a 50 h. p. hoist and a 4-drill compressor. No recent returns; probably

GH GRADE SILVER & COPPER MINING CO. **WASHINGTON**

Office: Chewelah, Wash.

Officers: Oscar Carstens, pres.; Henry Carstens, v. p., 828 Old National k Bldg., Spokane; J. A. Hansen, treas.

Inc. July, 1909. **Cap.,** 1,500,000 shares, assessments of 9 mills levied to

Property: 3 claims, about 3 miles N. E. of Chewelah, Stevens county vs a granite intrusion in lime with mineralization along contact. **Ore:** -grade copper with silver and lead values.

Development: by 125′ shaft and a new 60′ shaft being sunk on a body of ized iron ore. **Equipment:** includes hoist, boiler, pump, etc.

See Columbia Turk Copper Co., for lawsuit, etc.

LDEN GOLD & COPPER MINING CO. **WASHINGTON**

Mine near Lucerne, Chelan county, Wash.

Officers: J. H. Holden, pres.-mgr., Chelan, Wash.; A. W. Lachapelle ; O. A. Hoag, sec.-treas., with Chas. N. Boon, directors.

Cap., $250,000. Company has no debts and no earnings to date.

Property: 6 claims, 120 acres, on Railroad creek, near Lake Chelan, 60 N. of Wenatchee on the G. N. R. R., shows gneiss and schist cut by granite a vein of 40′ average and 185′ claimed maximum width.

Development: by 6 tunnels, Nos. 2 and 3 being connected by a blind with about 2,000′ of workings on 3 levels and several hundred feet of dia--drilling. There also are numerous open cuts. Mine shows ore said to from 7 to 10% copper, 2 oz. silver and $5 to $10 gold per ton. Idle, except nual assessment work.

IESTEAD COPPER CO. **WASHINGTON**

ddress: W. H. Angel, mgr., Colman Bldg., Seattle, Wash.

fficers: C. Dell Floyd, pres., Chehalis, Wash.; Mrs. Peter McLane, Peter McLane, treas., with W. H. Angel (mgr.), directors. Agnes W. , treas.

ic. in Washington. **Cap.,** $1,000,000; par $1.

roperty: 9 claims, 180 acres, 6 miles from Index, Snohomish county, show copper ore. Workings amount to only 200′ of tunneling. Is a ct.

NOIS COPPER & SILVER MINING CO. **WASHINGTON**

ddress: Keller, Ferry county, Wash. J. C. Davis, pres. and gen.

mgr.; J. D. Nighbert, v. p.; R. Shoemaker, supt.; Edwin Johnston, sec.; J. D. Hess, treas.

Inc. in Washington. **Cap.**, $2,000,000; $1 par; in $1,000,000 preferred and $1,000,000 common stock.

Property: 10 claims, in the San Poil district, and "a ⅓ interest in [illegible] acres of granite" 21 miles N. of Keller.

Development: by 3,000' of tunnels, exposing a 3½ vein of zinc-copper ore with silver values. In a second vein said to be 50' wide, $10 ore is cut and a third vein, 12' across, shows $30 ore. Mine under development since 1907.

Equipment includes $5,000 worth of machinery, all well housed.

INSURGENT GOLD MINING CO. WASHINGTON

Address: G. B. Dennis, Knickerbocker Apts., Spokane, Wash.

Inc. in Washington. **Cap.**, $500,000; $1 par.

Property: 1 claim and fraction adjacent to the Hope mine of the Northport S. & R. Co., at Republic, Ferry county, controlled by the Day Bros.

Development: by 540' shaft, opening a 15' vein.

In 1919, the Days started suit against the Insurgent and Lone Pine-Surprise Consolidated, claiming $100,000 damages for ore alleged to have been wrongfully removed by those companies.

Production: to 1918 amounted to 12,000 tons of $19.76 gold ore.

INTERNATIONAL GOLD MINING CO. WASHINGTON

Head office: Empire State Bldg., Spokane, Wash.

Officers: Peter Reid, pres.; D. F. Kizer, v. p.; G. H. Walters, sec.; C. L. Russell, treas., with H. L. Williams, directors.

Cap., $1,000,000; shares, $1 par.

Property: 6 claims in the Orient district, Ferry county, developed by tunnels and equipped sufficiently for a small mine.

INTERSTATE-SULLIVAN MINING CO. WASHINGTON

Officers: Dennis Sullivan, pres., Rockford, Wash.; H. F. Phillips, v. p.; A. E. Barnes, sec.-treas., Hyde Bldg., Spokane; Jack Ashley, Jr., supt.

Cap., $100,000; shares, 5c par.

Property: Hidden Treasure group, 6 claims, on Goat mountain, W. Fk. Clark's Fork, Wash., said to show a fissure vein with silver-lead ore. In 1919, a 3-drill compressor had been added to equipment, and a tunnel was run to cut the vein at a depth of 800'.

IRON CREEK MINING CO. WASHINGTON

Address: Keller, Wash.

Officers: R. J. Clark, pres.; J. E. Angel, sec.-treas.; both of Colville, Wash.; J. W. Duncan, v. p., 1311 McClellan St., Spokane; J. E. Kennedy, Chas. W. Clark, directors.

Inc. in Washington. **Cap.**, $1,500,000; par $1.

Property: several claims, unpatented, on Iron creek, 12 miles S. of Keller, in Ferry county, said to show silver-lead ore.

Development: 1,200' of workings, mainly tunnels.

In 1917, 20 tons, valued at $491, were shipped. At last report, company planning the erection of a 25-ton mill, and resumption of work.

IROQUOIS MINING CO. WASHINGTON

Address: Chas. E. Bisbee, receiver, Rookery Bldg., Spokane, Wash., appointed in May, 1918.

Officers: C. W. Horne, pres.; Jas. A. Crowther, sec.-treas.; with A. Verich, all of Spokane; John Kalscheuer, and Geo. H. Bessler, directors.

Cap., $1,500,000; par $1.

Property: had a lease and bond for $50,000 on 3 claims on Flat Mtn. 6 miles S. W. of Boundary, Wash. No [illegible] tunnel was run and expensive machinery installed [illegible] to the original owners, as a report by W. Earl [illegible]

IVANHOE MINING CO.

W. B. McChesney, mgr., Oroville, Wash.

Property: on Palmer mountain, 7 [illegible]

ity, developed by a 4,400′ tunnel to a vertical depth of 1,559′, at which depth main orebody was intersected.

NO-ECHO COPPER CO. **WASHINGTON**

Address: Albert E. Kulzer, Chewelah, Wash.

Officers: Dr. C. A. Hauber, pres.; C. T. Winslow, v. p.; with H. R. lden, of Colville; F. L. Reinoehl, Chewelah, and F. H. Alm, directors.

Inc. in Washington. **Cap.,** $150,000; par 10c; assessable up to 3c a share. e assessments of one mill called, 1917.

Property: the Juno, Echo and Ibex lode claims, 2 miles E. of Chewe- and adjacent to Security Copper Co. and Standard Chewelah Co. holdings. resumably a consolidation of Juno Copper Co. and Juno-Echo M. & M. Co.

Development: by 320′ shaft with levels at 150′ and 300′, exposing in of copper ore carrying molybdenite.

Property has shipped two carloads of high-grade ore.

ITER LEAD CO. **WASHINGTON**

Address: Northport, Wash., or care Al Baker, Spokane, Wash.; Chris. son, Wm. Bynan, C. Basler, and others, of Northport, Wash., lessees.

Cap., $300,000; par $1.

Property: the Last Chance group, 6 miles S. E. of Northport, which ig 1908-10 produced about 1,400 tons of lead ore, valued at $65,000. Idle 1916, when Norman Mines Co. took lease and bond on property for $30,000. ral carloads of ore were shipped, assaying 60% lead and zinc. Option was quished in October, 1916, and mine was idle until late in 1918.

T TIME MINING CO. **WASHINGTON**

Office: 326 Rookery Bldg., Spokane, Wash.

Officers: F. C. Descent, pres.; A. Anderson, sec.; with D. Danielson, tors, all of Spokane.

nc. 1917, in Washington. **Cap.,** $300,000; par $1.

Property: 2 unpatented claims, in Stevens county, 3 miles from Elec- Point mine, said to show silver-lead ore in a 70′ shaft. No recent report.

KAKEE MINING CO. **WASHINGTON**

Officers: H. L. Mayberry, pres.; Wm. Barnard, sec., Nespelem, Wash.; O'Neill, treas., with F. M. De Camp, G. G. Sather, E. Christensen, and . Smith, directors.

nc. in Washington. **Cap.,** $850,000; $1 par.

Property: 11 unpatented claims, and a millsite in Okanogan county, 3 W. of Nespelem, has zinc-copper ore with silver and a little gold. Said re 15,000 tons of ore blocked out.

Developing in 1918; no later report.

3 MINING CO. **WASHINGTON**

Lead. See Copper King Mining Co.

Officers: V. D. Williamson, pres., Empire St. Bldg., Spokane, Wash.; Douglas, v. p.-gen. mgr.

nc. in 1916, to take over the Copper King and Copper Queen mines at lah, Stevens county, Wash. See Vol. XIII.

B HILL MINING CO. **WASHINGTON**

Office: 622 Old National Bldg., Spokane. **Mine office:** Republic, Wash.

Officers: John Byrne, pres.; Chester Shoudy, v. p.; with T. A. White, Chamberlain, H. Kreysler, Mrs. John Byrne, and J. E. Daley, directors. Broyles, sec.-treas.

ap., $1,000,000; shares $1 par; all issued. Stock [illegible] Spokane Ex- . Annual meeting, January.

ults in 1916 were $33,812; in 1917, ore [illegible] 10 cts. lb

sales were $33,933; total income, $37,330.

6; operations resulting in a loss of $9,216.

idends: resumed in March, 1917, after a [illegible]

year, bringing total dividends to $105,000.

perty: the Knob Hill and Mud Lake [illegible]

Wash. The Knob Hill is developed by shafts [illegible]

oz. silver besides copper and gold values and which it is believed can be profitably mined and milled.

Equipment: includes a 15-h. p. electric hoist and 5 buildings. Company's last report shows a total expenditure at the mine from beginning of work to April 28, 1913, of $118,000, of which ore sales furnished $17,062, bonds $35,100 and stockholders (175,000 shares), $65,838.

In 1917 company expected to erect a mill including flotation, which process is expected to save at least 90% of the metal contents. A Hardinge 75-ton mill was ordered in December, 1919.

Property promises to make a good small mine.

Q. S. COPPER CO. — WASHINGTON

Mail returned from former office, 229 North Division St., Spokane, Wash. Mine office: Q. S. Ranch, Cusick, via Loomis, Wash.

Officers: A. M. Dewey, v. p.-gen. mgr., 4042 Arcade Bldg., Seattle, Wash.; J. P. Heckert, sec.; A. F. Suksdorf, treas.

Inc. April 10, 1914, in Washington. **Cap.,** $2,000,000; shares $1 par. Is successor of the Q. S. Mining Co. Property was purchased by the new corporation, which paid all the debts, amounting to more than $25,000, and issued stock at 2c a share to the old stockholders; forfeited stock was left in the treasury which gave the corporation a majority of the stock. Bad management in 1913 wrecked the former company and led to a receivership, no annual meeting being held that year. Property was sold for taxes, but sale set aside by the court when the receiver was appointed. Litigation involving ownership pending.

Property: 13 claims, with 10 acres of mill sites, and water rights on Sinlahekin creek, about midway between Loomis and Conconully, along the flank and crest of Aeneas mountain, in the Salmon River district. The property shows fissure veins in diorite carrying mainly low-grade copper ores. The company claims an orebody 300' wide at surface, which has been crosscut for 200' at a depth of 800' below the outcrop without reaching the wall, and traced by stripping for 6,000' on surface, showing a ledge of 212' width at the north end, in the middle and 285' at the southern end of the property.

Development: begun 1897, is by 2 open cuts at either end, a pit of 150' in the middle, and a tunnel 1,063' long cutting the vein at depth of 800', with another tunnel, intended for the main avenue of extraction, 540' below, planned to cut the orebody at depth of 2,000'. One tunnel shows chalcopyrite ore said to give assays of 11.4% copper and estimated to average 2 to 4% copper with small and variable silver values and about $1 gold per ton. The company claimed an average ore value of $14 per ton from several hundred assays.

Assessment work only done by new company. No recent information; probably idle, or out of business.

Q. S. MINING CO. — WASHINGTON

Succeeded by Q. S. Copper Co., which see.

QUILP GOLD MINING CO. — WASHINGTON

Address: Republic, Wash.

Officers: Jas. Hutchinson, pres.; W. G. C. Lanskail, sec.-gen. mgr.; G. V. Alexander, H. J. Lycett, and John Stack, directors. Alex. McKay, S. H. Richardson, cons. eng.

Cap., $1,500,000; par $1; 67,500 shares outstanding.

Property: 1 claim and a fraction including the Quilp mine at Republic, Ferry county. It is adjacent to the Insurgent, Last Chance and Surprise mines. The Quilp was located in 1896 and operated intermittently by several companies. It paid five dividends, totaling $67,500; last payment in 1912. Mine was reopened in 1914 after lengthy litigation with the defunct Republic Mines Corporation; and again opened in 1918. In 1919 the Quilp mine was the largest producer in the district. Shipments made to Tacoma smelter. Ore carries gold and silver.

Development: by over 6,000' of workings to depth of 800'. Results at 800' have been good.

Equipment: steam power, hoist, 7-drill compressor, drills, and regular mining plant.

Production: 39,653 tons valued at $492,843 to end of 1918. Shipments 1919 estimated to be worth $100,000.

THFON REDUCTION WORKS **WASHINGTON**

Officers: A. L. Bradley, pres., Danville, Wash.; D. W. Rathfon, gen. r., Republic, Wash.

Cap., $500,000; par $1; 400.000 shares common stock, assessable up to ents.

Property: company in 1913 acquired the famous Republic mine and other claim in Ferry county, at one time operated by New Republic Mining and before that by Patrick Clark, of Spokane. Said to have produced $2.-000 in gold. Ore was shipped in 1918. November 22, 1919, the Republic mine sold at sheriff's sale to satisfy a judgment of $43,406 in favor of Fred Kei-m, J. T. Hollis and Frank Babcock.

ARDON COPPER CO. **WASHINGTON**

Officers: Oscar Carstens, T. J. Carstens, Henry Carstens, all of Rear- Wash., and A. H. Kenyon, of Spokane.

Cap., $50,000; par 5c. A close corporation.

Property: near Turk, Stevens county, includes the High Grade mine.

Development: mainly by tunnels. Shipments were made in 1918, and 919 shipped 137 tons of ore up to September.

)WOOD COPPER MINING CO. **WASHINGTON**

Dead. Mine at Chewelah, Stevens county, Wash. Developed by 400′ tun- with several hundred feet of raises and winzes expected to expose copper at ter depth. Operations ceased in April, 1912, and property was lost under closure of mortgage. Present owners are Chas. Stevens and others, of Rob-n Straus & Co., St. Paul, Minn.

)UBLIC CONS. MINES CORPORATION **WASHINGTON**

Property now operated by the Northport Smelting & Refining Co., which Vol. XIII contains details of the corporation's checkered career.

S MINING CO. **WASHINGTON**

Address: Newport, Stevens county, Wash.

Officers: A. Ries, pres.; E. E. Jones, sec.; F. W. Vawater, treas., with . Bell, directors.

Inc. in Washington. **Cap.,** $100,000; $1 par.

Property: 4 claims near the Pend d'Oreille river, 2 miles N. of New- on the Washington side of the State border, about 30 miles E. of Chewelah e veins have been found, carrying silver, lead, and gold. A shipment of 11 from an old shaft returned 288 oz. silver, 4,245 lb. lead, and 4.4 oz. gold, or erage of $47 per ton. A 200′ shaft is being sunk.

Mine is favorably situated and the owners are sanguine of success.

'AL COPPER MINING & MILLING CO. **WASHINGTON**

. J. Winslow, pres. **Mine address:** Chewelah, Stevens county, Wash.

)roperty: 7 claims said to show 3 parallel ledges having slate and te contacts.

)evelopment: by 400′ tunnel said to carry copper, lead, silver, and with small amounts of copper. Company probably dormant, as letters are ied unclaimed.

Y MINING CO. **WASHINGTON**

'ighthawk, Okanogan county. Succeeded by the Pyrargyrite Mining Co., see.

TA RITA MINING & MILLING CO. **WASHINGTON**

ddress: F. C. Merriam, Wallace, Idaho.

)fficers: John H. Hemphill, sec.-treas., Peyton Bldg., Spo

nc. 1918 in Delaware to take over property of Clevela

$500,000; par $1.

roperty: 10 claims, including the old Cleveland mine,

gdale, Stevens county, discovered nearly 30 years ago. T

ead-zinc-silver sulphide, containing antimony and bismut

)rofitably. Mine is developed by a 265′ shaft and tunnels

ny started operations several years ago, but lack of capit

down after a concentrator had been built. In August, 1919, control passed to First National Bank of Devils Lake, North Dakota.

SEATTLE-BOSTON COPPER CO. **WASHINGTON**

Idle since 1916. Company owns water-rights of 40,000 est. h. p. and a charter for a railway to open large timber tracts and reach the Dutch Miller mine described under title of Dutch Miller M. & S. Co. The former mine holdings of the Seattle-Boston C. Co. are described in Vol. VIII, Copper Handbook.

SECURITY COPPER CO. **WASHINGTON**

Address: 720 Peyton Bldg., Spokane, Wash. **Mine office:** Chewelah, Stevens county, Wash.

Officers: J. F. McGinnis, pres.; M. C. Hunter, v. p.; A. H. Syverson, sec.-treas., with L. K. Armstrong, gen. mgr., and F. H. Fulton, directors.

Inc. 1913, in Washington. **Cap.,** $1,500,000; shares $1 par; 1,200,000 outstanding; assessable. Total expenditures, $275,000.

Property: Security group, 200 acres at Chewelah: Copper Butte group, 80 acres, and Champokane group, 600 acres, 16 miles W. of Springdale. The first-named shows fissure veins cutting shales and schists; the Champokane group has 5 veins, from a few feet to over 100′ in width, and the Copper Butte has one vein, over 50′ wide. All the groups carry argentiferous copper ore. Five cars shipped from the Copper Butte are said to have averaged 3.8% copper.

Development: on Security group by about 1,150′ of workings on a series of six veins by 550′ shaft, levels, and tunnel. The Copper Butte has about 500′, and the Champokane 1,000′ of workings.

Equipment: includes a gasoline hoist and a 3-drill air-compressor at the Security.

Refinancing was arranged in August, 1919.

SHIPPER GOLD MINING CO. **WASHINGTON**

Address: Chesaw, Wash.

Officers: J. P. Blaine, pres.-mgr.; H. L. Mooney, v. p.; A. C. Blaine, sec.; W. A. Harry, treas.

Inc. May 31, 1916, in Washington. **Cap.,** $1,000,000; $1 par; 500,000 issued.

Property: 3 claims, unpatented, 56 acres, located one-fourth mile north of Chesaw, contains a 3½′ flat quartz vein running E.-W., with 2?? ??

Ore: contains gold values with pyrite, and is said to average $?? per ton.

Development: 700′ of work, including 110′ shaft, connected with 300′ tunnel, blocking out 1,000 tons of $20 ore.

Production: 1,200 tons of $40 ore. Company owns 25-ton mill. No recent information; probably idle.

SILVER ANTIMONY MINING CO. **WASHINGTON**

Address: Uniontown, Wash.

Officers: J. J. Welle, pres.; Jos. Kuntz, v. p.; H. J. Hoefer, sec.-treas., with Albert Carbuhn, directors.

Inc. January 16, 1916, in Washington. **Cap.,** $1,500,000; par $1 assessable.

Property: one claim, one mile from Chewelah, Stevens county, said to show a quartz vein in serpentine, containing streaks of sulphide ore carrying gold-copper-antimony ore that averages $4.80 gold, $11.40 silver and $2?? copper. Has a shaft 170′ deep and 2 short tunnels.

SILVER BASIN MINING CO. **WASHINGTON**

Address: C. S. Turner, Davenport, Wash.

Cap., $1,500,000; par $1; non-assessable.

Property: 2 claims, unpatented, in Deer Trail district, Stevens county, said to have silver ore. Total production to 1918 reported as 7,500 tons, valued at $200,000. The 1917 output was 180 tons, valued at $6,000; none reported since.

Development: by shafts and crosscuts. **Equipment:** includes a 3-drill compressor and a pump.

SILVER BELL MINING CO. **WASHINGTON**

Address: E. H. Belden, 1208 Old National Bank Bldg., Spokane, Wash.

Officers: E. H. Belden, pres.; R. F. Blackwell, v. p.; with W. R. Dwyer
l. Fitzpatrick and J. C. Broad, directors; E. F. McCabe, sec.-treas.
Inc. November, 1916, in Washington. **Cap.,** $1,500,000; $1 par; 1,100,-
issued. Expenses in 1918 were $5,000.
Property: 8 claims, 160 acres, 5 miles S. E. of Loon Lake, Stevens
nty, and 35 miles N. W. of Spokane, Wash.
Development: by 125′ shaft, and 300′ of drifting, shows 4½′ quartz vein
ranite. Ore said to contain 25 oz. silver per ton, with gold up to $4. Sink
is to be continued.
Equipment: 16 h. p. gasoline hoist. Is a silver prospect.

VER CREEK MINING & MILLING CO. **WASHINGTON**
Company dead and property, the Gold Cord mine, sold for taxes. Bought
r Steil and company reorganized as Gold Cord Mining & Milling Co., Kel-
Wash., also dead.
See operations, 1904-1912, described in Vols. VIII and IX of Copper Hand-
. Property favorably reported on by Wm. J. Elmendorf.

VER TIP MINING & POWER CO. **WASHINGTON**
Office: J. H. Beattie, 718 Green Bldg., Seattle, Wash.
Officers: A. Julian, pres.; G. B. Gilfillan, v. p.; J. H. Ferguson, J. J.
ean, P. D. Roberts and H. R. Sanderson, directors. M. S. Davys, engr.
Inc. January 15, 1910, in Washington. **Cap.,** $1,000,000; shares $1 par;
2 issued. Bonds, $700,000 of 7%.
Property: the Lake Side mines, 557 acres, Skagit county, Wash., also
Hewitt and Lorna Doone mines in Slocan district, B. C. No recent in-
ation. Probably idle.

VER TRAIL MINING CO. **WASHINGTON**
Office: care J. Richard Brown, W. 1619 Clark St., Spokane, Wash.
Officers: J. R. Brown, pres.; A. L. Hooper, sec.; W. S. Haish, treas.;
Robert Bell, A. J. Bell, Peter Reid and M. S. Peters, directors.
Inc. 1915 in Washington. **Cap.,** $125,000; shares 10c par.
Property: the old Clungstone mine, 8 miles E. of Evans in Colville
g district, opened in early '90s by Col. I. N. Peyton.
Development: tunnels, the lower one 700′, with 400′ drift on a 2-6′ vein
ver-lead ore. Shipments made to Trail, 1916.
o recent information. Probably inactive.

CANE CONS. TUNGSTEN CO. **WASHINGTON**
Officers: F. E. Parks, pres., Deer Park, Wash.; E. N. Robinson, v. p.;
A. M. Winston, O. F. Kelly and A. M. Wood, directors.
Cap. $625,000; non-assessable. Company is a merger of the Deer
Mng. Co., Spokane Tungsten Co., and Beard & Myers mining leases.
Property: about 360 acres, held under 30-year lease from the State,
es N. of Deer Park, Stevens county, said to show tungsten ore. Shipments
mer owners reported as $30,000. Present company commenced work in
nd planned erecting a 50-ton mill.

CANE COPPER CO. **WASHINGTON**
Address: C. H. Harvey, Co., 618 Paulsen Bldg., Spokane, Wash.
Officers: B. Mabry, pres.; D. K. McDonald, v. p.; E. A. Moye,
with J. S. Ramage and J. Dillard, directors.
Inc. 1917 in Washington. **Cap.,** $100,000; shares 10c par; 600,000
Property: in Loon Lake district, Stevens county, 46 miles
ce. Examined by C. A. Low in August, 1917.
Development: by 100′ shaft and small opencut. In latter at dep
ebody is said to have been uncovered, 8′ on the footwall showing
ite ore. Reported late in 1918 to have cut 4½′ of copper ore

mpany's backers seem to bank on conditions in adjoining mines.
pany's literature these conditions constitute the burden of the so

NE TIN MINES CO. **WASHIN**
dress: Hyde Bldg., Spokane.

ployed at last accounts, and made occasional shipments. Company planned sinking shaft to depth of 400'. No recent information; probably idle.

UNITED SILVER-COPPER MINING CO. **WASHINGTON**

Name changed in 1919 from United Copper Mining Co.

Office: 217 Symons Bldg., Spokane, Wash. **Mine office:** Chewelah, Stevens county, Wash.

Officers: Conrad Wolfle, pres.-gen. mgr.; W. G. Collins, v. p.; E. C. Blanchard, sec.-treas., with Daniel Hoch and J. H. Griffith, directors. E. A. Wolfle, supt.; H. D. Quimby, mill supt.

Inc. July, 1906, in Washington. **Cap.**, $1,000,000; shares $1 par; fully issued; assessable by majority vote. Last assessment Sept., 1914, 5c a share. Annual meeting, Jan. 28. Company and Guaranty Trust Co., New York, transfer agents; Registrar & Transfer Co., and Spokane & Eastern Trust Co., Wash., registrars. Listed on New York Curb, May 1, 1917.

Treasurer's Report for years ending December 31st showed:

	1918	1917
Operating revenue	$282,966	$354,371
Operating expenses	234,291	240,899
Net operating profit	*18,174	113,472
Net indebtedness	39,879	61,577
Dividends	None	100,000

*After deducting depreciation charges and taxes.

In April, 1919, management stated that indebtedness was practically wiped out as a result of finding high-grade silver ore in sinking a winze from the 1,200' level. Estimated net profit for April was $26,000.

Dividends: total to date, $150,000. None since 1917.

Property: 16 claims, patented, 103 acres, 4½ miles N. E. of Chewelah.

Geology: claims show a 6' vein cutting through shale and schist. Ore contains chalcopyrite, with streaks of gray copper ore on both walls. The high-grade ore above the 1,000' level has been practically mined out, but the low-grade ore, which assayed 1.5% copper and 2 oz. silver, cannot be mined clean and the admixed waste lowers the grade so that the mill feed carries only 0.75% copper, and 1 oz. silver. In March, 1919, a new high-grade ore-shoot 4 to 5' wide, was found in sinking a winze from the 1,250' level; about one foot of this was rich silver ore, and the remaining 3 to 4' was good milling ore assaying 20 oz. silver and 5% copper.

Development: by shafts 250' below 1,000' level, and 5,000' tunnel, giving depth of 1,250'. Considerable development work was done in 1914-15; diamond-drilling reported to have proven the orebodies to depth of 1,500'. The mine has over 40,000' of workings. Report of Raymond Guyer, consulting engr., in March, 1919, estimated ore reserves at 50,836 tons above the 1,000' level, and below this level, 45,173 tons positive, 47,241 tons probable and 30,658 tons possible ore; grade about 1.35% copper and 3 oz. silver.

Equipment: includes electric hoist, air-compressors, capacity 1,500 cu. ft., 11 power drills, 2 pumps, and an electric lighting plant. Electric power is obtained from the Stevens County Power & Light Co. The mill is a flotation; in June, 1919, it was treating 225 tons ore daily, and this was to be raised to 300 tons. Employs about 90 men.

Production: 1910, 608 tons, $5,878; 1911, 1,134 tons, $11,184; 1912, 13,500 tons, $240,798; 1913, 14,938 tons, $171,617; 1914, 18,527 tons, $90,356.

	Tons mined	Value	Copper lb.	Silver oz.
1918	66,181	315,448	907,422	130,000
1917	59,600	354,371	1,147,014	147,500
1916	40,000	372,296	1,179,178	150,000
1915	25,000	145,632	650,995	137,500

Output for first quarter of 1920 was 400 tons of $100 crude ore, and 75 tons of concentrate carrying 17% copper and 45 oz. silver per ton.

Profit from ore mined above tunnel level is expected to pay off all indebtedness by midsummer when contract will be let to sink shaft to 1,200 or 1,400'.

ALLEY MAGNESITE CO. **WASHINGTON**

Office: Old National Bank Bldg., Spokane, Wash. **Mine office:** Valley, 'ashington.

Officers: F. M. Handy, pres.; B. E. Kehler, v. p.; W. J. Matthews, sec.;)bert Carnochan, treas. and Irving Whitehouse, asst. sec.-treas.; also di- ctors.

Inc. 1917, in Washington. **Cap.,** $1,500,000; shares $5 par; 213,000 issued.

Property: about 1,300 acres at Valley, Stevens county, Wash.

Development: to 100′ depth, is estimated to expose 1,000,000 tons of ignesite, one exposure being 75 to 200′. Mining is by quarry methods. e ore is a gray, coarsely crystalline magnesite, containing 0.5% lime and % silica, which is well within market requirements.

Equipment: 10 kilns with accessories. Capable of making 150 tons of cined magnesite daily.

About $300,000 has been spent on the property to date. As company s not even reply to repeated requests for information, production figures inot be given. The company's prospectus estimated costs at $12 per and a sale price of $32.50 per ton, equivalent to earnings of $3,000 daily a 150-ton plant.

LLEY MINING CO. **WASHINGTON**

Officers: W. R. Tuttle, pres., 1816½ 7th St., Spokane, Wash.; A. L. oper, sec.-treas.; with H. M. Ross, V. P. Adams, and S. Van Hook, di- ors, all of Spokane, Wash.

Property: 3 unpatented claims, locally known as the Edna mine, 9 miles of Valley, Stevens county. Idle for 12 years, but in September, 1917, e was unwatered to 400′, and levels have been driven at 100, 200, and 300′ th. Copper-silver ore exposed is said to have a value of $600,000.

Equipment: includes a hoist and 3-drill compressor.

TORY COPPER CO. **WASHINGTON**

See Copper King Mining Co.

GINIA MINING CO. **WASHINGTON**

See Chatterboy Mining Co.

LCAN MINING CO. **WASHINGTON**

Office: 2025 West 3rd Ave., Spokane, Wash. Mine at Orient, Stevens ity, Wash.

Officers: H. M. Gibson, pres.; P. Lewis, v. p.; A. O. Stuberg, sec.; P. en, treas., with J. D. Grimes, directors.

Inc. July, 1914, in Washington. **Cap.,** $1,500,000; par $1; assessable.

Property: 7 claims, 4 miles N. E. of Rock Cut at 3,850′ elevation, shows ns with gold ore; also some silver.

Development: by several hundred feet of tunnels and shallow shafts. Present owners have spent over $20,000 on development. No recent in- ation. Probably idle.

LA WALLA COPPER MINING CO. **WASHINGTON**

Office: Walla Walla, Wash. **Mine office:** Keller, Ferry county, Wash.

Officers: J. G. Muntinga, pres.; W. H. Meyer, v. p.; W. P. Lathrop, reas., with H. Osterman, Wm. Pfeiffer, Geo. Bradbury, C. M. McKin- all of Walla Walla, and J. T. Leonard, director.

ap., $1,000,000; par $1.

roperty: 10 claims, 2 patented, and a millsite 1 mile N. E. of Keller, southern half of the old Colville Indian reservation, shows a vein of timated width, partly mineralized with gold-copper ore of fair assay

eveloped by an open-cut, shaft, and tunnel. In January, 1919, a 500′ l was started.

HINGTON COPPER MINES DEV. CO. **WASHINGTON**

fficers: P. H. Nestor, pres.; J. L. Linn, v. p.; J. N. Hart, sec., all of nd, Ore.

ap., $500,000; par $1.

roperty: 9 claims, unpatented, in Bald Mt. district, Skamania county,

ore carries copper, gold, and silver. In 1918 company was reported putting about 30 tons of ore daily through a small mill. Said to have a considerable tonnage opened, but no shipments made to date.

WASHINGTON-IOWA COPPER MINING CO. WASHINGTON

Idle at last accounts, 1917. W. D. Gibson, pres.; P. R. Screven, sec., both of Seattle.

Property: on the eastern fork of Silver creek, 2 miles above Mineral and 14 miles N. W. of Index, Snohomish county, adjoins the Edison Mining & Development Co., and both properties are under one management. Claims said to show 5 veins, carrying complex ore, consisting of chalcopyrite, galena, sphalerite and pyrite, with quartz gangue.

Development: by the 1,200′ Bonanza crosscut tunnel.

WASHINGTON TUNGSTEN MINES CO. WASHINGTON

Address: Miller Bldg., Yakima, Wash.

Officers: D. B. McMahon, pres.-treas., Seattle, Wash.; J. Lenox Ward, sec., with Geo. Kerr, E. B. Sanford, E. G. Tennant, and J. J. Miller, directors.

Inc. November, 1915, in Washington. **Cap.,** $350,000; $1 par.

Property: 15 unpatented claims, in Bumping Lake district, 50 miles N. W. of Yakima, Yakima county, said to show gold-copper-tungsten ore. Idle.

WASHOUGAL GOLD & COPPER MINING CO. WASHINGTON

Address: Washougal, Clarke county, Wash.

Officers: F. A. Mabee, pres.; John Scharboarer, v. p.; J. B. Jordan and T. A. Altman, secretaries; Dr. Otta Sutter, treas., at last accounts.

Inc. 1902, in South Dakota. **Cap.,** $1,000,000; shares $1 par.

Property: 560 acres, held on a 30-year lease, from the State, near Mt. St. Helens, in the Bald Mountain district, on the upper Washougal river. Said to show several vertical fissure veins in granite, one of which, averaging 6′ thick, is developed by an 1,800′ tunnel exposing ore, estimated to average 5% copper, 15% lead and zinc, 2 to 70 oz. silver and $1 to $15 gold per ton.

Equipment: includes gasoline hoists, 25-ton concentrating mill, and a 3-drill Sullivan air compressor. No recent information available. Described in Mining and Scientific Press, 1916, by F. Brinsmade.

WENATCHEE GOLD MINING CO. WASHINGTON

Officers: J. P. Bonar, pres.; W. H. Kneemyer, treas.; both of Wenatchee, Wash.; M. P. Spencer, sec., Wenatchee, Wash.

Cap., $1,000,000; shares $1 par.

Property: 80 acres of State land, held under 30-year lease, in Entiat valley, Chelan county, said to show free gold ore.

Development: over 500′ of tunnels and shafts.

Equipment: includes a 2-stamp mill. Total shipments reported to have yielded about $170,000. In 1918 mine was reported under a 2-year lease.

WESTERN COPPER MINING CO. WASHINGTON

Office: 1123 Broadway, New York. **Mine office:** Reiter, Wash.

Officers: C. G. Reiter, pres.; Leroy B. Sherman, v. p.; J. J. O'Brien, sec.; J. D. Campbell, treas., with W. D. Schwarzwaelder, E. J. Wright, T. Christensen, Manfred Rockfeller and T. A. Meed, directors. C. Hendricks, mgr.; V. V. Clark, cons. engr.

Inc. April 25, 1917, in Maine. **Cap.,** $2,000,000; $1 par; 1,125,000 issued. Annual meeting, first Tuesday in April.

On June 6, 1917, company purchased assets of the Bunker Hill Mining & Smelting Co. for a stock consideration and assumed B. H. debts of $84,973, consisting of bonds and notes.

Property: 20 claims, 15 patented and 1 millsite, patented, 371 acres, at Reiter, 5 miles W. of Index, Snohomish county, Wash. Examined by Geo. Wright, T. E. Brown, E. M. Simonds and V. V. Clark. Claims said to show fissures in granite, syenite and diorite, dipping 45°, with N. 46° E. course.

Ore: is mainly chalcopyrite, associated with magnetite. On account of this latter mineral, the consulting engineer considered that prospecting with

lipping needle should find additional copper deposits. The Bell shoot has en followed to 500′ depth and the Jumbo to 100′.

Development: by incline shafts, 86 and 500′ deep and tunnels, the igest 2,700′. To depth of 1,200′ workings total 6,100′. Diamond drilling t a parallel body to the Bell at 497 to 526′, assaying 6.99% copper. This le is to be followed by a shaft. Exploration cost $112,927 to the end of 6.

Equipment: to December, 1916, cost $72,195, covering 300-h. p. hydroctric plant, 100-ton obsolete concentrator, 50-ton smelter, compressor, mway, diamond drill, steam engine, hoist, etc.

Property is well equipped for production if ore is developed and has a ge asset in over 50,000,000′ of standing timber. In December, 1919, work s to be resumed after several years of idleness.

EST HILL MINING CO. **WASHINGTON**

Out of business. Fully described in Vol. XIII.

WEST VIRGINIA

ARKESBURG CLINKERING CO. **WEST VIRGINIA**

Subsidiary of American Metal Co., Ltd.

Office: 61 Broadway, New York.

Works: a sintering or clinker plant at Bridgeport, W. Va., for treatnt of metal-bearing residues, such as those carrying silver from zinc :lters.

WISCONSIN

Wisconsin produces over 50,000 tons of zinc per annum from the treatnt of over 2,000,000 tons of 2.5% ore. Most of this ore is concentrated the mill product reduced to metal at Illinois smelters. The production ters named in their order of importance are: New Diggings, Benton, Hin-Livingston, Galena, Linden, Hazel Green, Shullsburg, and Highl. The output during the past two years follows:*

	1917	1918
de ore tons	3,014,800	2,377,300
: content, per cent	2.44	2.61
d content, per cent	0.13	0.19
: concentrates produced, tons	226,216	180,554
d " " "	5,544	6,210
al value of all products	$12,899,276	$9,746,234

The output of concentrates in 1919 was 158,871 tons from mills and)5 tons from roasting and separating plants (refineries).

* U. S. Geol. Survey figures. The Wisconsin zinc district is described 3oericke and Garnett in Bull. 152, August, 1919, of the Am. Inst. M. & >. 1213.

Since the year 1862, the fields have produced approximately 2,083,000 of zinc. Practically all the ore of this district occurs in solution open-, whose position is largely controlled by joints and crevices.

In Bull. XIV (1906) of the Wisconsin Geological and Natural History ·ey, U. S. Grant, describes the lead and zinc deposits of this State. Bull. V (1915) of the State Survey, also describes the mineral lands of >us counties, including those with iron-ore deposits. Little informaconcerning production could be obtained from mine-owners in the :, despite our frequent requests for same.

The mining companies operating in the State are arranged alphaally.

AMERICAN ZINC ORE SEPARATING CO. WISCONSIN

Address: Platteville, Wis.

Company owns and operates a plant using the Huff electrostatic process to remove iron from mill concentrates carrying 16 to 40% zinc and pyrite.

BARABA MINING CO. WISCONSIN

Office and mine: Mellen, Ashland county, Wis. Nelson Baraba, Sr., pres.; Nelson Baraba, Jr., sec.

Inc. 1906. **Cap.,** $1,000,000; shares $1 par. Has a shallow shaft showing ore assaying 2.8% copper, with traces of gold and silver.

Idle since 1917.

BIG BEND MINING CO. WISCONSIN

Address: Cuba City, Wis.

Inc. in September, 1919. **Cap.,** $60,000; shares $1 par. Will develop and operate leases in the Cuba district.

BLOCKHOUSE MINING CO. WISCONSIN

Address: Kistler & Stephens, Platteville, Wis.

In March, 1919, this property was the only active producer in Platteville district. The mine is extensively developed and actively worked, having an average weekly output of 40 tons of 40% blende. In 1917 company realized $500,000 from concentrate sold, and in 1918 was the largest producer in the district. Operations were curtailed in 1919 owing to low prices and lack of demand for zinc ore.

B. M. & B. MINING CO. WISCONSIN

Address: Jos. Wilson, supt., Mifflin, Wis. Company owns various zinc mines in the Mifflin district.

CAHOON MINE WISCONSIN

Address: A. W. Rohn, mgr., Baraboo, Wis.

Property: a tract of 140 acres, one mile S. W. of Baraboo, underlaid by iron ore, opened and mined by shafts and extensive workings.

CLEVELAND MINING CO. WISCONSIN

Office: 625 Bank & Insurance Bldg., Dubuque, Iowa. S. W. Barlow, mgr.; H. L. Jones, supt.

Property: 40 acres, includes the Cleveland and Hazel Green mines in Hazel Green, Grant county. Lead-zinc ore occurs in flats and pitches in limestone.

Development: several 150′ shafts with 1,500′ of workings said to have out 100,000 tons of ore.

Equipment: includes a 75-h. p. electric hoist, a 6-drill air-compressor, a 250-ton concentrating plant. Concentrate is sold to Mineral Zinc Co. under contract; employs normally 160 men on double shift.

COMMONWEALTH IRON CO. WISCONSIN

Address: E. W. Hopkins, mgr., Ironwood, Mich. **Property:** a well-known iron mine.

CONNECTING LINK MINING CO. WISCONSIN

Office: Theo. A. Waech, mgr., Cuba City, Wis.

Officers: Anton Zwack, pres.; B. H. Hoeper, v. p.; Curt M. Treat, sec.; Theo. E. Buechele, treas., with M. A. Barr and W. H. Hennigu, directors.

Inc. 1917, in Wisconsin. **Cap.,** $100,000; $1 par; 90,000 issued.

Dividends: two, equal to 20%, were paid in 1918.

Property: 220 acres in Cuba City district, Lafayette county. Deposit carries lead and zinc.

Equipment: includes electric hoist, a 150-ton mill, on the Dall land, and a new concentrator on the Coulthard land. Company was the largest producer in the Cuba district in 1918.

CONSOLIDATED LEAD & ZINC CO. WISCONSIN

Address: Charles Lawyer, mgr., Benton, Wis. Company has a lease on the Charles Smith tract, a mile S. of Benton. Drilling was completed and shaft sunk late in 1918.

FEARLESS MINING CO. WISCONSIN

Address: Frank Harker, Platteville, Wis.

Inc. 1919. **Cap.**, $100,000.
Property: in the Linden district has an orebody 60′ wide and 9′ thick, ·ying high-grade jack.
Equipment: includes a 100-ton mill, making 55% zinc concentrate by ·ing.

ELD MINING & MILLING CO. **WISCONSIN**
Office: 2200 Insurance Exchange, Chicago, Ill. **Supt.'s address**: R. F. No. 7, Scales Mound, Ill.
Officers: Robt. W. Hunt, pres.; Jas. C. Halsted, v. p., with L. V. Rice, mgr.; C. C. Whittier, directors. F. W. Guthrie, sec.-treas.
Inc. 1908, in Illinois. **Cap.**, $100,000; shares $100 par. $65,000 outstand- Annual meeting 1st Tuesday in May.
Property: the Thompson mine near New Diggings, Wis., an important -zinc producer, developed to depth of 225′ by vertical shaft. Ore occurs ssure veins and disseminations traversing dolomite. Management esti- ed ore reserves at 350,000 tons in May, 1917.
Equipment: includes electric power, 50-h. p. hoist, 600′ elec. compressor, rifugal pump, 800-ton mill, equipped with jigs and tables.
Produced zinc, lead, and pyrite averaging 45% zinc, 75% lead, 31% sul- r, 16% iron, respectively. Operations suspended in December, 1918.

NT MILL & FURNACE CO. **WISCONSIN**
Company operates a 20-ton Fink furnace at Wauwatosa, treating lead ·entrates from the Wisconsin fields.

)RENCE IRON CO., THE **WISCONSIN**
Address: E. H. Thiemann, asst. mgr., Florence, Wis.

)NTIER MINING CO. **WISCONSIN**
Office: 413 Fletcher Trust Bldg., Indianapolis, and Galena, Ill.
Officers: J. H. Billingsby, pres.; D. C. Ellison, v. p.; W. C. Haneisen, ·treas.; preceding with C. W. Craig, C. R. Hinkle, Carl L. Rost, S. O. ·hler, directors.
Cap., $125,000; shares $100 par.
Dividends: begun April, 1916, are 2% the first of each month, and 10% he 15th.
Property: the Frontier and Grotkin mines at Benton, and the Optimo 1 and 2 at Linden, also the Bearcat, Bull Moose, Hird and Middle ·s at Benton, Wis. Ore is zinc sulphide in pitches and flats in lime- e. Stopes are 120′ wide and 35′ high.
Development: 3 shafts, average depth of 150′. Room and pillar mining ·m is used. Extensive exploration on adjoining land was done in 1918.
Equipment: includes one 50-h. p. and one 75-h. p. electric hoists, air- ›ressor and drilling machines. There are also 3 concentrators with capacity of 600 tons in 10 hours.
Production: the mines when in full operation average about 800 tons › to 42% zinc concentrate weekly. Shipments are made under contract ıe Grasselli Chemical Co.

'NOW MINING CO. **WISCONSIN**
Address: Herman Grunow, supt., Mifflin, Wis.
Company operates zinc mines in the Mifflin district.

'VEY LEASE **WISCONSIN**
Address: Charles Wolfe, Cuba City, Wis.
Property: a tract N. of the Connecting Link mine, which after being ·n by drilling, was opened up by a shaft and equipped with the Law- · mill, removed from Hazel Green to this mine.

'ES MINING CO. **WISCONSIN**
Address: Ironwood, Mich.

:CULES MINING CO. **WISCONSIN**
Address: Cuba City, Wis.
Officers: H. H. Busch, pres., Dubuque, Iowa; Harry Seemiller, mgr.; rt Fox, mine supt.
:ap., $100,000.

Property: leases 400 acres of farms, 2 miles E. of Cuba City, on which drilling revealed rich zinc and lead ore. A 100-ton mill was to be erected at last accounts

HOLMES MINING & MILLING CO. **WISCONSIN**

Idle. Mellen, Ashland county, Wis.

Officers: John Holmes, pres.-mgr.; A. D. Barnes, v. p.; Thos. A. Humphrey, sec.; F. P. Simmonds, treas., with Edw. Bekken, A. D. Wilson and A. D. Hill, directors.

Inc. Jan. 9, 1902, in Wisconsin. **Cap.**, $150,000; shares 25c par.

Property: 160 acres in the Penokee iron range, about 1 mile N. of Bad river, shows fissure veins in greenstone, diorite and slate with E.-W. strike and dip of 70°. Three orebodies are claimed of which one, said to be 40' wide and traceable one-half mile by a strong gossan, with slate footwall and diorite hanging, is reported to have chalcopyrite in a quartz gangue. Ores give assays up to 9 oz. silver and $3 gold per ton.

Development: by 150' and 188' shafts.

Equipment: includes a 16-h. p. hoist.

INDIAN MOUND MINING CO. **WISCONSIN**

Mine controlled by Lawrence Mines Co., which see.

KLAR PIQUETTE MINING CO. **WISCONSIN**

Address: W. H. Doyle, sec., Platteville, Wis.

Company operates zinc mines in the Platteville district.

LAWRENCE MINES CO. **WISCONSIN**

Address: Dubuque, Iowa; or New Diggings, Wis.

Property: the Indian Mound mine at Benton and leases in New Diggings district. The Lawrence mine at Hazel Green was abandoned in 1918. The Indian Mound was a regular producer in 1918-19.

LITTLE PLATTE MINING CO. **WISCONSIN**

Address: Raymond Piquette, mgr., Platteville, Wis. Owns a lease on James Tracey land, 6 miles W. of Platteville. A 50-ton mill was erected in September, 1918, and shipments made.

LUCKY FIVE MINING CO. **WISCONSIN**

Address: Mr. McKinley, supt., Dodgeville, Wis.

Property: a lease on Davis and Thomas lands, in Dodgeville district, near Cuba City, Grant county, Wis. A small producer of high-grade lead-zinc concentrates. Developed by 100' shaft.

Equipment: includes steam plant and 50-ton concentrator. Shipments made to the Collinsville smelter, under lease to the Eagle Picher Lead Co.

LUCKY SIX MINING CO. **WISCONSIN**

J. N. Vail, supt., R. R. No. 2, Livingston, Wis.; or Mifflin, Wis.

Property: in Mifflin district, Iowa county, developed by two shafts and equipped with a 150-ton mill.

LUCKY TWELVE MINING CO. **WISCONSIN**

Address: L. N. Dana, mgr., Benton, Wis.

Company operates zinc mines in the Benton district.

McMILLAN ZINC CO. **WISCONSIN**

Offices: Platteville and Hazel Green, Grant county, Wis.

Officers: A. C. McMillan, pres.; Henry Hornischfeger, v. p.; H. B. Morrow, sec.-treas., with L. C. Dagenhardt and C. M. Echols, directors; L. C. Dagenhardt, supt., Hazel Green.

Inc. August 3, 1914, in Wisconsin. **Cap.**, $100,000; $1 par. Annual meeting, August 14.

Property: 100-acre lease, at Hazel Green, said to show zinc and lead sulphides occurring in a disseminated deposit in the Galena limestone formation.

Development: 180' vertical shaft.

Equipment: includes steam hoist, 300 cu. ft. air-compressor, pumps and a mill, capacity 400 tons per 20 hours.

In February, 1918, mine was closed temporarily, due to high costs and

ıvy flow of water. Although fully equipped, more capital is needed to ng property to producing basis.

ıCKAY MINING CO. **WISCONSIN**

Address: D. and W. Mackay, Platteville, Wis. Acquired property of Ross Mining Co. in Linden district, in October, 1919, and resumed min- and drilling in November.

DLAND MINING CO. **WISCONSIN**

Dead.

NERAL POINT ZINC CO. **WISCONSIN**

(Subsidiary of the New Jersey Zinc Co.)

Address: B. A. Hoskins, supt., Galena, Ill. W. F. Boericke and T. H. rnett, engineers.

Properties: the Black Jack mine at Galena, Ill.; Coker mine at Liv- ston, Wis.; Highland mine at Highland, Kennedy at Hazel Green, and Penna and Hoskins mines at New Diggings, Wis. The last named pro- ed over 17,678 tons of green blende concentrate in 1919. The Coker had a ord of over 15,000 tons in 1916.

Geology: in the Black Jack mine there are two "pitches" to the ore- ly; one contains heavy black jack, and has a smooth hanging wall; the er "pitch" contains ore heavy in marcasite and without any definite wall. the Coker mines the orebodies are of great length and determined by ll holes for a length of 6,900′. No. 1 orebody is 7,500′ long, if the mines of Vinegar Hill Zinc Co. be included. The Kennedy orebody including the lls and Winnebago mines, which are on an integral part of the Kennedy, the largest deposit of ore yet found in the district. Since 1860, these ee mines have yielded about 2,500,000 tons of ore, producing 150,000 tons 35% zinc concentrates.

Equipment: includes concentrating plants, zinc oxide works, and acid nt. At Mineral Point company has a separating plant, including a multi- ırth roaster of 150 to 200 tons daily capacity and magnetic separators to ıove pyrite from jig concentrates, whose zinc content is raised from 37 59%. Recovery is about 90% at cost of $2 per ton.

Production: in November, 1919, the mines were producting 25 to 30 s of zinc ore per week.

)NMOUTH ZINC MINING CO. **WISCONSIN**

Office: Hazel Green, Wis.

Officers: J. L. Noble, pres.; J. W. Houston, v. p.; C. G. Norton, sec.- as., with J. A. Allen, A. G. Patton and Jos. Harvey, directors. H. L. lliams, mgr.; Jack Rogers, supt.

Cap., $150,000; $10 par; $110,000 issued. Annual meeting first Tuesday :r first Monday in September.

Property: 200 acres at Hazel Green, Lafayette county, Wis. Deposit fissure or "pitch" in "blue" rock, with "horseshoe" course, characteristic the district. Ore assays 40% zinc, 15% iron, and 2.5% lime.

Development: by 209′ shaft and 260′ tunnel. **Equipment:** 75-h. p. motor- ven hoist, 2-drill compressor, pumps (one deep-well of 2,500, one sinker 800, and one station of 800 g. p. m.), 400′ tram from shaft to mill, and -ton mill employing 3 jigs of 7 cells each, in operation since Aug., 1918.

)NTREAL MINING CO. **WISCONSIN**

Address: F. B. Goodman, supt., Hurley, Wis.

.TIONAL ZINC SEPARATING CO. **WISCONSIN**

Address: W. N. Smith, gen. mgr., Platteville, Wis.

Works: company operates a roasting and magnetic-separating plant, acity 275 tons of crude zinc concentrate in 24 hours, at Cuba City, Grant nty, Wis. A Cottrell precipitator was installed in the works in 1918. e sulphuric acid plant can make 100 tons daily. Most of the supply nes from mines operated by the Vinegar Hill Zinc Co. The raw con- trate carries 23 to 46% zinc, and the final product 60%. This is sold the Illinois Zinc Co., Grasselli Chemical Co., and the American Zinc . of Hillsboro, Ill.

NORTHWESTERN IRON CO. WISCONSIN

Described in Vol. XIII. Mine now owned by the Steel & Tube Co of America, which see.

ODANAH IRON CO. WISCONSIN

Address: L. M. Hardenburgh, supt., Ironwood, Mich.; or J. M. Davis, Hurley, Wis.

Property: the Cary and Windsor mines, on Gogebic range, Wisconsin. Employed 275 men in 1919. For production, see Pickands, Mather & Co. under Minnesota, in this volume.

OLIVER IRON MINING CO. WISCONSIN

Office: Duluth, Minn. Operates lead-zinc mine and separator at Shellburg, Wis.

OPTIMO MINING CO. WISCONSIN

Office: 1127 State Life Bldg., Indianapolis, Ind.

Property: at Linden, Iowa county, Wis., was the main producer of lead-zinc concentrates in the Linden district in 1917-'18. Subleased to Vinegar Hill Zinc Co.

Equipment: includes electric power, drills, pump, and 100-ton mill. Concentrates carry 30 to 40% zinc.

PEACOCK MINING CO. WISCONSIN

Address: Henry Ovitz, supt., Mifflin, Wis.

Company operates zinc mines in the Mifflin district.

PENI MINING CO. WISCONSIN

Address: H. C. Holtz, supt., Mifflin, Wis. Owns a zinc mine in the Mifflin district.

ROSS MINING CO. WISCONSIN

Property acquired October, 1919, by the Mackay Mining Co., which see.

RUDOLPH LAND CO. WISCONSIN

Idle. Mine near Gordon, Douglas county, Wis.

Inc. 1905, as successor of Minong Range Copper Co.

Property: 12 miles from Gordon, on the southern fold of the Keweenawan syncline.

Development: by two shafts, deepest 350', sunk at an angle of 30°, on a dark amygdaloidal trap bed carrying small quantities of native copper.

Equipment: includes a 6-stamp mill. Property fully described under title of Minong Range Copper Co., Vol. XIII, Copper Handbook.

ST. CROIX CONSOLIDATED COPPER CO. WISCONSIN

(For description see Vol. XII.)

Successor St. Croix Consol. Mines. M. J. O'Brien, pres., 223 Ferguson Bldg., Duluth.

SHAMROCK MINING CO. WISCONSIN

Address: J. Maloney, mgr., Mifflin, Wis.

Officers: H. F. Cochenus, pres., 1536 First Nat'l Bank Bldg., Milwaukee, Wis. P. C. Kolinski, gen. mgr.

Property: 37 acres in Mifflin, said to show a 32' vein, running N. W. to S. E., carrying a 10 to 12" streak of lead-zinc sulphides, averaging 35% zinc, 25% lead. Mine is the old Shamrock & Peni mine on the so-called old tract, mined 100 years ago for lead, recently quarried for glass rock and now for its 10" to 12" of coal black "jack" ore.

Development: by 340' tunnel, and opened to 28' depth, by quarry, stripping off the "glass rocks." About 800 tons shipped in 1915, that averaged 30% zinc and 10 tons of lead concentrate.

Ore is treated in 50-ton mill and concentrate goes to DePue smelter. Company took over the Sunset mine, July, 1916. No recent returns.

STEEL & TUBE CO. OF AMERICA, THE WISCONSIN

Address: First Wisconsin National Bank, Milwaukee, Wis. J. F. Means and E. S. O'Connor, local operators.

Property: the Mayville mine formerly owned by the Northwestern Iron Co., at Mayville, Dodge county, developed to depth of 125'.

Ore: is a soft, red non-Bessemer hematite, containing 41.80% iron

)9% phosphoruus, 4.11% silica, 3.80% alumina, 6.50% lime, 4.50% mag-sia, and 11.04% moisture.

Production: 88,710 tons in 1918, and about 1,300,000 tons to date.

UPERIOR COPPER MINES CO. **WISCONSIN**

Address: Superior, Wis.

Officers: J. B. Arnold, pres.; T. A. Merritt, v. p.; F. L. Bernard, sec.; id H. M. DeLanoie, treas.

Inc. Nov. 14, 1916, in Wisconsin. **Cap.**, $1,000,000; all outstanding. isted on New York Curb.

Property: in Douglas county, Wisconsin. Ore carries native copper.

HOMAS FURNACE CO., THE **WISCONSIN**

Address: John M. Thomas, pres., Milwaukee, Wis.

Company is a manufacturer of pig-iron, low in phosphorus. A little e is mined for reduction in the works.

IFFANY MINING CO. **WISCONSIN**

Letters returned from former address, 925 Postal Telegraph Bldg., hicago, Ill., and company probably dead.

Inc. 1916. **Cap.**, $50.000.

Property: 160 acres, leasehold, east of the Wilson Mining Co. land, own as the Tiffany mine, formerly owned by W. N. Tiffany, of Platte-lle, Wis.

INEGAR HILL ZINC CO. **WISCONSIN**

(Owned by Mark Manufacturing Co., of Chicago, Ill.)

Office: Platteville, Wis. W. N. Smith, mgr.; J. A. MacCulloch, supt.

Property: the Ellsworth and Rundell mines at Livingston, the Martin Benton, the Wilkinson at Cuba City, the Vinegar Hill at Days Siding, id others.

The orebodies are of extraordinary length and persistence; that of No. mine of the Mineral Point Zinc Co., which is part of the ore deposit ined in the Vinegar Hill property, is continuous for 7,500′.

The Vinegar Hill company put up a 200-ton mill on the Edward Meloy in 1916 to handle the output of a tract on which drilling proved up an ebody 60′ thick. At the Martin mine a Whaley electric shovel was put , doing the work of 20 shovelers. In February, 1918, a 600-ton mining id milling plant was completed at the Jefferson mine in Hazel Green dis-ict. During 1918 the Calvert farm on the Swindler range was drilled and afts sunk and the Franklin Rundell mine developed and worked, the ore ing treated at the Yewdall mill at Mifflin. Late in the year the Kittoe ill was moved from Platteville to the Dale Rundell mine. Several of the ines were closed early in 1919 on account of the metal markets, but were -opened in August. An extension of the Hoskins range has been proved drilling for 550′ and a shaft will be sunk to open the orebody, whose out-it will be treated in the Meloy mill.

Company has a new shaft on Jas. Copeland tract at Shullsburg, has proven new run at Heughlett mine at Days Siding, and the Dale mine is now operating.

'EST HILL MINING CO. **WISCONSIN**

Address: W. Brown, supt., Platteville, Wis.

Cap., $20,000. In last eight months of 1915, reported to have made 150% ofit on capital stock.

Operates zinc lands in Platteville, Grant county, and was an important ipper of zinc concentrates. Paid a 10% dividend in March and another June, 1916. No new data available. Probably dead.

'HITE ROSE MINE **WISCONSIN**

Address: Gus. E. Brown, Platteville, Wis. Mill was burned in March, 18, but has been rebuilt.

'ISCONSIN ZINC CO. **WISCONSIN**

Subsidiary of the American Zinc, Lead & Smelting Co., which see.

Address: A. M. Plumb, gen. mgr., Platteville, Wis.

Inc. in Maine. **Cap.**, $1.000,000; $1 par; 925,000 shares issued; 649,774 vned by A. Z. L. & S. Co.

Dividends: 2% quarterly; No. 6 paid April 1, 1919.

Property: the Champion, Longhorn and Thompson mines at New Diggings, Wis. Crude ore averages 6% zinc. In 1919 company opened up an ore range and new shaft on the Booty lease, a half mile west of the Winskell. C.A.T. No. 2, was developed and connected by drift with C.A.T. No. 1—both at New Diggings.

Equipment: in 1917, a 200-ton mill was erected on the Copeland lease near Shullsburg. There is also a roasting plant at New Diggings, containing 7 Skinner hearth furnaces, 20′ diam., preparing ore for magnetic separation of marcasite from zinc blende.

Production: the Champion in 1917 yielded 15,727 tons of blende, and 17,004 tons green blende concentrate in 1919.

General: Company is one of the largest zinc-ore producers of this country, operating a number of mines as well as one of the Skinner magnetic separators, and an industrial railway that connects its several properties with the main line of the Galena division of the Chicago & Northwestern railroad. Three mines in the New Diggings district—the C.A.T., Champion, and Longhorn—are producing from 800 to 1,000 tons of zinc concentrate per week. A new mine recently developed and equipped is on the Copeland estate in the Shullsburg district. It made its initial ore deliveries during the third week of March. One of the most consistent producers of the field, from 1912-1918—the Winskill—also at Shullsburg, was exhausted and abandoned on March 16. The equipment will be dismantled and moved. Half a mile west a 170′ shaft was being sunk in the Booty land late in 1919. Drills are engaged by the company on various tracts in the Benton, Hazel Green, Shullsburg, Galena, and New Diggings districts. The Wisconsin Zinc, Vinegar Hill Zinc, and New Jersey Zinc companies combined to construct and operate at their own expense an industrial spur that is of great benefit to all.

Sales of dressed ore are made in open market to the highest bidder, although the Wisconsin Zinc Co. is a subsidiary of the American Zinc, Lead & Smelting Co., and is in this manner affilated with the American Zinc Co. smelters, at Hillsboro, Ill., to which point much of the finished ore finds its way. Heavy shipments are made at intervals of pyrite saved as by-product in the separation of zinc ore. The pyrite carries 30 to 35% sulphur. The Skinner roasters were completed in 1916 at a cost of $100,000. They are capable of treating 1,000 tons of raw zinc concentrate weekly. From this is recovered 500 tons of 59 to 61% blende. Cleveland-Knowles and Dings separators are largely employed in this plant, also the McDougall furnace. Fifty men can operate the plant per 24 hours. A wet mill was erected during the summer of 1917 to wash out fine and slime. The Overstrom slime table is mostly used. The ordinary method of wet concentration employed in the Wisconsin field is regarded efficient enough to eliminate the necessity of saving the small amount of mineral lost in slime.

Mill feed is handled on the can-contract system. Shovelers earn from $3 to $5 each per shift. Power supplied the company by the Inter-State Light & Power Co. of Galena, Ill. is steady and good. A telephone system connects the general manager's office with mine foremen underground.

Between 500 and 600 men are employed by the Wisconsin Zinc Co. Sociological conditions of the workers are given plenty of attention, and wages paid are good.

ZINC HILL MINING CO. WISCONSIN

Address: Charles Wolf, mgr., Platteville, Wis.

Property: formerly known as the Little Dick and Big Dick. Drills exposed good ore, and a 50 to 100-ton mill was erected in June, 1918. Operations were suspended in March, 1919, on account of market conditions, but were resumed in September, and $100,000 was to be spent in further exploration and erection of an electrostatic separating plant.

WYOMING

The mountainous regions of Wyoming contain numerous widely scat-ed mineral deposits, as yet but slightly developed, and the short-lived)om" of the Encampment district, on the Colorado border, bred so ny wild cats that the State has suffered ever since from the frauds of that iod.

The metal output is relatively small, that of 1918 being but 7 oz. of d, 253 oz. of silver, 754,324 lb. of copper, and a considerable tonnage of omite. The 1919 output was still smaller.

The mines are arranged alphabetically, as the State has no great min-center.

ME CONS. GOLD & COPPER MINING CO. **WYOMING**

Inactive. See Copper Handbook, Vol. XI.

TNA MINING CO. **WYOMING**

Idle. **Office:** Merrill, Wis. Mine near Riverside, Carbon county, Wyo. Copper Handbook, Vol. XI.

IERICAN FIREPROOFING & MINING CO. **WYOMING**

Address: Investment Clearing House, Fin. Agts., 513 Denham Bldg., nver, Colo. A. E. Minium, pres.; S. E. Coyler, mgr.

Inc. 1913. **Cap.,** $10,000,000; shares 10c par. Stock was offered at 2c h a guarantee of refund attached should the company's statement not be ified.

Property: 8 and a fraction claims, 200 acres, in the South Pass mining trict, 35 miles from Lander, Fremont county, Wyo., the nearest railroad, nprising the Jerry Dain and Hidden Hand Fraction group, a bond and se on the Bobtail, Denver and Bluebird claims, near Lewiston, and con-l of 120 acres of partially developed mineralized land.

Ore: quartz, with gold in fissure veins, 15-24" wide; said to average ter than $100 per ton in gold.

Development: includes shafts 40-70' deep, including 500' of underground rkings on the Bobtail claim.

Equipment: shaft-house, blacksmith shop, pumping station, engine, ler, crusher, electric plant, and other machinery. A new mill was ready operation in May, 1919.

ICHORIA COPPER MINING CO. **WYOMING**

Idle several years.

Office: Room 3 Algoma Bldg., Oshkosh, Wis. **Mine office:** Copper-, Carbon county, Wyo. H. O. Granberg, sec.-treas.

Inc. April, 1901, in Wyoming. **Cap.,** $1,000,000; shares $1 par.

Lands: 4 claims, 80 acres, patented, in the Battle Lake district, de-oped by a 200' shaft and tunnels of 45' and 60', showing an orebody esti-ted at 45' width, giving specimen assays of 17% copper, and from a trace $5 gold per ton. Has a 40-h. p. steam plant, with hoist good for 500', ee power drills and four substantial mine buildings of logs.

INIE MINING CO. **WYOMING**

Mine office: Jelm, Albany county, Wyo. L. A. Hancock, sec.

Inc. 1903, in Wyoming. **Cap.,** $250,000; shares $1 par.

Property: 100 acres, near Jelm, said to show two 4' contact veins be-een granite and schist, opened by a 140' shaft and a 138' tunnel, showing)per carbonates and bornite, assaying up to 20% copper and $10 gold per . Idle since 1907, except for assessment work performed each year.

'LAS COPPER MINING CO. **WYOMING**

Address: Tie Siding, Albany county, Wyo.

Development work was carried on in 1918-'19, a few hundred tons of being shipped to the Omaha smelter in 1918.

URITE MINING CO. **WYOMING**

Idle. **Office:** Room 3 Algomah Bldg., Oshkosh, Wis. Arthur Bishop, p.; H. O. Granberg, sec.-treas. and gen. mgr.

Inc. Dec. 17, 1904, in Wyoming. **Cap.**, $1,000,000; shares $1 par; issued, $624,650.

Lands: 5 claims, 63 acres, in the Battle Lake district, near Dillon, Carbon county, showing 3 fissure veins, in gabbro, of 15 to 20' estimated width, opened by 305' of work, including a 65' shaft and 70' tunnel.

BIG FIVE COPPER CO. WYOMING

Company dissolved. Fully described in Vol. XIII.

BOSTON & WYOMING COPPER MINING CO. WYOMING

Idle. **Office:** care Jas. A. Shinn, Leadville, Colo. **Mine office:** Esterbrook, Albany county, Wyo.

Inc. January, 1903. **Cap.**, $500,000.

Property: the oldest in the district, includes 120 acres mineral land and 120 acres miscellaneous lands, taken over from Esterbrook Mining Co. The Esterbrook mine has a 4' fissure vein, traversing diorite, schist and granite, carrying cuprite, chalcopyrite, cerussite and galena, estimated by former owner to average 2 to 4% copper, 25 to 30% lead, 2 to 4 oz. silver and $1 to $2 gold per ton, developed by 2 short tunnels and 5 shafts, deepest 335'.

COMMERCIAL GOLD MINING CO. WYOMING

Office: Centennial, Wyo.

Officers: P. A. Peterson, pres., Canon Falls, Minn.; P. L. Holtum, sec.; B. Holtum, mgr., Centennial, Wyo.

Transfer office: Centennial. Annual meeting, second Tuesday in August.

Inc. 1909, in Wyoming. **Cap.**, $1,000,000; $1 par; 350,000 outstanding.

Property: 2 patented claims of 96 acres in Centennial mining district. The formation is similar to that of the district, granite, schist, porphyry, quartzite, etc., with N. E.-S. W. trend.

Idle since 1918.

CONGO MINING CO. WYOMING

Address: Rawlins, Wyo.

Owns property in Battle Lake district; idle for several years on account of lack of transportation. No recent information.

CONTINENTAL-MORRIS COPPER MNG. CO. WYOMING

Office: Morris, Ill. Mine near Encampment, Carbon county, Wyo.

Officers: J. H. Rogers, v. p.; Dr. G. A. Leach, sec.-treas., with L. Hatcher, U. C. Davis, W. A. Thomas, E. R. Joyce, B. C. Hitchcock, directors.

Inc. March 31, 1908, in Wyoming, as a merger of the Continental Copper Mining Co. and Morris Mining Co. **Cap.**, $2,250,000, increased later to $5,000,000; $1 par, issued, $1,750,000. Annual meeting, first Tuesday in February.

Property: 7 claims, patented, 120 acres, in the Battle Lake district, carrying about 50 acres of good pine timber. Claims show schist, with veins, of 31 to 40' estimated average width, traceable 1,500 to 3,000', carrying carbonate and sulphide ore, estimated to average 1 to 8% copper, with small gold and silver values.

Development: includes several shafts and 1,400' of tunnels. **Equipment** includes a steam hoist, good for 500', and 2 buildings. Idle, but resumption planned as soon as property can be refinanced.

COPPER BOTTOM MINING & MILLING CO. WYOMING

Address: Inez, Converse, Wyo. Henry Metz, Sr., pres.; Fred Metz, sec.-treas.

Property: the Green Hope mine, in the Hartville district, Laramie county, has produced about 125 tons of ore. Company also owns 4 copper claims in the region at the head of Broom creek, 15 miles from Sunrise, on which annual assessment work has been done.

ELECTROLYTIC COPPER CO. WYOMING

Offices: 342 Securities Bldg., Omaha, Neb., and Fort[illegible], Wyo.

Officers: E. J. Stoll, pres.; W. C. Metzger, sec. and gen. mgr.; Frank ·ling, treas., with Q. P. Wyland, directors. Wm. Benton, supt.
Inc. November, 1918, in Wyoming. **Cap.**, $1,500,000; $1 par; 700,000 ·d.
Property: 8 claims, 150 acres, includes the Mountain Rest, Iron Blos- . and Jitney copper mines, 4 miles N. and N. W. of Foxpark, Albany ·ty, Wyo. In first-named claim, ore is said to carry gold, silver, copper, , zinc, vanadium, and nickel. The Iron Blossom claim was acquired ı the Iron Blossom Mining Co., which see.
Development: by 128′ shaft and 350′ of workings. Equipped with double- ı hoist; a 100-ton concentrating plant is planned.

:NOR MINES CO. **WYOMING**

Address: O. M. Beck, Atlantic, Wyo.
Officers: O. M. Beck, pres.; Nate Wilson, v. p.; F. V. Marsh, sec.-treas.
Inc. 1917, in Wyoming. **Cap.**, $150,000; shares 50c par.
Property: 12 claims about 4 miles N. W. of South Pass and 28 miles ı of Lander, show a well-defined vein carrying copper, gold, and silver :s.

:HORN COPPER MINING CO. **WYOMING**

Property: the Elkhorn mine in the Elkhorn Mountain district, near ·land, Carbon county, said to carry a 7′ vein of sulphide ore, averaging 8% copper, with considerable ore in sight. Mine has a shaft and a tunnel, with about 1,000′ of drifts. Development work was carried on 18, and the ore mined was stored until the 400-ton concentrating mill n 1918, was finished.

:RALD MINING CO. **WYOMING**

dle. Wheatland, Laramie county, Wyo.
Property: the Cooney Hill mine, formerly owned by the Cooney Hill & Copper M. & M. Co., and the Emerald mine, on Slate creek, show- prominent gossan outcrop in schist. The Emerald has a 60′ shaft in and a 100′ shaft bottomed in a gossan showing traces of copper sul- s. No recent report received.

RIS-HAGGARTY COPPER MINING CO. **WYOMING**

nactive. Owns, or did own, the copper mine of this name at Rudefeha, ɔn county, Wyo. Company also owned $375,000 of the Penn Wyoming ·, but as its stock is practically all owned by the Penn Wyoming, its ·rate officers and affairs are of no public interest, save as the only ble mining asset of the chain of bankrupt corporations, controlled by enn Wyoming and its alleged and equally rotten successor, the United ers, Railway & Copper Co. See under Penn Wyoming Co., in Vol. also Vol. X, Copper Handbook.

LD MILLING AND LEASING CO. **WYOMING**

. A. Lathrop, mgr., Centennial, Wyo. Company had a lease on the rty of the Utopia M. & M. Co. (which see) in the Centennial district.

GARTY COPPER MINING CO. **WYOMING**

robably dead. Mine at Rudefeha, Carbon county, Wyo. L. N. Pen- former pres.
ap., $10,000, increased Nov. 9, 1908, to $1,500,000; shares $1 par. Con- l and owned by the United Smelters, Railway & Copper Co. Is a nion of the Ferris Haggarty Co., but like all its sister companies by the U. S. R. & C. Co. Only a lawyer can tell which of the two the copper mine that has been the bait for so many "investors." c Vol. XIV, also Vol. X of "Copper Handbook," under Penn-Wyom- pper Co.

A CONSOLIDATED MINES CO. **WYOMING**

fice: at last reports, care Henry Schwartz, pres., 308 Masonic Bldg., r, Colo. Mine at Hecla, Laramie county, Wyo.
c. 1909, in Wyoming, as a merger of the Hecla Mining Co., Amalga- Copper Mining & Extraction Co. and Kopper Krown Mining Co. 5,000,000; shares $1 par.

Property: 610 acres, including the Hecla group, 13 claims, 2 patented, and a 35-acre townsite, in the Silver Crown district, 4 miles from Granite Canyon, on the Union Pacific railroad and 7 miles from the Cheyenne Northern line. The Hecla is claimed to show 16 fissure veins, of 8′ average width, in schist and granite, of which 3, of 7′ average claimed width, carry oxidized and sulphide ores, said to give average assays of 3.4% copper, 3 oz. silver and several dollars in gold per ton, besides nickel, platinum and uranium.

Development: includes a 40′ tunnel and 14 pits and shafts of 10 to 14′ depth.

The Hecla mill has 15 stamps, a 50-ton concentrating plant and a leaching plant. Ore is mainly low in grade, and only in part adapted to concentration, and the mill requires overhauling, and flotation equipment. The history and financial methods of this company and its predecessor are described in Vol. X.

Same management as the Henley Cons. Copper Mines, Wyo. Letter returned unclaimed 1919. Probably dead.

HENLEY CONSOLIDATED COPPER MINES WYOMING

Address: at last accounts, Henry Schwartz, 308 Masonic Temple, Denver, Colo., chief owner.

Property: 25 claims, 500 acres, 25 miles S. W. of Cheyenne, Laramie county, Wyo.

Same management as the Hecla Cons. Mines Co., which see.

HOME RUN COPPER MINING CO. WYOMING

Office: Rooms 17-18 Postoffice Bldg., Colorado Springs, Colo. Mine near Rudefeha, Carbon county, Wyo.

Officers: A. L. Bohrer, pres.; J. F. Humphrey, v. p.; Adolph Fehring, treas.; Wm. C. Robinson, sec., at last accounts.

Cap., $1,500,000; shares $1 par.

Property: 180 acres, partly patented, known as the Copper Bell group near the Ferris-Haggarty mine, having a 350′ tunnel showing a vein of copper, gold, and silver values. Idle many years.

IMPERIAL COPPER & GOLD MINING CO. WYOMING

Office: 423 Caswell Block, Milwaukee, Wis. Jacob Best, sec.-treas.

Property: 6 claims, 113 acres, patented, near the Penn-Wyoming mine on Upper Cow creek, 12 miles west of Encampment, said to show 2 veins, 1 of 26 to 32′ estimated width, being a schist dike. Mine has about 500′ of tunnels, developing ore giving assays of 6 to 14% copper, with small gold and silver values. Idle since 1915.

INDEPENDENCE MINING CO. WYOMING

Successor of Leighton-Gentry Mining Co.

Idle. **Office:** Algoma Bldg., Oshkosh, Wis.

Officers: E. E. Meeleus, pres.; Henry L. Larsen, v. p.; H. O. Granke, sec.-treas. and gen. mgr.

Inc. June 28, 1904, in Wyoming. **Cap.,** $1,000,000; $1 par.

Property: 6 claims, patented, 120 acres, 2 miles north of Dillon in the Battle Lake district, shows eruptive metamorphic country rocks, carrying an 11′ contact vein between quartzite and diorite.

Development: by 200′ incline shaft and 250′ tunnel, showing occasional stringers of 3 to 12″ width, carrying a little chalcopyrite assaying 12% copper, with small quantities of nickel and cobalt and traces of silver and gold. Has steam power, a hoist and several small mine buildings.

IRON BLOSSOM MINING CO. WYOMING

Office: Laramie, Wyo. **Mine office:** Foxpark, Wyo.

Officers and directors: Grant Thomas, pres.; E. J. Stoll, v. p.; W. Benton, sec.-treas. and mgr.

Inc. August, 1914, in Wyoming. **Cap.,** $100,000; 10c par; $75,000 issued, 250,000 shares in treasury. Paid dividends of 40% during 1918.

Balance sheet of August 3, 1918, showed cash, Liberty bonds and securities worth $15,400; and bills and taxes of $240.

Property: 5 claims, 100 acres, in Albany county, includes the Amazon, at Rambler, and Beulah mines, 5 miles W. of the C. W. & E. R. R. at Spark.

The Amazon mine whose claims cover 40 acres, has a 1,000′ tunnel giving a back of 200′. Ore was encountered in fissure veins in diorite at 200′ 600′ from portal. Two lots of ore shipped to the Grant smelter, Den- gave returns (1) 11% copper, $6.40 gold and silver; (2) 15.40% copper, 60 gold and silver.

The Beulah property has a 65′ shaft with a 30′ crosscut from which ore mined that yielded 11.20-15.6% copper, $3.40 and $5.60 gold and silver. carries 40% iron making it a good flux. A 2,200′ tunnel is being driven vein through Amazon property towards Beulah shaft to drain ground allow larger production at lower cost. Tunnel 965′ long, December,).

Company intends to sell 50,000 shares at 30c. to complete work planned. anuary, 1920, it was decided to erect a power plant, hoist, pumps, and a

IAY COPPER MINING CO. **WYOMING**

Idle. **Office:** Rawlins, Wyo. Mine near Rambler, Carbon county, Wyo. Miller, mgr.; Albert Bryle, supt., at last accounts.

Property: 4 miles S. of Rambler, is said to have a 20′ vein, carrying a streak of high-grade ore, apparently undeveloped, and another vein up to width carrying sulphide ore.

Development: by a 300′ shaft. Mine has been a complete failure to date.

K POT MINING & MILLING CO. **WYOMING**

Idle. **Office:** Room 3 Algoma Bldg., Oshkosh, Wis.

Officers: H. Thorsgaard, v. p.; H. O. Granberg, sec.-treas.

Inc. Dec. 23, 1903, in Wyoming. **Cap.,** $1,000,000; shares $1 par.

Property: 9 patented claims, 180 acres, in the Battle Lake district, ing fissure veins in diorite and chlorite schist, and 2 contact veins, be- n diorite and porphyry, carrying carbonate and sulphide ores. Two , slightly developed, are said to average 14′ to 60′ in width. The ler vein has averaged 8% copper and $3 to $12 gold per ton, the larger showing very low-grade copper ore.

Development: 75′ tunnel, 100′ shaft and 8 pits of 20 to 36′ depth, with of workings. Though inactive for many years, company is still in nce and all taxes have been paid to date.

BALL MINING CO. **WYOMING**

dle. **Address:** Kimball, Neb. B. A. Lathrop, pres. and supt., Centen- Carbon county, Wyo. G. W. Forsling, v. p.; A. J. Hull, sec.-treas.

roperty: 19 unpatented claims, near Centennial, developed by 800′ of ls opening a quartz vein with gold and silver-bearing copper ore. No t returns.

HTON-WYOMING MINING CO. **WYOMING**

dle. Letters returned from 417 Seventh St., Milwaukee, Wis.

fficers: M. H. Yewdale, pres.; Herman Pereles, v. p.; H. E. Dankoler, Spencer C. Yewdale, treas.; with A. G. Weissert, S. P. Bjorklund and Hendricks, directors, at last accounts.

c. 1906. **Cap.,** $1,000,000; shares $1 par; issued, $810,000.

roperty: 2 patented claims, about 1 mile north of the Ferris-Haggarty in the Battle Lake district.

evelopment: by a 186′ tunnel and a 65′ shaft.

quipment: includes a sawmill and a small machinery plant, bought from the Haskins mine.

MER MINERALS CO. **WYOMING**

ddress: M. Lorimer, Lusk, Wyo.

November, 1919, machinery had been erected to make a trial run, ring rich uranium ore for shipment to the extracting plants in the It was expected that radium would be extracted locally from the nd a sanitarium erected.

LOST CABIN MINING CO. WYOMING

Address: A. O. Heger, sec., Shoshoni, Fremont county, Wyo.

Cap., $150,000.

Property: the Lost Cabin group, in the Boyeson section, said to carry the Summit vein. Gold, silver and copper ore occurs in quartz veins. Since 1909 assessment work only has been done.

MAGGIE MURPHY COPPER CO. WYOMING

Office: care Chas. S. Ashley, pres., New Bedford, Mass. Mine near Douglas, Converse county, Wyo.

Inc. August, 1904, in Wyoming. **Cap.,** $1,000,000; shares $1 par

Property: 12 claims, 180 acres, and a 60-acre millsite in Horseshoe canyon, in the Laramie Peak district. Claims show granite, with gneiss and schists, carrying 7 veins between gneiss and mica-schist, one of which ranges 30 to 60′ in width and shows covellite, bornite and chalcopyrite, with pyrrhotite ores assaying 1 to 6% copper, 2 to 9 oz. silver and 40 cts. to $3 gold per ton.

Development: includes 114′ shaft and various shallow workings. Company has kept up necessary annual assessment work, but has done no development, as far as can be ascertained.

NORTH LARAMIE PEAK COPPER MINING CO. WYOMING

Office: care L. V. Saul, sec., Esterbrook, Wyo. **Mine office:** Douglas, Converse county, Wyo.

Officers: H. C. Saul, pres.; W. A. Saul, treas.

Inc. 1908, in Wyoming. **Cap.,** $2,000,000; shares $1 par; fully paid, non-assessable; 500,000 shares in treasury.

Property: 29 claims, 440 acres, patented, in the North Laramie Peak district, show pre-Cambrian schists bordering granite contacts, on which 1,000′ of diamond-drill work has proven existence of a flat body of disseminated chalcopyrite ore 40′ wide. A shaft has been sunk 100′ on a channel of chalcopyrite ore said to assay 27% copper, 6 oz. silver and $2 gold, in a total width of 5′.

Equipment: includes 80-h. p. boiler with hoist, pump, steam power and a 3-drill compressor. Is a close corporation, entirely owned and financed by Messrs. Saul. No recent returns.

OCCIDENTAL GOLD MNG. & MLLG. CO. WYOMING

Address: Beulah, Crook county, Wyo.

Property: 12 miles from Beulah, was not operated in 1918-19, though roads were built, and flumes and pipe laid as part of assessment work.

OSHKOSH-WYOMING MINING CO. WYOMING

Idle. **Office:** 3 Algoma Bldg., Oshkosh, Wis. Mine near Dillon, Carbon county, Wyo.

Officers: O. A. Koch, pres.; E. E. Meeleus, v. p.; H. O. Granberg, treas. and gen mgr.

Inc. June 20, 1904, in Wyoming. **Cap.,** $1,000,000; shares $1 par.

Property: 11 claims, 220 acres, in the Battle Lake district, is said to carry fissure veins in gabbro, of 22′ estimated average width, opened by shafts of 32′ and 72′ and a 22′ tunnel, showing chalcopyrite and oxide of copper.

OTEGO MINING CO. WYOMING

Hecla, Wyo. **Officers:** Horace E. Adams, pres.; L. M. Porter, v. p.; Fred McTygue, sec.-treas.

Inc. in Wyoming. **Cap.,** $5,000,000; shares $1 par.

Property: 3 claims, about 60 acres, in the Silver Crown mining district near Hecla, Laramie county. The Arizona mine is said to show granite schist cut by an extensively fractured dike of diorite, about 200′ wide, 2,000′ long, outcropping at surface over a considerable distance. Ore at surface is oxidized and carries principally malachite, succeeded at depth by copper sulphides and native copper. Gold occurs disseminated throughout the orebody.

Development: by 160′ shaft with 102′ crosscut at the 80′ level, 3

scuts and drifts on the 130′ level, and a 100′ tunnel. Mine reported on . E. Jamison and H. C. Beeler (1907).

K GOLD MINING CO. **WYOMING**

Office: Mining Exchange Bldg., Colorado Springs, Colo. **Mine office:** ennial, Wyo.

Officers: Henry Sachs, pres.; G. Y. Kittle, v. p.; C. B. Garnett, sec.-.; P. J. Winters, mgr., with E. H. Joslyn, directors.

Inc. 1916, in Wyoming. **Cap.**, $700,000; shares $1 par; non-assessable; 50 shares outstanding.

Property: 10 claims, 100 acres, 40 acres being placer ground, in Cen-ial mining district, Albany county, 3½ miles by road to Centennial, at levation of 9,294′. Also has a bond and lease on 200 acres adjoining nd, developed by a main tunnel expected to cut the veins of the ralized zone at 500′ from portal.

Development: work was started in January, 1917, and consists of two els, longest 335′ and a shallow shaft.

Equipment: includes gasoline engine and 3-drill compressor.

The lode claims have been favorably compared by the two engineers have reported on the properties at different times "to the Homestake in South Dakota."

Funds for development being raised by sale of notes convertible into s at 10c per share.

N-WYOMING COPPER CO. **WYOMING**

For detailed history, see Vol. X of "Copper Handbook."

n January, 1919, it was announced that Morse Bros. Machinery & Sup-Co. of Denver had purchased from the Bondholders Protective Commit-he entire assets of the Penn-Wyoming, including all the assets of the us subsidiary companies whose bond issues totaled $3,600,000. Pro-on from properties totals 6,414,011 lb. of copper recovered from 59,000 of ore equivalent to 5.4% copper.

The aerial tram connecting the Ferris-Haggerty mine with the smelter ıcampment is 16 2/3 miles long, and was a costly attempt to solve the portation problem. An honest effort will be made by the new owners ove the value of the mines, and to operate them if investigation proves worthy of the necessary expenditure. The smelter and concentrators ıcampment will be dismantled and sold.

The geologic features of the district are described by A. C. Spencer, ofessional Paper No. 25, of the U. S. Geological Survey, 1904.

TINUM MINING & MILLING CO. **WYOMING**

Merged with Rambler Copper & Platinum Co. into Rambler Consoli-Mines Corporation, which see. Fully described in Vol. XIII.

TO GOLD & COPPER MINING CO. **WYOMING**

dle. **Office:** 3 Algoma Bldg., Oshkosh, Wis. Mine near Dillon, Car-county, Wyo. H. Thorsgaard, v. p.; H. O. Granberg, sec.-treas.

nc. Dec. 15, 1902, in Wyoming. **Cap.**, $1,000,000; shares $1 par.

Property: 11 claims, patented, 220 acres, and a 40-acre millsite, in the e Lake district, near the Ferris-Haggerty mine, said to show both fis-veins in quartzite and contact deposits between diorite and quartzite, ng from 2 to 30′ in width, and carrying copper ore, with average assays copper, a trace of silver and $3 gold per ton.

Development: by numerous pits of 10 to 20′ depth, 5 shafts of 55 to epth, and a tunnel of 1,004′ with about 2,000′ of underground workings.

Equipment: includes a 40-h. p. steam plant and 3-drill air compressor. ive since 1908.

ND CONSOLIDATED COPPER CO. **WYOMING**

Office: 20 Broad St., New York.

Officers: Herbert Frankenberger, pres.; Myer Newberger, v. p.; J. N. [illegible] treas.; with David Sherman, T. C. Delany and W. H. D'Esterre, [illegible]

[illegible] 16, in Wyoming. **Cap.**, $2,000,000; shares $1 par; 1.571,216 shares

outstanding. Security Trans
Company office, transfer offi

Property: formerly own
Mining Co. and the Portlan
153¾ acres patented, at Enc
mile along a mineralized zone
is reported to be traversed
westerly into and through th
to vary from 12″ to 40′ in wi
Minerals are chiefly pyrite, c

Development: 2,600′ of v
consisting of an 1,150′ tunnel
timates ore reserves at 300,00
copper and 40c gold; and 50
to 25% copper and $1 to $6
to prove value of the proper

RAMBLER CONSOLIDAT

A merger of the Rambler
& Milling Co.

Office: 912 Otis Bldg., Cl

Officers: A. A. McKinley
with F. S. Sheldon, J. K. Blis

Cap., $2,500,000; $1 par;
entire issue placed in 1919.

Property: 12 claims, 240
Albany county, Wyo. Ore a

Geology: the platinum o
platinum) in basic dikes, whi
and massive granite. The a
and chalcopyrite. Recent wo
able orebody. In 1918, the o
tons of concentrate containi
ver, and copper.

Mine operated for first
operations expected to be res
p. 914.

RAMBLER COPPER & PI

Merged with Platinum M
Corporation, which see. Ful

RICH CHARTER OAK CO

Address: G. P. Elmen, s

Property: formerly owne
N. W. of Encampment, the

Development: by 7 shaft
to have exposed copper-gol
2 miles. About 15,000 tons
to 40% copper and $10 in g
1,000′.

Equipment: includes ho
and 60-ton mill installed in J

SHAWNEE COPPER MIN

Address: J. M. Bovee,
and A. H. Ikenberry.

Property: 5 claims, unp
district, Carbon county, Wyo
schist cut by a fissure zone 2

Development: by 160′ s
by H C Beeler, J. J. Hinton,
is done each year.

AKE RIVER CONSOLIDATED MINING CO. WYOMING

Offices: 426 Century Bldg., Denver; and Columbine, Routt county, Colo.
Officers: L. A. Pease, pres., treas. and gen. mgr.; A. L. Arnold, sec.
Inc. July, 1906, in Wyoming. **Cap.,** $5,000,000; $1 par; fully issued, with 0,000 stock assigned to a trustee, for the benefit of the treasury. An- meeting, second Wednesday in July.
Property: 9 lode claims, 2 patented, 180 acres, and 520 acres of placer ns, unpatented, in Three Forks district, 26 miles S. W. of Encampment, nearest rail point.
Geology: claims show granite and diorite, reported by management ave veins carrying auriferous galena, with strike of N. 25° W., and cross s carrying copper striking at nearly right angles, the galena vein system ng an extreme width of 120', with length of 4,500', the paystreak varying 10" to 54" in width. The galena ore is said to average 10 to 20% free from zinc, with silver and gold values. The copper veins are un- loped, but show a variety of oxidized ores, at surface.
Development: by pits and shafts, and numerous short tunnels, from 30 0' in length, nearly all openings showing ore. The management esti- s 5,000 tons of ore blocked out for stoping. Plan raising necessary s for proper equipment and small concentrating plant.

TED SMELTERS, RAILWAY & COPPER CO. WYOMING

Dead. The property claimed by company is described under the title e Penn-Wyoming Copper Co., which apparently was the legal owner, full particulars regarding the entire chain of rotten promotions, in- ng this company, are given in Vol. X, Copper Handbook, under Penn- ming Copper Co.
udgment against company for $2,500,000 was secured by Continental mmercial Trust & Savings Bank, Chicago, December, 1913. Bank had d money to company taking a mortgage on the property. Several of litigation were thus ended and the properties of the United Sm., & C. Co. and its subsidiaries were sold at forced sale, being bought in e bank.
On January 1, 1919, the property was purchased by the Morse Bros. inery Co. of Denver, who will build a mill for the treatment of the melter slag dump.

PIA MINING & MILLING CO. WYOMING

ddress: Centennial, Albany county, Wyo.
fficers: Lee Van Voorhis, pres.; Jas. McCune, v. p.; P. L. Loltum, Bernards Loltum, gen. mgr.
nc. 1898, in Wyoming. **Cap.,** $1,000,000; shares $1 par; non-assessable; l, $875,000. Annual meeting, third Tuesday in August.
roperty: 2 claims, 30 acres, unpatented, in the Centennial district, said ow 2 contact veins between diorite and schist, of which 1 averaging 5' lth, is reported to have given assays of 3% copper, 4 to 20% zinc, up oz. silver and $44 gold per ton. Minerals are mainly chalcopyrite, rite, and pyrite. Ore averages $15 per ton.
evelopment: by tunnels of 250', 600', 175', 300', and 1,200', with about of workings, all in ore.
quipment: includes a small electric installation, with electric drill, and dings. Reopened in 1913 and leased in 1915 to the Gould Milling & g Co. A 50-ton mill costing $20,000 was erected, but was closed dur- e war. It was to be remodeled, and mine and mill operated by lessees 9-20.

TOR CONSOLIDATED GOLD MINING CO. WYOMING

603 Symes Bldg., Denver, Colo., and Glenrock, Wyo.
t see same company under Colorado.
t 3 patented chromite claims, 23 miles S. E. of Glenrock, Con- Wyo., purchased in October, 1918, for $8,750 cash, plus 12½% on board cars.
enough work has been done to prove limits of 4 lenses

of 40% chromic oxide ore whose croppings are scattered over an area of 400' across. Exploration work and stoping have produced 610 tons and developed indicated ore amounting to 2,000 tons, with faces still in ore. This ore is from 4 to 22' wide, and is found but 10' below the surface. One lens yielded 50 tons of 34% ore, with enough indicated ore to show that it would take 5 months' work to extract it and would give a profit after paying for purchase price and all improvements, including much road construction.

Financial: chromite mined on the Pacific Coast when shipped to Denver, takes a freight rate of $8.70 per ton higher than ore from Glenrock to the Vindicator company's Denver plant, where two 1,500 kva. electric furnaces reduce the ore to ferro-chrome with output of 200 tons per month. This freight charge gives the Vindicator Company a big advantage over other chromite producers. The total outlay at the mine up to February, 1919, was $55,273, less $21,671 for ore sold.

WESTERN SULPHUR CO. WYOMING

Address: Douglas, Wyo.

Officers: W. F. Cox, pres.; G. W. Metcalf, v. p.; C. D. Zimmerman, sec.-treas.; with P. I. Rothwell, directors. H. C. Austin, supt.

Inc. in Wyoming. **Cap.**, $15,000,000.

Property: 430 acres at Thermopolis, Hot Springs county, Wyo. Examined by Chauvenet of St. Louis and McClave of Denver.

Sulphur deposit is a dissemination in limestone, assaying from 6 to 99.7% S. Mining is to be by steam shovels. Diamond-drilling under way in 1919. A spur line is contemplated, also a refinery.

WILLIAMS LUMAN MINING CO. WYOMING

Address: care W. J. Thom, cashier First Nat'l Bank, Buffalo, Wyo.

Mine office: Depass, Fremont county, Wyo. L. R. Vanhouten, pres.

Inc. May 2, 1908, in Wyoming. **Cap.**, $2,500,000; $1 par; issued 2,385,000 shares.

Property: 9 claims, patented, 130 acres, 16 miles from a railway, in Copper Mountain district, shows 8 fissure veins in granite, diorite and altered schist. The main vein zone, 50 to 60' wide, traceable 3,400', is much altered, crushed and fissured diorite, has a 2' paystreak carrying free gold, copper ore, and native copper in thin sheets and nuggets, ore minerals being cuprite, melaconite, malachite and chalcocite. Ore is reported to assay 10% copper, 5 to 10 oz. silver, and $2 to $8 gold per ton.

In April, 1918, company bonded the McGrath claims from D. L. Day of Basin, Wyo.

The G. & M. Copper Mining Co. operated a lease on the main property and was reported shipping ore. Company resumed operations in 1918.

Development: by an 820' shaft, showing sulphides on the 800' level, with 2,000' of workings. There also are tunnels of 513' and 300'.

Equipment: includes an 80-h. p. gasoline plant, with a 15-h. p. hoist and a 2-drill compressor. A concentrator was erected in April, 1918.

The company is operated as a close corporation, money for development having been furnished by about 10 shareholders only. Property favorably regarded, but needs railroad transportation.

WINONA GOLD-COPPER MINING & MILLING CO. WYOMING

Office: 111 Market Ave., S. Canton, Ohio. **Mine office:** Painter, Big Horn county, Wyo.

Officers: L. Cavanah, pres. and gen. mgr.; Geo. House, v. p.; D. L. East, 2nd v. p.; Wm. H. McAloney, sec.-treas., at last accounts.

Inc. 1903, in Wyoming. **Cap.**, $5,000,000; shares $1 par; fully paid. Management was changed and company practically reorganized December, 1905.

Property: 25 claims, unpatented, 440 acres, in the Sunlight district, Silver creek, in Rose, Bonfil and Sulphur mountains, in the N. W. corner of Big Horn [illegible] miles E. of the Yellowstone National Park. Claims [illegible] ores, carrying [illegible] with [illegible] pyrite, chalcopyrite [illegible]

ite and are reported to average 7 to 8% copper with about $3 gold per . The principal veins in andesite are known as the Bluff, Malachite and enhorn. The Bluff vein is said to be 25′ wide with a 12′ paystreak of per ore. The Malachite vein, 10 to 25′ wide, has a paystreak of high-de copper ore, 1½′ wide at surface, increasing to 5′ at depth.

Development: by 2 tunnels, the lower or main working tunnel, 804′ g. Total workings, 1,032′. **Equipment:** includes steam and electric power its and 10 buildings. No recent returns; presumably inactive.

'OMING COPPER & GOLD MINING CO. **WYOMING**

Office: Alma, Kan. C. B. Henderson, pres.; Al Rohr, v. p.; J. R. Hen-son, sec.-treas.

Inc. Sept. 3, 1903, in Arizona. **Cap.**, $1,500,000; shares $1 par; non-ssable.

Property: 9 claims, known as the Metal Chief and Jessie group, in Hog k, in the upper Platte district, 12 miles from a railway, show granite gneiss, cut by 2 fissure veins with S.-E strike, reported by management average 28 to 35′ in width, and to carry copper oxide and carbonate , with average assay of 3 to 15% copper, a little silver and $1.63 to 9 gold per ton.

Development: the Metal Chief vein has a 105′ shaft and the vein is re-ed to widen at depth. The Jessie vein has a 175′ shaft showing ore of 10% copper tenor with small gold and silver values.

Equipment: includes a small steam plant with a hoist, steam pump, and ildings.

No recent returns; presumably idle.

OMING COPPER MINING CO. **WYOMING**

Idle. **Office:** 303 Detroit Free Press Bldg., Detroit, Mich. **Mine office:** th Pass City, Fremont county, Wyo.

Officers: Charles K. Skinner, pres.; C. F. Remington, treas.; Jas. Mac-lane, v. p. and supt.; C. A. Spalding, sec., with Chas. E. Murphy, and s. D. Ridgway, directors.

Inc. 1905, in Wyoming. **Cap.**, $2,000,000; $1 par; issued 1,375,000.

Property: 12 quartz claims, 240 acres, and a 30-acre placer claim, in the th Pass district of the Wind River mountains, reported to show a act zone between granite and metamorphic rock, proven for one-half in length by prospect pits.

Development: includes a 500′ incline shaft, and several hundred feet of scutting. The vein is reported by the former management to show sul-e ore at depth of 72′, ore giving assays of 2 to 6% copper, with an age of 1 to 2 oz., and maximum of 20 oz. silver, and $3 to $4 gold per

Equipment: includes an 80-h. p. boiler and a 40-h. p. hoist, with several lings.

CANADA

The mining companies of Canada are grouped by provinces and by districts, and arranged alphabetically under these names—Cobalt, Porcupine, etc., are therefore, described under Ontario. The Pas district, the new copper district of Canada is in Manitoba and the great number of mineral properties of the Pacific Coast region are described in the British Columbia section.

Newfoundland being an independent Crown Colony is in a separate section.

ALBERTA

ATHABASCA MINING CO.

Inc. in Alberta, Can., April, 1914. **Cap.**, $1,000,000. Hon. G. H. Bulyea, Gov. of Alberta, Hon. Chas. R. Mitchell, E. J. Taylor and C. L. Freemann, directors, all of Edmonton.

Property: assets and properties of the Athabasca Mng. Syn. consist of 800 acres of nickel claims, 160 acres iron claims, on and near Lake Athabasca near Edmonton, Alberta, Canada. Assays of surface samples showed 1½ to 2% nickel, iron samples ran 66.7% iron, 2.12% silica, .014% phosphorous and .02% sulphur. Copper occurs as bornite.

BRITISH COLUMBIA

The mining companies of this province are arranged alphabetically. Readers interested in British Columbia mines should consult the yearly reports of the Provincial Mineralogist, issued as Annual Report of the Minister of Mines, obtainable free from the Minister of Mines, Victoria, B. C.

A. B. C. METALS CO. **BRITISH COLUMBIA**

See Alaska British Columbia Metals Co.

ALAMO CONCENTRATOR **BRITISH COLUMBIA**

Located at Alamo, on the Kaslo-Nakusp Ry. Owned by Clarence Cunningham, and built by General Engineering Co., of Salt Lake City. Mill has a capacity of 150 tons and was built to treat ore from the Queen Bess, Wonder, Sovereign, and Idaho and Alamo mines, operated by Cunningham. Power obtained from a 225 h. p. Pelton wheel. Mill started operating about August 1, 1919.

ALASKA BRITISH COLUMBIA METALS CO. BRITISH COLUMBIA

Office: S. I. Silverman, 1 Wall St., New York.

Officers: S. I. Silverman, pres.-mgr.; C. S. Cohen, v. p.; H. H. Hyman, sec.-treas., with H. M. Keith and H. L. Dudley, directors.

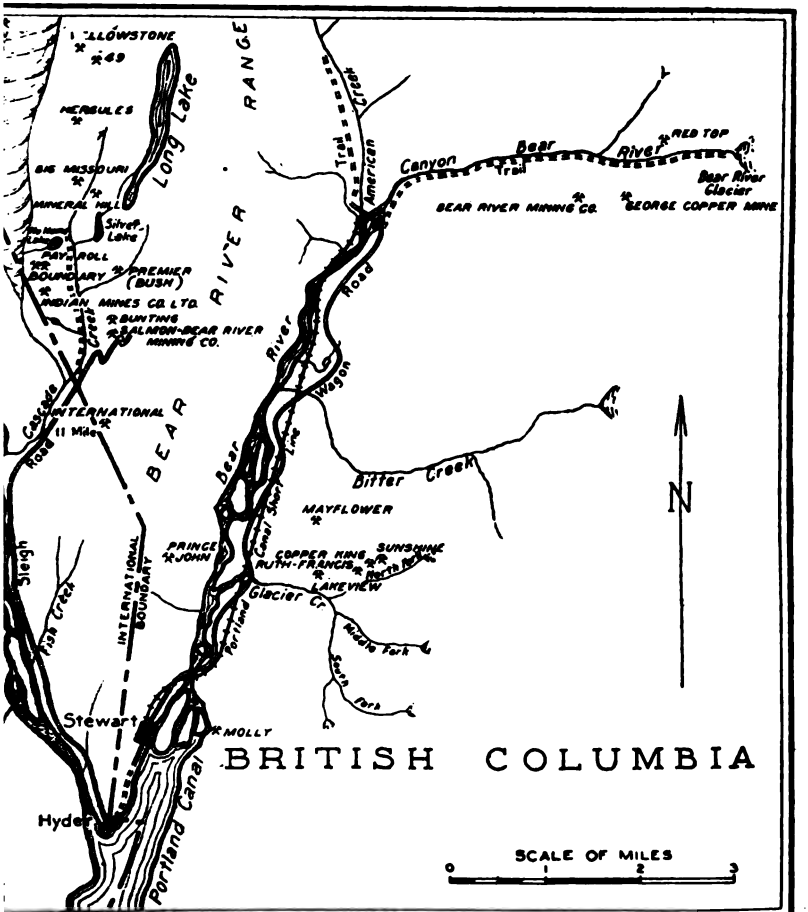
Inc. December, 1915, in Washington. **Cap.**, $2,000,000; $1 par; increased from $1,000,000. Metropolitan Trust Co., New York, transfer agents and registrars. Listed on New York Curb.

Company is a holding concern whose principal interests are in the Dewdney or Indian Chief mine of the Dewdney Canadian Syndicate, and in the Forty-Nine Mining Co., Ltd., which see. Also controls the Tidewater Copper Co., which see.

AMARGOSA COPPER CO. **BRITISH COLUMBIA**

Office: 823 Old National Bank Bldg., Spokane, Wash.

Officers: E. P. Spalding, pres.-mgr.; C. D. Muxen, v. p.; Oscar Cain, treas., with A. M. Premo and G. A. Henkel, trustees.
Inc. 1916, in Washington. **Cap.,** $1,000,000; $1 par; assessable.
Property: 7 claims, 300 acres, 5 miles from Hazelton, claimed to cover ' on the strike of a series of veins, from 4-10' wide, carrying copper-silver-ore.
Development: by 300' crosscut tunnel. Idle since June, 1917.



TIES OF THE NEW BOUNDARY DISTRICT. THE DOLLY VARDEN MINE IS EAST OF STEWART.

RICAN BOY MINING CO. BRITISH COLUMBIA

ockholders, 1918, Maurice Oppenheimer, A. W. Siegel, Sam Hanauer, and McCall, of Spokane, and C. D. Bibbins, Oakland, Calif. Reported in 1918 nas. F. Caldwell and Eastern associates had taken a 3-year lease and bond perty of the company for $100,000. Mine has been idle for 10 years.
p., $1,500,000; par $1.
operty: 4 claims, adjoining the Last Chance, on Reco Mountain, andon, Slocan district, said to show silver-lead ore. There are several

thousand feet of workings; considerable ore was shipped when the property was operating.

ARGO MINING & TUNNEL CO., LTD. **BRITISH COLUMBIA**

Office and mine: Greenwood, Yale district, B. C.

Officers: Ole Lofstad, pres. and gen. mgr.; A. S. Black, sec.-treas.; with John Williamson, Jerome McConnell and Oscar Hartman, directors.

Inc. June 10, 1909, in British Columbia. **Cap.,** $125,000; shares 25c par.

Property: the Argo mine, near the Greenwood smelter, developed by 1,150' tunnel, at a vertical depth of 500', with portal about 500' from track of Canadian P. Ry. A vein of milling quartz, 10' wide, contains a 4' band of concentrating ore. No recent information; probably idle.

ASPEN GROVE AMAL. MINES, LTD. **BRITISH COLUMBIA**

Address: Merritt, B. C.

Officers: J. E. Bate, pres.; M. L. Grimmett, v. p.; M. R. Durland, sec.-treas., with Jos. Walters, and J. J. Gillis, directors.

Inc. in British Columbia. **Cap.,** $1,000,000; par $1.

Property: 75 claims, in Aspen Grove district, Nicola mining division, which show low-grade copper ore. At last report property was under bond and lease to Jas. Errington and associates and was to be explored by drilling.

AUFEAS MINES, LTD. **BRITISH COLUMBIA**

Dead. Formerly at Hope, B. C. See Vol. XII.

BABINE BONANZA M. & M. CO. **BRITISH COLUMBIA**

Officers: Jas. Cronin, pres., 924 S. Maple St., Spokane; Chas. Thein, v. p., with Wm. Huntley, J. F. Cronin, all of Spokane, Wash., and A. H. MacNeill, Vancouver, directors.

Property: a group of claims, 300 acres, at the head of the Tuchi river, in the Babine range, Skeena district, 22 miles by trail from Smithers, on the Grand Trunk Pac. R. R. Orebodies occur on contact of granite porphyry and altered sediments, and in fissure veins, 1 to 3' wide, in the porphyry. Values are in the silver-lead-zinc contents. Average assays show 20 to 60 oz. silver, 11 to 56% lead, 10 to 34% zinc.

Development: several tunnels, longest 400', and shafts, deepest 50'. A promising prospect, but handicapped by its remoteness. Planning to continue development work, 1920.

BELMONT-CANADIAN MINES, LTD. **BRITISH COLUMBIA**

Described in Vol. XIII. Property taken over by Belmont Surf Inlet Mines, Ltd., which see.

BELMONT SURF INLET MINES, LTD. **BRITISH COLUMBIA**

Office: 500 Bullitt Bldg., Philadelphia, Pa.

Officers: C. A. Heller, pres.; W. M. Potts and S. D. Sinkler, v.-p.; C. B. Taylor, gen. counsel., with E. A. Cleveland, M. B. Cutter, J. C. Fox, R. G. Park and T. W. Synnot, directors. J. K. Kitto, sec.-treas.; B. G. Hawkins, R. G. Wilson, and A. S. Arnold, asst. sec.-treas.; C. Ducheneau, comptroller; Frederick Bradshaw, gen. mgr.; F. W. Holler, supt.; G. H. Garrey, consulting geologist; H. J. O'Connell, mine supt.; F. H. Penn, mill supt.; E. W. Hawkins, auditor.

Inc. in British Columbia. **Cap.,** $2,500,000; shares, $1 par. Incorporated by the Tonopah Belmont Development Co., of Nevada, to take over property of Belmont-Canadian Mines, Ltd., and Surf Inlet Power Co., two British Columbia corporations, owning the Tonopah Belmont, which controlled the mine directly. The mother company owns 80% of the total [illegible] Inlet Mines. Up to the end of 1918, the Tonopah Belmont [illegible] on the property, a sum which has since been [illegible]

[illegible] 28, 1918, shows $325,7[illegible] ceipts [illegible] were $326,258, and [illegible] ties, $[illegible] 31, 1918, the [illegible] $744,432, [illegible],811, and [illegible] 107. Net [illegible] 434.

ividends: initial, of 5 cents a share, equal to $125,000, was paid in 1919; total for 1919, $375,000. First quarter of 1920, $125,000.
roperty: a gold-copper mine on Princess Royal Island, B. C.
evelopment: by the present company, total 16,000′ of work, all h tunnels. The cost per foot in 1918 was $15.116 for 1,887′. The winze the main haulage-level (550′) is now a fully equipped three-compartment with electric hoist, etc. Recent exploration has exposed orebodies of large nd on January 1, 1919, reserves were reported as 422,761 tons, an increase .790 tons since March 1, 1917. In 1918, 116,349 tons were mined.
quipment: is very complete, including 750 k. w. hydro-electric plant, ile transmission-line, compressors, machine-drills, conveyor-bridge, and 1 mill (started Sept., 1917), containing ball-mills, concentrators, and flo- machines. Concentrate is sent to smelter. A modern township has been ed and dwellings erected for employees.

oduction:	Gold,	Silver,	Copper,	Value	Total		
Tons	oz.	oz.	%	per ton	realized	Recovery	Cost
..... 103,451	0.438	0.275	0.315	.....	.....	.....	.....
..... 83,142	0.481	0.311	0.261	$11.12	$740,090	93.13	$5,012
3..... 33,207	0.501	0.354	0.199	11.11	325,549	92.30	7.131

ıe 1918 figures are for 10 months, and those for 1917-18 for 6 months, oken periods. Net profit for last quarter in 1919, $88,181.
ıis mine is now a regular dividend-payer.

MISSOURI MINE. **BRITISH COLUMBIA**

ddress: Lindeborg Bros., Stewart, B. C. Mine worked under lease nd by Sir Donald Mann, and Sandy Mann, of Montreal.
operty: 20 claims on Cascade creek, just N. of property of Premier ; Co., 20 miles from Stewart, said to show an immense body of low-grade x ore, opened by a series of open-cuts made in 1917, which prove the ore vidth of at least 1,000′. Hundreds of samples from these cuts average 60c l, $1.05 in silver, 2.16% lead, 0.5% copper, 5%zinc, 14.3% iron, 75% silica. in 1918 is said to have disclosed extensive bodies of high-grade silver ore ill assay, in places, over $100 per ton in a width of 20′. Diamond drilling, l during the winter, to be renewed in 1920. If further development shows ıation of such a large low-grade orebody experimental work will doubt- d a method to treat the complex ore. The high-grade ore is an additional

ENA COPPER MINES, LTD. **BRITISH COLUMBIA**

fice: 420 Rogers Bldg., Vancouver.
ficers: L. A. Brown, pres.; T. W. Turner, v. p.; C. M. Oliver sec.- with D. McCallum, and G. Armitage, directors.
c. May, 1913, in British Columbia. **Cap.,** $300,000; $1 par; outstand- 7,020. Annual meeting, December 13. Spent $20,477 in development work

operty: 3 claims, 150 acres, crown-granted, on the east side of Island, 12 miles west of Vancouver, said to show disseminated copper ore g 1.9% copper and containing gold and silver.
velopment: 170′ tunnel, claimed to block out 10,000 tons ore. Trial ns sent to Ladysmith smelter in 1917, ran 3.3% copper, $2.40 gold and 1.16 per ton, netted $14.18 per ton.
sander Sharp, E. M., reported 8,000 tons of 1.8% ore and G. S. Eldridge, tal assayer, Vancouver, reported the 10 dumps ran 2.42% copper.
operty leased, July, 1918, to C. W. Tipping for 5 years, company to re- 0% of the net profits. Lessee has built a 100-ton mill. No record of

-ALBERTA MINING CO. **BRITISH COLUMBIA**

A. J. Flood, pres., Vulcan, Alberta; W. R. Allen, sec., Nel-

rick group, 4 claims, 6 miles N. of Argenta, at head

of Kootenay Lake, Ainsworth mining division. Said to show a 36' vein with lead-silver-zinc ore in streaks 6 to 18" in width. Developed by tunnel and a 90' shaft. In 1918, a few men were employed and a little ore mined.

BRITISH-AMERICAN COPPER MNG. & SM. CO. B. C.

Office: 510 White Bldg., Seattle, Wash.

Incorporators: Arthur Bernstein, Norman Herman, Adam Beeler, J. J. Sullivan, and E. M. Kennard.

Inc. in 1917 in Washington. Cap., $2,000,000. Company planned to develop copper mines in British Columbia. No recent information.

BRITISH AMERICAN MNG. CO., LTD. **BRITISH COLUMBIA**

Office: Van Anda, Texada Island, B. C.

Officers: H. J. Peterson, pres.; E. E. Harnish, v. p.; O. L. Grondal, sec.; preceding officers, J. D. Smith, Geo. King, R. C. Payne and A. G. Byle, directors; L. M. Olson, treas.; John Minear, supt.

Inc. December 1906, in Arizona. **Cap.**, $1,000,000; $1 par; 591,000 outstanding.

Property: 3 patented claims on Texada Island, B. C., said to show copper, gold and silver ore in vein. Development is by 160' incline shaft.

Equipment: hoist, 3-drill air compressor. Company does not reply to letters. A prospect.

BRITISH CANADIAN SILVER CORP'N **BRITISH COLUMBIA**

Address. R. E. Bayliss, 19 St. Swithin Lane, London, E. C. 4, England.

Organized February, 1920, as operating subsidiary of Selukwe Gold Mng. & Finance Co., to develop properties in Stewart district, B. C.

BRITISH COLUMBIA COPPER CO., LTD. **BRITISH COLUMBIA**

Fully described in Vol. XII. See Canada Copper Corporation.

BRITISH COLUMBIA IRON CO., LTD. **BRITISH COLUMBIA**

Address: E. C. Wragge, Nelson, B. C.

Organized in summer of 1919, to develop 40 claims located about 3 miles W. of Kitchener.

Management states that the holdings show a large body of hematite, running from 60 to 75% iron, and that diamond drilling will be done to ascertain its commercial possibilities.

BRITISH COLUMBIA MANGANESE CO. **BRITISH COLUMBIA**

Operates a manganese property at Hill 60, 12 miles W. of Duncan. Reports shipments are made to the Tacoma smelter.

BRITISH COLUMBIA PHOENIX CO., LTD. **BRITISH COLUMBIA**

Described in Vol. XIII. Presumably dead.

BRITISH COLUMBIA SILVER MINES, LTD. **BRITISH COLUMBIA**

Address: O. B. Bush, Stewart, B. C.

Inc. in 1919.

Property: the Lake and O'Leary claims between the Premier and Bush mines and the Mountain claims between the Premier and International, a few miles north of Stewart.

BRITANNIA MNG. & SMELTING CO. **BRITISH COLUMBIA**

All stock acquired by the Howe Sound Co., which see.

BULLION MINING SYNDICATE **BRITISH COLUMBIA**

R. T. Ward, mgr., Bullion, B. C.

Property: over 1,200 acres, 600 held under a 25-year government lease, 600 acres Crown-granted, in Caribou district, Quesnel mining division. The property was formerly the largest hydraulic gold mine in British Columbia. It has been tied up by litigation for several years. The Quesnel Forks Gold Mines Co. was formed to take it over, but according to report the property has been awarded by the Courts to R. T. Ward. A large amount of money has been spent on the mine, and over $1,500,000 of gold has been extracted.

BUCKEYE MINES CO. **BRITISH COLUMBIA**

Office: Geo. C. Mercer, pres., Lodi, N. J.; W. C. Dalgliish, v. p.; F. Larkin, treas.; T. C. Larkin, sec., all of 291 Broadway, New York; J. J. H. G. Glennon, directors.

Inc. in Delaware. **Cap.**, $1,000,000; par $1.

Property: 67 acres in Ainsworth district, B. C., said to show several dred feet of the Highland silver-lead-zinc vein, worked by Cons. M. & S. Co. ugh its Highland mine.

Development: two 40′ shafts and 200′ tunnel. Company has spent 00 in development.

In 1918, stock of this company was being sold by Winslow Taylor & Co., and & Co., brokers, of Philadelphia. No recent information; probably idle.

LLOCK MINING CO. **BRITISH COLUMBIA**

Organized September, 1919, by Groves Bros., of Bullock, Lardeau mining sion, to develop a silver property near Bullock. Details of organization not lable.

RNIERE GOLD MINING CO. **BRITISH COLUMBIA**

Reported November, 1919, that this company, whose office is in Indianapolis, had acquired the Burniere and Nelson claims, 6 miles from Camborne, and iles from property of New Era Mining Co. The company was to start de- pment work and put up a mill.

3H MINE **BRITISH COLUMBIA**

See Premier Mining Co., Ltd.

3H MINES, LTD. **BRITISH COLUMBIA**

Address: O. B. Bush, pres. and H. Tanner, supt., Stewart, B. C.

Inc. in 1919.

Property: a group of claims just northeast of the Premier silver mine, h of Stewart. Encouraging conditions were reported late in 1919.

TE & ROCHER DE BOULE COPPER CO. BRITISH COLUMBIA

Idle. **Office:** 49 East Broadway, Butte, Mont. **Branch office:** Hazel- B. C.

Officers: Samuel McConnell, pres.; C. J. Stone, v. p.; J. W. McLane, treas., with Paul Ozanne and P. J. Jennings, directors.

Inc. 1912, in Arizona. **Cap.,** $1,000,000; $1 par; fully issued.

Property: the Highland Boy group adjoining, but 1,000′ above the ier de Boule mine and covering 400 acres on Juniper Basin, Rocher de e mountain, Omineca mining district, 3 miles from New Hazleton and 4 from the Grand Trunk railroad. Claims show the extension of the Rocher oule veins, 2 of which have been opened by tunnels and open cuts. Ore s in fissure veins following intrusive dikes of porphyry in granite. Sam- from veins 18″ to 5′ wide, assayed from 1.5% to 5.7% copper; with 0.5 to 0.8 ilver and slight gold values.

Property considered promising and worthy of further development.

IFORNIA MINING CO. **BRITISH COLUMBIA**

Officers: J. R. Cassin, pres., E. 416 9th St., Spokane, Wash.; W. R. orff, sec.-treas.; W. H. Turner, mgr.

Property: 5 claims, on Bird creek, near Nelson, B. C., shows a strong developed by tunnels; No. 3 tunnel, 1,200′ long, is 170′ vertically below No. 2, is 627′ long. Ore is said to average $17 gold per ton.

The Athabasca 10-stamp mill, leased to test the ore, was enlarged to 25-ton ity by adding a ball-mill, Senn table, and flotation unit. A recovery of 90% ected.

ADA COPPER CORPORATION, LTD. **BRITISH COLUMBIA**

Office: 42 Broadway, New York.

Officers: L. W. Mayer, pres.; A. J. Ronaghan, v. p.; with C. H. Burke, st Heckscher, Allen H. Rogers, C. I. Stralem, E. L. Gruver, New- Erb, Colgate Hoyt, directors. R. H. Eggleston, sec.-treas.; H. R. Wagenen, gen. mgr.; Allen H. Rogers, cons. engr.; and F. S. Norcross, , of mines, British Columbia.

March, 1914, in Virginia. **Cap.,** $10,000,000; $5 par; increased Au- 1917, from $5,000,000; outstanding 945,859 shares. Funded debt, sinking fund convertible gold 6s dated January 1, 1918, due January any time into stock at $3 a share. A sinking fund of 15c. than $150,000 shall be paid each year.

6% gold debentures issued October 1,

1919, subject to call at $105 and interest, and offered stockholders pre
par with a bonus of 100% par value of stock.

Equitable Trust Co., New York, transfer agent. Empire Trust Co.
York, registrar.

On March 20, 1917, company purchased the properties and assets of
British Columbia Copper Co., Ltd., the operating company, by exchange of
of its shares for two of the latter. In May, 1917, there was less than
the capital stock of the B. C. company outstanding.

Comparative Balance Sheet, years ending December 31:

Assets.	1918	1917
Properties	$6,059,323	$5
Equipment for future delivery at contract prices	258,920	
Metal & Smel. Products, Supplies, etc	346,054	
Copper on hand and in transit	106,309	
Insurance, taxes, etc	22,098	
Investments	211,539	
Bonds, 10-yr., due in 1918		1
Cash	542,966	
Profit and loss	229,864	
Total	$7,777,073	$7

Liabilities.	1918	1917
Capital stock	$4,729,295	$4
Bonds—10-yr., 6%	2,575,000	2
Liberty Bonds—deferred installments	45,361	
Equipment contracts	209,578	
Accounts payable	203,811	
Reserve for sundry Liab	14,028	
Total	$7,777,073	$7

From January 1, 1918, to November 26, 1918, operations of the old pro
resulted in a deficit of $19,574, compared with net earnings of $152,
previous year.

The company smelter at Greenwood, B. C., was permanently shu
November 26, 1918, owing to depletion of ore reserves, and low grade of re
ing ores. The Lone Star mine (Wash.), was also closed down, as its ore
for years mined for use as a flux for the B. C. ores. By itself it is too
pay mining costs. The Boundary creek properties are described in Vol. X

Copper Mountain Properties:

The company's future depends on the newer and larger holdings
acres of mineral and other land at or near Copper Mountain, British Co
9.5 miles due south of Princeton, British Columbia, and 182 miles by
of Vancouver. A 13-mile branch of the Kettle Valley R. R. connects Pri
and Copper Mountain.

Geology: Copper mountain consists of monzonite-porphyry and
diorite, intruded by a system of light-colored porphyry dikes.

The ore consists of primary chalcopyrite, bornite and pyrite finely
nated in the porphyry and granodiorite, carrying recoverable values in
silver. The ore is found at or close to the surface, but oxide minerals

Development: property has been developed in a systematic ma
a large amount of drilling and underground work. Over 11
diamond drilling, surface trenching, 18,000' of drifting, 15
raising, and 900' been done to block out ore. Ore is
through the 2,900 e tunnel. There is a difference in ele
800' between this next nea kings: a 2-compartm
way and a zigzag ting th

All ore thus far developed occurs above the level of the Similkameen River, ich passes along the base of Copper Mountain at an elevation of approximately 0'.

Ore reserves: estimated at 10,000,000 tons of developed ore and 2,000,- tons of probable ore, having an assay value of 1.74% copper, and approxi- ely 35c. per ton in gold and silver. Careful geological study suggests the sibility of eventually doubling the present tonnage of assured ore. Com- y in addition owns several other promising prospects in the locality.

The average grade of ore has been determined from bulk samples drawn n the underground workings, and these areas have been thoroughly checked by drill and groove sampling.

Treatment of ore: a 40-ton flotation test mill erected at the prop- has given very satisfactory results. Since there is a marked absence of dized material in the ores, a recovery of 90% of the copper is expected in ılar operations; actual savings very close to this figure on extended experi- ıtal runs have already been obtained. Concentrates assaying 25% copper e maintained with a concentration ratio of approximately 17 into 1.

For the purpose of estimating earnings, a recovery of 27.4 lb. of copper per of ore was assumed after allowing for a certain amount of dilution by te rock. As the wall rock is generally light colored dike material, the ore its of clean mining.

The cost of producing copper is estimated at 9½c. per lb. when operating a basis of 3,000 tons per day. Approximately one-half of the present ore rves will be extracted by open-cast mining methods, and all of the ore will lrawn from the mines by means of tunnels.

The millsite, called Allenby, is 9 miles from the mine and 4 miles from iceton. The mill, almost completed by end of 1919, being delayed for 4 ths by a labor strike, is rated at 2,000 tons per day. The ore as mined will through the ore-pass to pockets on the 3,170', or main haulage level, where trammed in 10-ton cars hauled by electric locomotives to the crushing t at the mouth of the tunnel. After crushing to 2½" it will go into 3,000- bins, then by railway cars to the mill bins.

Concentrates from the mill are to be smelted by the Consolidated M. & S. at Trail, and the converter copper refined electrolitically.

Power is furnished by the West Kootenay Power & Light Co., which con- :ted a 100-mile transmission-line under a contract to supply 5,000 h. p.

Production:

Year	Gold, Oz.	Silver, Oz.	Fine Copper, Lb.	Year	Gold, Oz.	Silver, Oz.	Fine Copper, Lb.
905....	26,226	95,416	5,601,309	1912....	25,863	142,025	11,146,811
906....	20,238	82,193	5,820,651	1913....	26,640	137,052	8,296,902
907....	24,967	101,114	8,643,133	1914*...	14,442	63,501	4,116,190
908....	13,597	58,204	5,567,355	1915....	5,417	23,002	1,734,385
909....	18,244	64,234	6,325,000	1916....	12,366	49,928	5,196,239
910....	24,962	84,180	7,143,456	1917....	9,592	46,356	4,247,316
911....	31,144	134,266	9,944,987	1918....	12,663	60,495	2,813,993

* January 1 to August 23.

The following estimates of future operations and earnings have been made e company's president: with the treatment of 1,000,000 tons of ore annually roduction is estimated at 27,400,000 lb. of copper. The yearly earnings hare, assuming 1,778,787 shares outstanding (which allows for the con- on of the $2,500,000 of bonds), would be as follows on various prices for r:

of Copper.....	15c	16c	17c	18c	20c
ated earnings.....$1,507,000		$1,781,000	$2,055,000	$2,329,000	$2,877,000
earnings per share	$0.85	$1.00	$1.15	$1.31	$1.62

will be seen from the foregoing that the estimated net operating profit 50 per ton of ore is based on 15c. copper, which on the developed and ble ore would represent a total net profit of $18,000,000 not allowing for

amortization. The estimated life of the property based on present ore reserves is 12 years. With the development work now in progress it is expected that the present ore reserves will be substantially increased.

CASSIAR CROWN COPPER CO. **BRITISH COLUMBIA**

Office: 601 Empire State Bldg., Spokane, Wash.

Officers: A. C. Mason, pres.; W. C. Miller, v. p.; J. V. Pohlman, sec.-treas.

Inc. in 1916. **Cap.,** increased from $1,000,000 to $1,500,000; $1 par, 268,000 shares in treasury.

Property: five 50-acre mineral claims on Grouse mountain, 18 miles S. E. of Telkwa and Aldermere, B. C., and 260 miles from Prince Rupert on Grand Trunk Pac. R. R., said to show zinc-copper-silver ore. Reported in December, 1918, that 11′ of ore had been cut at 100′ depth, assaying 21% zinc, 2% copper, and 5 oz. silver.

Development is mainly by tunnels, longest in over 750′. Mineralized area as indicated by surface workings is a sheeted zone 10 to 12′ wide. There are several shallow shafts and pits all showing more or less copper. Average assay of all ore exposed in workings is claimed to exceed 7% copper and $3 gold.

For geology see Canadian Geological Survey of Cassiar Crown group for 1915, by J. D. McKenzie.

COAST COPPER CO., LTD. **BRITISH COLUMBIA**

Head office: Trail, B. C.

Officers: J. J. Warren, pres., Toronto, Ont.; T. W. Bingay, sec.-treas., with S. G. Blaylock, W. M. Archibald, M. W. Bacon and W. E. Cullen, directors; W. M. Archibald, mgr.; Wm. Clancy, supt., Quatsino, B. C. Company is successor of Quatsino Copper Co. and is controlled by the Consolidated Mining & Smelting Co.

Inc. September 15, 1916, in British Columbia. **Cap.,** $1,000,000; $5 par. Operating expenses in 1917, reported as $48,600.

Property: at Elk mountain, near Elk lake, Quatsino mining division, Vancouver Island, B. C. Ore shoots carry argentiferous chalcopyrite in magnetite in fissures with dip of 40° that cut through diorite.

Development: 1,000′ tunnel, a 250′ winze and 1,000′ of underground workings to depth of 500′. Work in 1918 was on a level at bottom of the winze on which considerable amount of ore has been developed.

Equipment: 6x8′ single drum hoist, 300 cu. ft. compressor and water power.

COLONIAL GROUP **BRITISH COLUMBIA**

Address: A. D. Coplen, mgr., 2324 Allamont Blvd., Spokane, Wash.

Property: 1 claim, 43 acres, at Sandon, B. C., shows a fissure vein containing silver-lead-zinc. Developed by 700′ tunnel, with 1,000 tons of ore blocked out. A prospect.

CONNERAPPE MINES, LTD. **BRITISH COLUMBIA**

Address: Calgary, Canada. S. Chapin, gen. mgr. W. O. Young, sec. Mine opens a replacement deposit in limestone, the ore assaying about 15% lead, and 3 oz. silver per ton, with a small percentage of zinc. Property has been operated about 4 years, the output being concentrated in the Monarch mill. In 1918, 776 tons ore were shipped to the Trail smelter.

CONSOLIDATED M. & S. CO. OF CANADA, LTD.

Office: Room 1202, Canadian Pacific R. R. Bldg., Toronto.

Works office: Trail, B. C.

Officers: J. J. Warren, pres.; Geo. Sumner, v. p.; with Sir Edmund Osler, Chas. R. Hosmer, H. S. Osler, W. L. Matthews, J. C. Hodgson, and Hon. Joseph, and J. K. L. Ross, directors; J. Kitto, sec.

Operating officials: S. G. Blaylock, gen. mgr.; W. M. Archibald, mgr. of mines, and staff consisting of F. S. Peters at Rossland, F. G. [illegible] at Sullivan and St. Eugene; L. W. Oughtred at Michaud, [illegible] Gibson and the Ivy Fern groups; [illegible] R. M. Macaulay, at Emma; D. M[illegible] Coast Copper, and G. H. Kilburn [illegible]

M. E. Purcell, R. G. Mellin, J. K. Cram, and G. H. Kilburn); T. W. Bingay, iptroller; James Buchanan, smelter supt.; G. E. Murray, assistant; B. A. nmel, manager of zinc plant; F. E. Beasley, and J. J. Fingland, in charge of neries; R. W. Diamond, supt. of concentration and testing; G. F. Chapman, struction eng.; W. E. Jones, mechanical eng.; A. L. MacCallum, supt. of acid its; F. E. Lee, W. H. Hannay, H. R. Motherwell, research engrs.; G. Cruick-nk, F. S. Willis, H. Woodburn, R. G. S. Anthony, department superintendents inc plant; D. G. Bissett, chief chemist; R. K. Blois, supt. Cottrell plant.

Inc. January 1, 1906, in Canada as Canadian Consolidated Mines, Ltd. ., $15,000,000; $25 par; issued $10,477,450; increased from $5,500,000 in) to $7,500,000, and again in December, 1915, to present amount. Company's al year ends September 30. Annual meeting, third Tuesday in December. ed on Toronto and Montreal Exchanges. Transfer agents: Toronto Gen-Trusts Corporation, Toronto, and Royal Trust Co., Montreal.

Bonds: $3,000,000 7% debentures authorized December, 1918, and con-ible after January 1, 1924, into stock at par.

Cons. M. & S. controls the West Kootenay Power & Light Co., Ltd., a dend-payer that supplies electric current to mines in that region.

Financial Statement, years ending Sept. 30 to 1918, then Dec. 31:

Assets.

	Property and investments	Mining and reduct'n w'ks	Ore and products	Supplies	Accounts receivable	Cash and advances	Total
.....	$9,360,854	$5,289,740	$2,987,297	$1,251,842	$939,257	$9,195	$19,866,739
.....	$7,884,564	$4,589,608	$2,828,416	$1,188,183	$542,826	$71,325	$17,099,923
.....	7,303,443	4,867,505	2,615,664	970,954	1,152,801	83,199	16,994,569
.....	6,964,885	4,072,680	2,682,934	803,856	282,094	208,278	15,014,228

Liabilities.

Capital Stock	Bonds	Bank Loans	Accounts payable	Dividend payable	Advance by Govt.	Profit and loss account	Total
$10,533,700	$3,000,000	$3,067,435	$1,288,503	$263,343	.....	$1,713,757	$19,866,739
$10,477,450	$.....	$2,809,071	$1,403,848	$261,936	.....	$2,148,123	$17,099,923
10,447,450	.....	2,081,806	1,113,101	261,936	$700,000	2,360,274	16,994,569
8,427,800	.....	2,288,253	1,209,021	210,695	600,000	2,278,459	15,014,228

Profit and loss account: Income.

	Sales of products	Ores, etc. on hand	Sundries	Dividends from Power Co.	Total
.....	$9,761,005	$2,987,297	$11,659	$242,537	$13,002,499
.....	$9,780,565	$2,828,416	$16,065	$160,444	$12,784,985
.....	12,700,971	2,615,664	66,441	150,000	15,533,076
.....	7,203,807	2,682,934	62,804	83,333	10,032,879

Expenditures.

Ore at end previous year	Ore and metals purch'd	Freight on ore	Mining and reduction	Depreciation, etc.	Profit	Total
$2,848,416	$3,066,580	$358,376	$5,195,641	$577,420	$976,065	$13,002,499
2,615,674	4,120,244	190,687	4,487,412	421,773	949,245	12,784,985
2,682,933	5,899,082	286,978	4,910,670	676,588	1,076,829	15,523,076
1,146,813	2,913,426	204,546	4,479,870	292,127	996,496	10,032,879

Dividends: rate of 10% per year quarterly from May, 1906, to April, then 1¼% in November, 1907, 4% in October, 1912; 2% quarterly from 1913, to October, 1915; and 2½% quarterly from January, 1916, to March 920. Total, $6,567,211.

Property: company was formed to take over the following properties, by direct ownership, or by stock control; War Eagle Consolidated Mining evelopment Co., Ltd.; Centre Star Mining Co., St. Eugene Consolidated ng Co., The Rossland Power Co., and the Trail smelter, formerly operated e British Columbia Southern railroad. In 1907, the Iron Mask, Idaho and rprise mines at Rossland were purchased and the Phoenix Amalgamated er Mines, Ltd.; also the Keystone and Four Ace claims adjoining the nix, located at Phoenix, B. C. In 1910 the company acquired the La Plata, olly Gibson group, near Nelson, and the No. 7 group in the Boundary ct. In 1911, company purchased control of the Fort Steele Mining & ing Co., Ltd., owning [illegible] near Fort Steele; Le Mining Co. at R[illegible] Mines. In 1915,

company purchased the Monte Christo, Paul Boy, Eddie J. and the Iron Horse mines, all at Rossland, and acquired a controlling interest in the Silver King Mines, Ltd., at Nelson. Also the No. 1 and the Highland groups in Ainsworth. In 1913, the Deer Park, Grand Prize and Mabel in Rossland were taken over and the Ottawa mine near Slocan City purchased. Control was purchased of the Quatsino Copper Co., operating on Vancouver Island. Late in 1917 the company bought silicious flux properties in the Camp McKinney and Fairview districts, near Keremeos, B. C. The Voight copper mine near Princeton was acquired in 1918. To ensure a further supply of fluxing ore, the San Poil gold-silver mine at Republic, Wash., was bought in 1918 at a receiver's sale. The Blue Grouse copper mine on Cowichan lake was taken over in March, 1918, from the Gordon Bay Mines, Ltd., and was being drilled in 1919. In 1918 an option was taken on the Ivy Fern claims on W. side of Kootenay lake on which surface conditions indicate lead-silver ores in 2 veins. The Coast Copper Co. mine at Elk lake also owned by the company is opening fairly well. To ensure a cheaper supply of fluorspar, the Rock Candy claims on Kennedy creek were acquired in 1918, and a 100-ton mill erected. In January, 1920, the Sooke group on Vancouver Island were taken over. Over 1,000′ of crosscutting and 500′ of diamond-drilling has been done.

The *Le Roi-Centre Star* group, on the southern slope of Red mountain, Rossland, is still the principal property. At this place the country rock is a complex of effusive and fragmentary volcanics of the Paleozoic age intruded by an elongated mass of monzonite-porphyry. This monzonitic mass, with the adjacent rocks, has been intruded by a large number of nearly vertical dikes from a few feet to 250′ wide, with generally N.-S. trend, the dikes being basalt and occasionally slickensided, larger dikes cutting off the veins completely, with the more important orebodies occurring at the points of intersection, and having a series of faults, mainly parallel to the dikes. Ore occurs in shoots of 3 to 5′ width, and 50 to 600′ length, widening at intersection of veins with dikes. Ore is strongly auriferous and fairly argentiferous chalcopyrite, associated with pyrite and pyrrhotite with gangue of silicious altered country rock, ore ranging 0.5 to 2% copper, and $8 to $20, and occasionally up to $100 gold per ton. Pay shoots extend, in some cases, from wall to wall, and from local enrichments, the walls in some cases being very indistinct, and ore shading into the country rock. There are several veins, the more important being the Centre Star, Le Roi and War Eagle, on which the mines are opened, these being shear zones, carrying chalcopyrite disseminated mainly in pyrrhotite, with some pyrite and arseno-pyrite.

The Rossland group, which now has a total acreage of about 775 acres, includes the Le Roi, Centre Star, War Eagle and Iron Mask mines, which are practically one, all connected by drifts and crosscuts, with about 58 miles of workings. Mines are worked by overhand stoping, partly on the shrinkage system and partly timbered with square sets, cut from round timber. Electric haulage is used throughout, 13 electric locomotives hauling 2-ton side dumping cars to the underground ore pockets of the Centre Star shaft.

The Centre Star mine has a 2,200′ 68° inclined shaft, with 16 levels opened at intervals of 125 to 175′. The shaft is concreted from the 12th level to the bottom. The mine has 8 or 10 different orebodies, but ore comes principally from the Centre Star vein, averaging 0.6% copper, 0.3 oz. silver, $8 to $10 gold per ton.

In the Centre Star-War Eagle-Iron Mask group, ore is mined from the Centre Star veins, Main, North and South, as well as from the Iron Mask, War Eagle, Josie, Poorman and Mugwump veins.

The Le Roi group produces ore from the Le Roi main South, Intermediate, North Peyton and Hollywell veins.

Electric power for the complete operation ofthe mines is taken from the Bonnington Falls plant of the West Kootenay Power & Light Co., controlled by Cons. M. & S. Co., 35 miles distant, at 60,000 volts, stepped down at the mines to 2,000 volts for distribution and use. The compressor room has a 120-k.w. alternating current generator, driven by an alternating current motor, supplying current at 250 volts for electric motors on surface and underground, and for lighting. Air for drilling is furnished to all the mines through one system.

The mines are gold, rather than copper producers.

The **Richmond-Eureka** mine, at Sandon, has argentiferous lead and ores, developed by tunnels aggregating 1¼ miles in length. Ore is transed to bin on C. P. R. R. tracks at Sandon by 4,000′ aerial tram.

The **Sullivan mine**, at Kimberly, is a lead-zinc producer, whose ore rs in replacement deposit, in a fine grained argillaceous quartzite. Ore is a ture of fine-grained galena, zinc blende, and iron sulphide. The ore-shoot vs a maximum stope width of 125′. Developments principally by tunnels and s. Workings total 8 miles. A low-level tunnel, 2 miles long, equipped with ble standard-gage tracks, has been driven to open up this property, which ie of the most important zinc mines developed in North America for many s. The ore is complex, but experimental work has proven that it can be factorily milled. It will go to a 400-ton mill at company's smelter; the conrate being shipped to Trail, B. C., for treatment by the electrolytic process.

The **Molly Gibson** mine, bought 1910, formerly owned by Molly Gib- Mining Co., Ltd., and later by La Plata Mines, Ltd., has a regular fissure in granite containing highly argentiferous lead-zinc ore. Developed by over miles of tunnels. An aerial tram 2 miles long connects the mine and mill, e a second, five miles long, connects mill and loading bins, 5 miles from tenay lake. The mine is equipped with 100-ton mill, operated by water power, two air-compressors.

The **St. Eugene mine**, at Moyie, has produced over 1,000,000 tons of r-lead ore. The mine has about 20 miles of workings, is equipped with 0-ton mill, but considerable of its equipment has been dismantled. Now operated by a small force and shipments of crude ore are regularly made.

No. 1 Group, at Ainsworth, 400 acres, has a contact deposit between mite and a dark lime schist. The ore consists largely of oxides of iron, and lead in a silicious lime gangue. Principal value is in silver. Develop- by tunnel and winze, totals 1¼ miles. Equipment includes a 2-stage, 11x 8″ Jenckes air compressor, driven by belt from 150 h. p. 2,080-volt motor, r being supplied from a 350 k. w. generator at Highland Mill, Cedar creek, ′ distant; and an aerial tram, connecting mine ore bins with loading bins, on of Kootenay lake. Storage capacity at mine and lake bins is about 700 tons.

Highland Group, 240 acres, has a series of fissure veins. Ores are r-lead and development is by 3⅛ miles of tunnels. Equipment includes ll air compressor, driven by water power, and a single rope aerial tram ′ long, connecting mine ore bins with 150-ton mill at Kootenay lake. Power nill is from a 350 k. w. generator, driven by a Pelton wheel under a head 000′.

The Ottawa mine has a fissure vein in granite. Development by 2 of tunnels and winzes. Principal metal is silver, associated with copper, and zinc sulphides, some barite in gangue.

The Silver King mine on Toad mountain, back of Nelson, has mineral- fissure veins in granite, yielding high-grade silver-copper ores. De- ment by 4 miles of tunnels and winzes. Equipment includes single rope tram 4½ miles long, connecting ore bins at mine with shipping bins on R. R. tracks at Nelson.

Details of all the mines are too lengthy for insertion, but the following table summary of the facts concerning the principal properties.

Name	Class of ore	Development in 1918 feet	Total in miles	Drilling in 1918 feet	Production in 1918 tons	Production to date tons
War Eagle	gold, copper	4,274	40.98	4,833	42,298	2,060,441
[illegible]	gold, copper	2,645	17.60	4,641	54,918	2,062,544
[illegible]	lead	61	20.04	.....	1,191	1,022,127
[illegible]	zinc, lead, pyrite	2,589	7.65	1,775	104,756	595,559
[illegible]	lead, silver	2,426	3.28	.....	288	4,002
[illegible]	silver, lead	366	2.10	.....	1,320	.....
[illegible]	[illegible]	559	1.70	.....	5,186	23,312
[illegible]	[illegible]	1,817	1.11	693	24,968	201,050
[illegible]	gold, copper	.....	.....	1,831	1,491	.....
[illegible]	[illegible]	40	.....	492	.....	.....

Reduction works: the Trail smelter near the International boundary treats all kinds of ores and does an extensive custom business, which will be mainly smelting concentrate and refining copper from the Canada Copper Corporation at Princeton.

There are two sampling mills, equipped with crushers and Vezin samplers: No. 1 mill, for copper ores, of 200 tons hourly capacity; No. 2, for lead ores, of 100 tons hourly capacity.

The smelter has a calcining department, and blast-furnaces for copper and lead. All the copper ores are bedded and hauled from the beds (of 21,000 sq. ft.) by electric locomotives to the charge bins, and from these to the furnaces. Lead ores for the roasting department are delivered to beds by a system of belt conveyors and drawn from these beds by a conveyor over an electric scale to the roasters.

The calcining department consists of three 22½′ 7-deck Wedge roasters and five 26′ Godfrey furnaces. The roasted ore is sintered in 32 Huntington-Heberlein sintering pots and 3 Dwight-Lloyd sintering machines, fumes being passed through the Cottrell electric precipitator.

The 1,800-ton copper smelter has 4 blast furnaces, 2 of 35′ and 2 of 25′, taking a 32 oz. cold blast. Two 12′ Great Falls type converters are in operation making blister copper.

The 350-ton lead smelter has one 45x180″ and three 45x180″ blast furnaces with mechanical feed, reducing mainly calcined ores. Crude lead ores are roasted in seven 26′ Godfrey furnaces, which reduce the sulphur from the original ten. of 16% to 8%, and these calcines are re-roasted in fifteen 9′ Huntington-Heberlein sintering pots, yielding a product carrying only 4½% sulphur. The sintered ore, carrying 30 to 50% lead, is smelted in the blast-furnaces, each making 50 to 85 tons of lead bullion daily, with about 4% matte fall. This matte is roasted and again put through the blast-furnaces, and slags are granulated. Blast-furnace gases are passed through a Cottrell precipitator.

An electrolytic lead refinery, handles anodes cast from the silver-lead bullion. This plant, of 100 tons daily capacity, was the first electrolytic lead refinery ever built, and uses the Betts process. The lead is of exceptional purity, with an average assay of about 99.997%, which means that a short ton of lead carries only about 1 oz. of impurities, which is excellent work.

The silver refinery, taking silver sludge from the electrolytic lead tanks, has a water-jacketed reverberatory furnace for the production of dore bullion, and the necessary kettles, tanks, and bluestone plant for parting the precious metals with sulphuric acid; also furnaces for melting and casting the silver and gold bullion. The silver bullion is 999 fine and the gold bars are 995 fine.

The electrolytic copper refinery now handles 50 tons per day, having been enlarged in 1918 at a cost of $250,000. A wire-rod mill is also to be built costing $75,000.

Blast is supplied at 32 oz. for all furnaces, by one No. 9, and one No. 11, one No. 11, and one 400 cu. ft. Root blower, and one 200 cu. ft. Connersville blower.

An electrolytic zinc plant was erected in 1916. The process is similar to that used at Anaconda, Mont., but is the direct result of the operation of an experimental plant treating ore from the Sullivan mine and producing 1,000 lb. of zinc per day.

The plant contains two driers, three 18x5′ ball mills, thirteen 7-deck 22½′ Wedge roasters, a large leaching building, where the ores are leached by counter current continuous process in Pachuca tanks and thickened in Dorr thickeners, purified in Pachuca tanks, and filtered with Kelly and Oliver filters, electrolytic tank rooms, where the solutions are electrolyzed in concrete electrolytic tanks; thirteen 1,000 k. w. motor-generator sets; the necessary transformer plant to reduce the 60,000 volt current with which the plant is supplied; and a melting plant with two reverberatory furnaces for melting the cathode zinc.

U. S. Patent No. 1,320,805 [illegible] 4, 1919, was issued to R. H. Stewart, S. Blaylock, [illegible] Vaughan, [illegible] Batchelder, of this company, for [illegible]

emical extraction of zinc from ores or other zinc-containing material in which zinc has been made soluble by roasting, the process above.

The zinc concentrator, with daily capacity of 400 tons, is equipped with a 6x6′ ll mill, a standard 24″ 17-cell Minerals Separation flotation machine, concen- ting tables, filters, thickeners, and complementary appliances. This plant is be increased to 2,500 tons capacity. Briefly, the method consists in removing ittle of the heavy galena on tables, the middling is subjected to wet magnetic paration for removal of pyrrhotite, and finally to preferential flotation for paration of the blende from the galena. Concentrate from the mill goes to the ctrolytic plant described above.

Other accessories to the Trail smelter are copper and zinc-casting depart- nts, sulphuric-acid plant (2,879 tons in 1918), hydro-fluosilicic plant (196 tons 1918), and bluestone plant, all recently overhauled and in good order.

Power for the reduction works is electric throughout, and brought from nnington falls, on the Kootenay river.

The works have a central heating station and well-equipped machine, car- ter, boiler, and electric shops. The assay-office, which handles an unusual iety of work, in great detail, is exceptionally commodious and well equipped.

Production, including custom ores:

	Ore Smelted, tons.	Gold, oz.	Silver, oz.	Lead, lb.	Copper, lb.	Zinc, lb.
.....	398,118	59,605	1,782,025	41,711,147	6,933,962	30,743,461
.....	374,889	52,917	1,708,692	38,844,946	7,982,908	21,800,932
.....	359,404	69,704	2,471,887	44,260,989	7,404,852	18,021,127
.....	447,017	98,814	2,285,631	39,974,411	4,446,080	8,088,199
.....	447,064	148,891	2,280,500	40,177,910	5,306,184	.....
.....	374,771	129,083	2,568,301	34,617,318	3,645,997	.....
.....	407,124	186,017	2,224,458	48,325,252	3,454,814	.....
.....	.....	129,789	1,765,992	26,072,074	2,914,181	.....
.....	.....	119,067	1,458,758	24,026,015	4,421,988	.....
.....	.....	137,614	1,162,406	42,368,816	5,974,959	.....
.....	.....	114,920	2,443,475	43,675,077	4,637,631	.....
.....	.....	121,380	2,224,888	32,157,139	4,004,468	.....
.....	.....	69,186	1,100,271	20,380,088	3,488,310	.....
otal 1894 to 1918..	5,554,196	1,881,838	28,714,042	497,171,470	83,030,313	44,857,928

Company at present is the only one in the world producing electrolytically ned copper, gold, lead, silver, and zinc at one plant; also making sulphuric , hydrofluosilicic acid, bluestone, and manganese dioxide. Trail is a metal- rical center using the latest processes, not following recent practice, but a ler in devising new methods.

While Cons. M. & S. has many mines, its future apparently depends on the e ones described, especially the Sullivan mine.

Its custom business is important and will expand. The management is en- rising, competent, and eminently fair in its dealings with the companies that ore to its smelter.

PPER MOUNTAIN MG. & DEV. CO. **BRITISH COLUMBIA**

Office: 5406 Union Ave., South Tacoma, Wash. Mine near Quatsino, reported sold, 1917. Fully described Vol. XII.

RK-PROVINCE MINES, LTD. **BRITISH-COLUMBIA**

Office: Kaslo, B. C. Mine at Zwicky, B. C.

Officers: W. E. Zwicky, pres.-gen. mgr.; Henry Giegerich, v. p.; W. H. gess, sec.-treas., with I. B. Sherwood and R. E. M. Strickland, directors. sfer office: Kaslo. W. H. Burgess, registrar.

Inc. May, 1915, in British Columbia. **Cap.**, $1,000,000, 10c par, 8,500,- issued; increased July 17, 1919, to $1,250,000; shares $1 par. Bonds issued, 00. Net indebtedness at end of 1919 was $4,000.

Property: 13 claims, 9 crown granted, containing about 580 acres on S. Fork of Kaslo creek in the Slocan district. Company is a consolidation e Cork and Province groups.

The ore occurs in fissure veins in slate, which have a N. E.-S. W. course 68° dip. The shoots are 6′ to 30′ wide, containing silver-lead, and zinc ore.

Development: a 1,400′ crosscut tunnel, intersects the Black Fox and the Cork veins, at depth of 300′ and has 2,300′ of workings. The Black Fox vein cut at 700′ from the portal is 4′ to 6′ wide, but has no commercial ore at this point and will be explored. The Cork vein cut at 920′ is strong and wide and contains 4 productive ore shoots averaging 8′ wide for lengths of 50 to 325′. Ore reserves are said to be 10,000 tons.

Equipment: 100-ton concentrator, hydro-electric plant, sawmill, compressor and electric lighting system.

Production: mine yielded 1,206 tons previous to consolidation, and about 933 tons in 1915; 45 in 1916; 414 in 1917; 733 in 1918. Ore shipments averaged 35 oz. silver and 49% lead in 1918.

Operations were resumed in June, 1919, but suspended in October; 250 tons of lead concentrate, and some zinc was shipped. Management is optimistic for the future after re-financing.

DELLIE MINING & MILLING CO. BRITISH COLUMBIA

A reorganization, 1918, of the Silver Hoard Mining Co., described in Vol. XIII.

Officers: W. H. Carder, pres., Carder, Wash.; Dr. E. N. Northrop, v. p.; L. R. Hawley, sec.-treas., Spokane, Wash.

Inc. 1918, in Washington. In summer of 1919, company levied an assessment of 1c. per share in order to pay off its heavy indebtedness and resume operations.

Property: 5 claims, 202 acres, crown-granted, near Ainsworth, said to carry the same vein stoped in No. 1 mine of Cons. M. & S. Co., 2,400′ away. The vein is in limestone. Milling ore is said to assay 3% lead, 10% zinc, and 8 oz. silver per ton.

Development: 7,000′ of workings. Ore reserves are said to be 50,000 tons.

Equipment: includes hydro-electric power, compressor, hoist and 75-ton flotation plant which started operations in July, 1917.

Production: from 1911 to 1916, reported as 43 cars of ore, assaying 46.9 oz. silver, 4% lead, and 15% zinc, with net smelter returns of $32,000.

Mine was idle in 1916, but worked in 1917 by lessees (W. S. Hawley Co.).

DELTA COPPER CO. BRITISH COLUMBIA

Address: 703 Tegler Block, Edmonton, Alberta.

Property: 25 claims, including the Delta, Chicago, Highland Bay, Hazelton, and Dyke group of claims, in the Hazelton district, adjoining the Roche de Boule mine on the east.

DISCOVERY MINING & POWER CO. BRITISH COLUMBIA

Operates a placer property on Pine creek, Atlin mining division. Gold production for summer of 1919 was about $25,000. Said to be controlled by Fred H. Mobley, of Prince Rupert.

DOLLY VARDEN MINES CO. BRITISH COLUMBIA

Property near Alice Arm, taken over by Taylor Mining Co. (which see) in June, 1919, ending a protracted legal squabble that stopped development of this rich mine for a long time. The Taylor Mining Co. was organized by the Taylor Engineering Co., which met financial disaster when the D. V. M. Co. refused to make the payments due for constructing a railroad to the Dolly Varden mine. In December it was announced that the validity of legislation passed by the Provincial Government, whereby the Taylor Mining Co. became owner of the Dolly Varden, was to be contested in the Dominion courts.

DONOHUE MINES, LTD. BRITISH COLUMBIA

Address: F. M. Hawkes, Seattle, Wash., or James McKieran, Quilchena, Nicola district, B. C.; Jos. T. Knopp, supt.

Property: 8 claims, including the Tubal Cain, King William, and Joshua mines, near Stump lake, Nicola mining division. Ore contains copper, zinc, silver, and gold. Development has followed veins to 400′ in depth. Equipment: includes a 30-ton mill.

The Joshua mine, idle for 30 years, has recently been unwatered, and will start on the 300′ level.

RUM LUMMON MINES, LTD. **BRITISH COLUMBIA**

Address: 1115 Dominion Bldg., Vancouver, B. C.

Directors: T. Pearse, W. Paterson, J. M. Robertson, J. Broatch, Capt. mie, W. P. Sloan, and J. Maitland, all of Vancouver.

Property: 15 claims, at Tidewater, at Miskatlah bay, Douglas channel, fway between Kitimat and Hartley bay.

A shear zone 75′ wide with granite walls carries copper glance in quartz igue, the ore assaying 0.02 oz. gold, 3.2 oz. silver, and 5.26% copper.

Development: by 360′ crosscut tunnel, with depth of 200′.

Equipment: includes a 30-ton mill; heads average 5.9% copper and con- itrate assays 63.5% copper, 1.12 oz. gold, and 30 oz. silver.

JNDEE MINING CO. **BRITISH COLUMBIA**

Property: the Dundee mine, adjoining the Yankee Girl at Ymir. The perty is reported to have very favorable indications of a large tonnage of nmercial ore, having a tunnel 2,954′ long said to prove the ore to 1,100′ depth. thur Lakes, Jr., estimated 100,000 tons ore proven, with a gross value of 0,000, or $380,000 net.

Property has been idle, but work is planned for 1920.

HO SILVER-LEAD MINING CO. **BRITISH COLUMBIA**

Address: L. J. McAtee, sec.-treas., 104 8th St., Spokane, Wash., P. J. nner, supt., Silverton, B. C.

Inc. in Washington. **Cap.,** $150,000; par 10c.

Property: near Silverton, in Slocan mining district, adjoins Standard ver Lead property.

Development: by tunnels. Main ore shoot said to be 8′ in width. Late 1918, company is reported to have arranged for a lease of the Standard Silver id Co.'s mill during part of each month, and in May, 1919, the output was at rate of 4 carloads silver-lead concentrates, and 3 carloads zinc concentrates nthly.

EN-CRESCENT MINING CO. **BRITISH COLUMBIA**

Address: W. Y. Williams, mgr., Coffee Creek Landing, near Ains- rth, B. C.

Officers: A. L. White, pres.; W. J. Nicholls, v. p.; E. B. McBride, -treas., with W. Y. Williams, C. F. Caldwell and W. H. Button, directors, ast report.

Inc. January, 1917, in Washington. **Cap.,** $75,000; shares 5c par; 900,- issued. **Property:** 8 claims, on Kootenay lake, near Ainsworth, B. C.

Development: by 2 shallow shafts and 800′ tunnel. In September, 1917, osscut had opened 6′ of ore assaying 30% lead and 6 oz. silver per ton. Devel- ient was continued in 1918.

Prospects reported by management to be favorable.

FANJAY GOLD MINING CO. **BRITISH COLUMBIA**

Address: A. J. Grover, sec.-treas., Hyde Bldg., Spokane, Wash.

Officers: J. A. Irvine, pres.; J. L. Goodwin, v. p.

Company organized in 1916 to take over the Fawn group of claims, under d. Also leased a 4-stamp mill on adjoining Nugget claim.

The Fawn group is in Sheep Creek district, near Salmo, B. C., and is orted to show an orebody 14″ wide carrying from $21 to $65 gold per ton.

Development: by tunnel. No recent information, probably dead.

LIS SILVER MINING CO., LTD. **BRITISH COLUMBIA**

Office: 31 Wellington St., East Toronto, Ont.

Officers: in 1918.—P. W. Ellis, pres.; M. C. Ellis and R. V. Ellis, .'s.

Inc. in Ontario.

Property: the Eastmont group, about 60 acres, on Ten-mile creek, Slo- mining division. Said to show silver-lead ore, developed by tunnels on 4 In 1918, mine was under lease and bond to H. D. Lea & Co.

ANCIPATION MINING CO., LTD. **BRITISH COLUMBIA**

Office: 502 Credit Foncier Bldg., Vancouver. Wm. Thompson, mgr., B. C.

Inc. 1917 in B. C. **Cap.**, $120,000; par $1.

Property: 15 claims in Coquahalla valley, about 15 miles from Hope, said to show quartz veins.

Development: by tunnels; recent work has been on a narrow, and in places, rich vein, from which small shipments have been made for several years; those in 1918 totaled 18½ tons, yielding 457.5 oz. gold and 79 oz. silver.

ENGINEER MINES **BRITISH COLUMBIA**

Owned by Capt. James Alexander, who was lost in the S. S. Princess Sophia disaster, October, 1918. No information regarding present owners.

Claiming a 20% interest and alleging that the mine is to be sold for $3,000,000 W. P. Grant started suit in the B. C. Supreme Court against Gold Commissioner and Mining Recorder at Atlin, B. C.

Property: 11 claims, on east side of Taku arm, and 25 miles from Atlin, show quartz veins with native gold and tellurides, in shales and greywacke. Deposits range from simple veins a few inches in thickness to compound veins over 200′ thick. Two large central veins of the latter type are "hubs" from which several veins radiate. "Hub A" is 200′ wide and over 300′ long; "Hub B" is 270′ in width.

Development: includes a great number of open-cuts, and several tunnels driven on the most promising-looking veins. Surface work has exposed about 25 veins, up to 4′ in width, a few containing shoots and pockets of bonanza ore; two of these are especially rich—the boulder vein and the shaft vein. Greater part of work has been on vein "E" on which a 275′ shaft has been sunk, with four levels, totalling about 1,100′ of workings. All this work has been in ore. Waste is broken about 10′ ahead of ore, which is afterward taken down with as little shooting as possible, and sorted into 3 grades. The first grade, showing visible gold, is treated in a 5-foot ball mill; the record run of this mill was 2[illegible] oz. of gold from 160 lb. of ore.

A Minister of Mines report for 1918, states "there is every reason to believe that it can be developed into one of the greatest gold-producers on the Continent."

ENTERPRISE MINING, DEV., & POWER CO. **BRITISH COLUMBIA**

Officers: in 1918—Chas. A. Coffin, pres.-gen. mgr.; W. V. Garrett, v. p.; N. L. Jackson, sec.-treas., all of Spokane.

Inc. in Washington. **Cap.**, $250,000; par, 10c.

Property: 7 claims, 2 crown-granted, at Paulson, Trail Creek mining division, said to show three gold veins, two silver veins, and a large lead vein.

Development: by several tunnels, one 300′ long.

EUREKA COPPER MINES, LTD. **BRITISH COLUMBIA**

Address: Nelson, B. C.

Officers: J. J. Malone, pres.; J. G. Bunyan, sec.-treas.; with J. A. Erickson, L. K. Larson, and J. J. Bunyan, of Nelson, and S. G. Campbell, Vancouver, directors.

Property: acquired October, 1918, by Inland Mining Co., which is operating it under lease and bond, and has so far made two payments.

EVA MINING CO. **BRITISH COLUMBIA**

At last accounts, W. C. Bailey, sec., Nelson, B. C.

Inc. in British Columbia. **Cap.**, $1,500,000; par $1.

Property: at Camborne, on Poole creek, Lardeau mining district. Although the mine is one of the most extensively developed properties in the district, it has been idle for several years. Developed by over 5,500′ of workings, with 200,000 tons of ore blocked out; the 30,500 tons already milled showed a gross value of $5.69 per ton.

Equipment: includes a 10-stamp mill and a compressor.

EXPANSION GOLD MINING & MILLING CO. **BRITISH COLUMBIA**

Officers: in 1918—Ed. Richter, pres., Keremeos, B. C.; R. G. [illegible], sec., Bridesville, B. C.

Inc. in British Columbia. **Cap.**, $1,000,000; par $1.

Property: 2 claims, 90 acres, at Camp McKinney, Osoyoos mining [illegible]

ision, said to show gold-silver ore, assaying $4-$5 per ton in three veins, 5′ ide and traceable for 600′.

Development: by 400′ tunnel and several shallow shafts.

'ALLS CREEK COPPER MINING CO. BRITISH COLUMBIA

Officers: in 1918: L. H. Snyder, pres.; R. H. Finley, sec., 63 Ziegler ldg., Spokane, Wash.

Inc. in Washington. **Cap.**, $1,500,000; par $1; assessable.

Property: 6 claims, 2 crown granted, 300 acres, 8 miles from Nelson, id to show 2½% copper ore. Has a 1,500′ tunnel, reaching a depth of 500′.

'ERGUSON MINES CO., LTD. BRITISH COLUMBIA

Controlled by Geo. Alexander, of London, Eng., represented by Jas. Ander- n, Kaslo, B. C. Company is in hands of receiver and mine leased for company's ccount.

Property: the Ajax, Nettie L., and Silver Cup groups in Trout Lake ining division, with over 2 miles of workings. Considerable ore was shipped 5 to 20 years ago; 550 tons ore shipped in 1912, assaying 40 oz. silver and 60% ad.

IFE MINES, LTD. BRITISH COLUMBIA

Address: Rossland, B. C. Chas. Dempster, gen. mgr.

Property: the Hattie Brown claim at Rossland and the Dykehead, Ben ur, Three Bells, and Fife claims at Fife, near Christina lake, 12 miles E. of rand Forks, Boundary district, B. C. Claims show a vein up to 30′ in width, rrying about 6′ of smelting ore, with balance of concentrating grade, developed a glory hole, an 80′ shaft and a main tunnel having a 235′ winze.

Ore: contains chalcopyrite, carrying gold and silver values, claimed average 3 to 6% copper and $4 to $8 gold per ton.

Equipment: includes necessary mine buildings and a 5-drill air com- essor. Property considered promising. Idle.

IRE VALLEY GOLD MINING CO. BRITISH COLUMBIA

Office (in 1918)—404 Brokerage Bldg., St. Paul, Minn.

Officers: H. G. MacRae, pres.; C. P. Nash, v. p.-treas.; with Geo. R. ocum, Geo. W. Markham, all of St. Paul; A. O. Cochrane, sec., Vernon, B. C.; d C. A. Carnes, Chicago, Ill.

Inc. in British Columbia. **Cap.**, $1,000,000; par $1.

Property: 3 crown-granted claims, 135 acres, 47 miles E. of Vernon, id to show gold-silver ore assaying about $7 per ton.

Development: 1,700′ of workings. Idle.

ISHER MAIDEN MINING CO. BRITISH COLUMBIA

Officers: J. L. Prickett, pres.; Wm. Huntley, v. p.; H. S. Stoolfire, sec.- as., Sherwood Bldg., Spokane, Wash., with John O'Connor, directors.

Cap., 1,500,000 shares, 10c par; 1,000,000 issued.

Property: the Fisher Maiden group, 7 miles from Silverton, Slocan dis- ct, B. C., reported sold to Barney Crilley and J. J. Malone, on a 3-year bond d lease, 1917. Claims said to carry silver, lead, and zinc.

No recent information, probably idle.

.ORENCE SILVER MINING CO., LTD. BRITISH COLUMBIA

Offices: Hutton Bldg., Spokane, Wash., and Ainsworth, B. C.

Officers: F. R. Wolfle, pres. and gen. mgr.; A. F. Kelly, v. p.; D. E. nders, sec.-treas., with J. A. Lavender, J. H. Noble, and J. E. Blazier, directors. H. Hewer, gen. supt.; J. H. Noble, mill supt.

Inc. July 1, 1911, in Washington, and in November, 1917, in British lumbia. **Cap.**, $1,250,000; $1,175,000 outstanding; $1 par. Stock trans- red at company office, Spokane. Annual meeting, May 15.

Dividends: in March, 1919, initial dividend of $17,650, 1½c a share, in rd a second dividend was paid; later payments to be made quarterly.

Property: 8 claims, crown granted, 370 acres, 3 miles N. of Ainsworth. ims on the west side of Lake Kootenay, extend west from shore about 2 miles.

Ore: lead, zinc and silver in E. W. fissure veins in quartzite and slate. ree ore-shoots have been developed, one said to have over 400′ of commercial

ore. Milling ore said to contain 10 to 20% lead, 8 to 15% zinc, and 6 oz. silver per ton.

Development: the main working tunnel (N.-S.) is 3,600' long. It is connected by raises with No. 2 tunnel, 360' above; the latter is 2,400' long and has over 10,000' of workings at average depth of 700'. No. 3 and 4 levels have about 700' of workings. Company states that it has 600,000 tons of ore blocked out that averages 14% lead, 10% zinc, and 4 oz. silver.

Equipment: includes 250-h. p. compressor, 350-h. p. hydro-electric plant and 1,800' aerial tram from No. 3 tunnel to the mill. The 300-ton concentrating mill on the shore of Kootenay lake was completed May 1, 1917. Water power is developed at Woodberry creek, under 350' head. Total cost of improvements to January 1, 1919, is $225,000. A 500' surface tram runs from tunnel portal to terminus of an 1,800' aerial tram that runs to the mill. A 40-h. p. gasoline motor hauls ore in 10 car trains.

Production: 1,850 tons of concentrate in 1919, valued at about $70 per ton net at smelter.

FORTY-NINE MINING CO., LTD. (THE) BRITISH COLUMBIA

A subsidiary of the Alaska-British Columbia Metals Co., which see.

Offices: 701 Rogers Bldg., Vancouver, B. C., and 1 Wall St., New York.

Officers: S. I. Silverman, pres.; H. B. Price, v. p., 227 Pemberton Block, Victoria, B. C.; Silas P. Silverman, sec.-treas., 701 Rogers Bldg., Vancouver, B. C., with C. F. Caldwell and O. B. Bush, directors.

Inc. 1918, in British Columbia. **Cap.**, $1,500,000; par $1; outstanding 1,100,000 shares. Registrar and transfer agents, U. S. Corporation Co., New York City. Listed on New York Curb. Sales $5 high, $1 low, 1919.

Property: 5 claims and 2 fractions, 200 acres, on W. slope of Mt. Dilworth, in Salmon River district, 20 miles N. E. of Stewart, B. C., or Hyder, Alaska. There are 2 parallel veins, the larger of which is 40' wide and exposed for 700' in length. The second vein, 50' from the other is 8' wide.

Development: on the Forty-Nine claim there is 20' of ore in the croppings of the vein, averaging $40 per ton in silver and gold. One 12" streak assayed 987 oz. silver and 1 oz. gold per ton. A moiled sample in a 20' trench averaged 50 oz. silver per ton. A tunnel is being driven on this shoot at depth of 100'. In January, 1920, width and value persisted for 25', also in a raise above the tunnel.

On the Occidental claim there is a 10' vein of high grade ore. The tunnel is in 25', and ore has been averaging $100 per ton. In February, 1920, 2' of ore assayed $400 per ton in silver and gold, the remainder $100 per ton.

On the Dumas claim there is said to be a large showing of high-grade ore. 1' of the same averaging 300 oz. silver and ½ oz. gold per ton.

On the Yellowstone fraction claim, an opencut has struck high grade ore, some of it running from $200 to $300 per ton in silver.

On the Chicago claim an orebody from 100 to 200' in width, of milling grade, has been opened. This orebody is said to be the largest in the district.

GALENA MINING & MILLING CO. BRITISH COLUMBIA

Company was formed to take over the Galena Farm silver-lead-zinc mine in the Silverton district, B. C. The estate of the late Patrick Clark of Salt Lake City holds 75% of the stock, and the A. W. McCune interests of Salt Lake City the remainder. P. W. Clark is manager, and A. King in charge of the mine.

Development: exploration has been kept well ahead of milling operations, the last orebody opened up said to be 11 to 14' wide, as disclosed in raises 100' apart on the intermediate level. Ore said to be worth about $20 a ton.

Equipment: includes a 100-ton concentrator, erected early in 1917. Daily output of concentrate is 35 tons. Additional tables and flotation machines installed during 1917 raised the capacity to 150 tons of ore daily. Recovery is 90% lead on tables and 80% zinc by flotation. Rolls and Huntington mill do the crushing.

GENERAL MINING, MILLING & LEASING CO.

Officers: W. H. [illegible], Hyde Bldg., Spokane, Wash.

Kelly, sec.: Chas. V. Bobb, mgr., with W. T. McCurry, directors, at last counts.

Has a lease on the Lucky Strike and Wisconsin mines, on a tributary of idge Creek, 7 miles W. of Kootenay landing, said to show a 30' vein in Nelson anite, traceable for 3,000'. Ore in pits along vein reported to assay $25 to $40 ld and 3 to 7 oz. silver per ton.

Development: 2 tunnels claimed to open up ore valued at $1,000,000, ich is doubtful. No recent information; probably idle.

EORGIA RIVER MINING CO., LTD. **BRITISH COLUMBIA**

C. H. Dickie, Duncan, B. C., chief owner.

Cap., $25,000; par $25.

Property: 8 claims on George River, 20 miles from Stewart, shows free lling gold ore, worked during the summer of 1918; but a mill is needed to at the ore before property can make a profit.

BSON MINING CO. **BRITISH COLUMBIA**

Officers: D. K. May, pres., Rookery Bldg., Spokane, Wash.; Robt. inning, v. p.; E. H. Latham, sec.-treas., Kaslo, B. C., with Jos. Daschbach, and E. Archer, directors.

Cap., $2,000,000; par $1; outstanding July 1, 1919; 1,421,963 shares issued.

Annual report, year ended July 1, 1919, shows: receipts from stock sales, 2.152; from ore sales, $803; accounts payable, $16,930; total expenditures, 12,092.

Property: 12 miles W. of Kaslo, has silver-lead-zinc ore. Several hun-ed feet of tunnelling was done about 20 years ago by former owners. In 18, as much more underground work was done and company installed water wer equipment and a compressor. Mine idle in 1919, though some milling has been found.

The title is in litigation, as J. M. Wolbert and J. Chassy of Spokane claim alf interest in the mine.

ACIER CREEK MINING CO., LTD. **BRITISH COLUMBIA**

Officers: in 1918, R. T. Elliott, pres.; R. M. Stewart, v. p.; with H. ckle, H. A. Munn, and J. A. Mora, directors, all of Victoria, B. C.

Inc. in British Columbia. **Cap.**, $500,000; par 50c.

Property: 7 claims, crown-granted, 250 acres, on N. bank of Glacier ek, in Portland Canal mining division, said to show a vein 4 to 10' wide with d ore.

Development: by tunnels, with several hundred feet of workings.

)LD CURE MINING CO. **BRITISH COLUMBIA**

Officers: Chas. F. Caldwell, pres., Kaslo, B. C.; J. F. Blake, v. p.; Clar-e Marsh, sec.-treas., 314 Dalton St., Spokane, Wash., with A. G. Copeland, ectors.

Inc. in 1917, in British Columbia.

Property: 7 claims on south fork of Kaslo creek, Slocan, said to show eral veins of silver-lead ore from which high grade ore was shipped in the ly days.

Development: by tunnels. Reported that operations were resumed July 1919.

LDEN CANYON GOLD & SILVER MNG. CO., LTD. **B. C.**

Officers: W. J. McMillan, pres.; Peter Hamilton, v. p.; with R. J. Mc-llan, all of Vancouver.

Property: in Slocan region, said to show ore assaying as high as 60% inmmy.

Development: several hundred feet of tunnels. Shipments total 100 recent information; probably idle.

WONDER GROUP **BRITISH COLUMBIA**

W. S. Harris and Dennis Comeau of Hazleton and operated W. Sutherland, 1917.

ns on Rocher de Boule Mt., about 1 mile from Hazel-veins of chalcopyrite ore assaying 8% copper. No recent

GORDON BAY MINES, LTD. **BRITISH COLUMBIA**

Address: Consolidated Mining & Smelting Co., Trail, B. C.

Property: on Cowichan lake, is being operated by Cons. M. & S. Co. Some 4 to 5% ore was mined in 1918, and diamond-drilling was being done at last accounts.

GRANBY CONS. M. S. & P. CO. **BRITISH COLUMBIA**

Offices: 718 Granville St., Vancouver, B. C., and 52 Broadway, New York. Mines at Phoenix and Hidden Creek, B. C., and Valdez, Alaska; and other places in B. C. and Alaska. Smelters at Grand Forks and Anyox, B. C.

Officers: W. H. Nichols, pres.; E. P. Earle, W. H. Robinson, Edw. Thorne and F. M. Sylvester (mg. dir.), v. p.'s.; Henry Bruere, B. Hochschild, W. A. Paine, J. B. P. Herreshoff, S. H. Steele, and Chas. Hayden, directors; Edward Everett, sec.; H. Harvey, asst. sec.; G. W. Wooster, treas.; H. T. Mahan, asst. sec.; O. B. Smith, supt. of mines; C. M. Campbell, supt. at Phoenix mines; E. E. Campbell, supt. at Anyox mine; W. A. Williams, supt. at smelters; A. J. Bone, supt. Anyox smelter.

Inc. March 29, 1901, by special act of the British Columbia Parliament. Cap., originally $15,000,000; shares $10 par; changed, 1906, to $100 par; increased to $20,000,000 in February, 1914, to provide for conversion of bonds. $15,000,420 outstanding. **Bonds:** authorized February 25, 1913, $5,000,000, first mortgage, 6%, 15-year, convertible at par; June 30, 1919, $1,799,800; series A, of which $931,900 are stamped bonds; dated May 1, 1913. Series A bonds are convertible until May 1, 1923, at holders' option, into stock at par with cash adjustment of accrued interest and current dividend. Bonds of general issue redeemable at 105 plus interest after 10 years, 4% to be retired by purchase at $110, annually.

Capital increased to $25,000,000 in February, 1920; also bonds increased by $2,500,000, 8%, underwritten by Hayden, Stone & Co. Capital expenditures during the past 2 years approximate $11,500,000. Shares listed on Boston Stock Exchange.

Boston Safe Deposit & Trust Co., and Lincoln Trust Co., New York, registrars; American Trust Co., Boston, and Title Guarantee & Trust Co., New York, transfer agents; registrar of bonds, Title Guarantee & Trust Co., New York, trustee of bonds, Columbia Trust Co., New York. Annual meeting, first Tuesday in October.

Company was organized to purchase the property and assets of the Old Ironsides Mining Co., Knob Hill Gold Mining Co., Ltd., Gray Eagle Gold Mining Co., Ltd., Granby Consolidated Mining & Smelting Co., Ltd., and the Grand Forks Water & Light Co., at an aggregate cost of $12,097,030. Stock to the amount of $1,402,970 was issued for cash and services rendered.

Comparative General Balance Sheet, years ending June 30:

Assets.

Year	Prop. and Equipment	Investments	Supplies Accts. Rec.	Cash, Ore and Metals	Total
1919	$17,597,917	$743,370	$5,608,312	$83,774*	$24,033,37[illegible]
1918	15,220,344	630,412	7,920,190	66,897*	23,837,84[illegible]
1917	22,315,637	683,230	6,448,063	.....	29,447,0[illegible]
1916	20,366,316	575,644	1,041,012	2,927,317	24,910,2[illegible]
1915	19,965,755	430,517	568,465	1,756,543	22,721,2[illegible]
1914	19,630,026	514,809	525,097	1,375,794	22,045,7[illegible]

* Cash only.

Liabilities.

	Capital Stock	Bonds	Loans Unsecured	Loans Current	P. & L. Surplus	Total
1919	$15,000,420	$1,799,800	.....	$6,108,744	$1,124,409	*$24,033,37[illegible]
1918	15,000,420	2,039,800	.....	3,368,206	3,429,418	*23,837,84[illegible]
1917	15,000,420	2,514,000	.....	1,242,806	9,434,038	29,447,0[illegible]
1916	14,998,520	3,042,300	.....	281,997	6,587,471	24,910,2[illegible]
1915	14,998,520	3,390,000	.....	664,680	3,668,087	22,721,2[illegible]
1914	[illegible]	2,290,000	$960,000	1,057,296	2,739,914	22,045,7[illegible]

* [illegible] $6,267 reser[illegible]ion of ore and plant.

Comparative Income Account, years ending June 30:

	Gross Sales	Operating Expenses	Int. Deprec.	Net Income	Div. Paid	Prev. Surplus	P. & L. Surplus
9.....	$6,455,000	$6,669,054	$120,884*	$219,889†	$1,312,539	$3,421,355	$1,124,409
8.....	11,522,472	7,519,492	131,325*	3,542,624	1,500,042	3,402,327	3,429,418
7.....	12,259,185	7,022,402	211,532*	5,025,251	1,349,962	6,587,471	12,040,267
6.....	11,370,500	7,262,878	288,325	3,819,295	899,911	8,668,088	6,587,471
5.....	5,953,886	3,718,329	411,893	929,164	.....	2,788,922	3,688,086
4.....	4,504,766	3,882,095	182,520	439,551	899,901	3,199,272	2,738,922

* Bond interest paid. † Loss.

Dividends for years ended June 30:

133,630.....	1903	$270,000.....	1909	$899,911.....	1916
339,991.....	1905	248,481.....	1910	1,349,962.....	1917
620,000.....	1906	449,955.....	1913	1,500,042.....	1918
215,000.....	1907	899,900.....	1914	1,312,537.....	1919
540,000.....	1908	.....	1915		

Property: includes original Granby group at Phoenix in the Boundary ıtrict, B. C.; the Hidden Creek mine on Granby bay, Observatory inlet, B. C.; ıpper Key and Belcher groups at Belcher mountain, Wash.; the Oversight ıup; the Bonanza Creek mine; 30 quartz claims on Granby Peninsula; Mamie d Dean mines on the Kasaan Peninsula; the Midas mine at Valdez, and the mine adjoining the Dean on Prince of Wales island.

Company has carried on exploratory work for 2 years on a property on the stall river where results are said to be satisfactory. Also owns a large interest a coal mine and coking plant at Crows Nest Pass, and a 100,000-h. p. waterwer plant at Kettle Falls. The smelter at Grand Forks, operated since 1901, ıs closed down June 20, 1919. Company also owns the Cassidy coal mine of er 800 acres at Nanaimo, on Vancouver island, 70 miles N. of Victoria.

The Phoenix Mines.

The Granby or Knob Hill properties at Phoenix, B. C., 43 claims and fracns, 1,050 acres. The property had 2 distinct sets of orebodies. The largest d longest worked were those of the Knob Hill-Ironsides mines; the other one, e-half mile east, was the Gold Drop. Mining operations were stopped June 14, 19. though the mines still show 2,513,636 tons of low-grade ore, of which ıount about 500,000 tons is available. The geology and development are ıcribed in Vol. XIII.

During 1918 shipments from all sources totaled 310,943 tons. Mining, ıshing, and loading Victoria ore was $1.25, and development 33c. per ton. covery reported from the smelter for Phoenix ore amounted to 19.58 lb. cop-, 0.239 oz. silver, and 0.447 oz. gold per ton, the best recovery obtained since)9.

Mining operations ceased at these mines on June 14, 1919. The shutdown ich was rapidly approaching on account of exhaustion of orebodies was hased somewhat by a shortage of coke, due to labor trouble at the local mines.

Grand Forks Smelter: blown out, June 20, 1919. Plant is described in l. XIII; mines and smelter in B. C. are well described in "Min. & Sci. Press" February 24, 1917. During the year tonnage treated in the Grand Forks elter totaled 313,133 tons of Granby ore, 7,200 tons of foreign ore, 16,168 tons converter slag and matte, and 187 tons of flue dust.

Hidden Creek or Anyox Mines.

Address: E. E. Campbell, supt., Hidden Creek, B. C.

The Hidden Creek mine is located on Granby (formerly Goose) bay, Obvatory inlet, south of and parallel to Portland canal. It is probably the largest ıper mine of British Columbia. The 9 claims cover the top and sides of a 920' high, enclosed by 2 branches of Hidden creek and 2 miles from Anyox, smelter site and seaport town of the company.

Geology: the ore occurs as a mass of solid sulphides, pyrite and chalpyrite, or mixed with country rock in shear zones, in crushed and schistose ıllite. The rocks are folded and mashed but are part of the cover of the

great granite mass forming the Coast range. There are 2 deposits, one 25 to 40′ wide, traced 1,400′ said to average 6%, the other estimated to be 100′ wide and of unknown length. Development by diamond drill holes shows the ore to extend 300′ below sea-level, a vertical distance of 1,250′ below outcrop.

Development: by tunnels, with principal workings on the 750′ crosscut main tunnel, which is about 450′ from the surface. New work for the last year totaled 3,185′ at a cost of $26.16 per foot, making a total of 34,000′. Diamond-drilling amounted to 11,972′ at a cost of $2.71 per foot; total drilling amounts to 99,152 feet.

Cost of ore delivered on cars was $1.38 per ton, an increase of 18.2 cents. The mine was operated 312 days, with an average number of 243 men, and produced 683,889 tons of ore, a decrease of 205,719 tons from the previous year. Average grade mined was 1.88% copper, compared with 2.14% in 1918, and 2.08% in 1917. During the year, new ore amounting to 1,321,250 tons was added to reserves.

Anyox Smelter: this is the company's headquarters and chief plant. There are 4 furnaces, 52″ wide and 30′ long, making it the largest pyritic smelter in the world, as it treats from 2,000 to 2,500 tons daily. Company has laid out a town, installed water works, electric plant, graded streets, built stores, hospitals, etc. To supply fuel for the smelter, coal is brought from Vancouver Island and made into coke at Anyox, in a plant completed in 1919. By-products are saved. The works were described in "The Canadian Mining Journal" of November 15, 1919.

Company also owns the Bonanza group, adjacent to the Hidden Creek mine. The original estimate of ore reserves (including Bonanza) was 14,516,700 tons. June 30, 1919, the reserve was 11,222,702 tons, averaging 2.24% copper. The low grade ore, averaging 0.65% copper, amounts to 11,504,850 tons (including Bonanza), most of it, amenable to flotation concentration.

Alaskan Mines.

The Midas mine at Valdez, shipped 3,459 tons during early part of 1918 and was then closed, owing to cost of transportation. The year previous 25,350 tons were shipped, assaying 3.24% copper, 0.476 oz. gold, and 0.32 oz. silver. Ore reserves amount to about 136,000 tons, grade not given.

The Mamie mine was closed in July, 1918, as the compressor house was burned down. Very little, if any, ore of commercial value remains in the mine. The year previous 3,102 tons ore of 1.90% copper was shipped.

The It mine shipped 1,560 tons of ore during first half of 1918 and then was abandoned after doing considerable development. The year previous there was shipped 11,776 tons ore of 4.89% copper.

Production: for years ending June 30, except 1916, which is for nine months ending March 31:

	Ore Tons (a)	Cost M'ng	Per ton Sm.	Total	Lb. Cu. per ton	Copper lb.	Silver	Gold, Oz.	Cost (b) cents
1919(d)	.....	.....	.....	.....	.....	11,100,000	.....	.....	...
1919	986,959	.....	.....	.....	27.97	28,218,552	567,423	38,308	33.0
1918	1,475,637	.....	.....	.....	.....	44,685,001	550,163	30,730	15.0
1917	1,490,804	$1.348	$1.926	$3.274	25.27	37,676,368	466,302	25,128	12.5
1916	1,929,205	0.990	1.800	2.290	22.36	42,198,089	487,845	44,848	12.5
1915	1,008,020	0.850	1.190	2.190	23.99	26,666,912	277,881	21,008	13.0
1914	1,289,000	0.800	1.220	2.730	16.89	28,320,097	485,275	43,852	11.5
1913	1,279,869	0.750	1.210	2.650	17.08	22,668,614	294,326	47,286	13.0
1912	739,519	0.770	1.260	2.900	18.01	13,231,124	285,305	38,305	17.0

Custom ore is not included in the figures for 1917, 1918 or 1919.
(a) In 1916 custom ore amounted to 1½% of total ore treated.
(b) After crediting gold and silver. (c) Estimated.
(d) July to December, inclusive.

The Anyox mines in 1919 yielded 11,100 oz. gold, 425,111 oz. silver, and 20,000,000 lb. copper from 655,427 tons of ore.

Reserves: present ore reserves exceed 11,000,000 tons developed and 10,000,000 tons probable ore.

Granby is a strong and well managed company, but its large construction expenses have used up its surplus, hampering its expansion. New financing in 1920 includes $5[illegible] of convertible debentures. Expenditures on the [illegible]

al mine, coke plant, and smelter recently amounted to about $5,000,000, financed ɔm treasury and temporary loans.

REAT OHIO COPPER MINE **BRITISH COLUMBIA**

Sargent & Munro, owners, New Hazleton, B. C.

Property: adjoins the Butte Rocher de Boule mine and is operated by ıings and Trimble, under lease and bond. A well defined fissure vein in ınodorite, traceable at surface for 700', carries an orebody 4' wide, giving ıays of 22.5% lead, 9.5% copper, 134 oz. silver, 8.6% zinc and 0.04 oz. gold.

Developed by 355' tunnel, open cuts and drifts. Ore occurence and ıditions are similar to those in the Rocher de Boule, but further development :essary to determine value of mine. No recent information.

REAT LAKE MINING & MILLING CO. **BRITISH COLUMBIA**

Owns a property on Thurlow Island, which was reported November, 1919, ler lease to the Ladysmith Smelting Corporation.

IBBELL ISLAND COPPER CO. **BRITISH COLUMBIA**

Office: 203 First National Bank Bldg., Bellingham, Wash. Mine at bbell Island, Skeena River division, Cassiar district, B. C. Idle since 1906, ing to lack of funds. Fully described, Vol. XI, Copper Handbook.

DLEY GOLD MINING CO., LTD. **BRITISH COLUMBIA**

A Canadian re-incorporation, 1918, of the Hedley Gold Mng. Co.

Offices: 42 Broadway, New York; and Hedley, B. C.

Officers: I. L. Merrill, pres.; W. B. Dickson, v. p.; J. D. Clarke, sec.-ıs., with W. D. Thornton, E. C. Congdon, G. E. Tener, G. P. Jones, Veryl :ston, Marcus Daly, and W. E. Corey, directors. W. S. Harper, asst. sec.-ıs.; G. P. Jones, gen. supt., Hedley, B. C.

Inc. 1913, in British Columbia, as successor to the Yale Mining Co. ɔ., $2,400,000; shares $10 par; all issued. Guaranty Trust Co., New York, ısfer agent; Mechanics & Metals Nat. Bank, New York, registrar. Annual :ting, second Wednesday in April, at Hedley, B. C. Listed on New York :b.

Comparative Statements of Income Account:

r	Rec. at Mill	Expenditures	Profits(a)	Dividends	Surplus	Ernngs. on Cap. Stock
...	$690,711	.....	$132,578	$108,000	$24,578	$0.55
....	737,840	$499,745	238,095	240,000	441,783	1.98
....	711,997	463,380	248,617	240,000	443,688	2.07
....	796,591	421,846	374,745	300,000	74,745	3.12
....	797,341	409,112	388,229	300,000	88,229	3.23
....	802,330	397,075	405,255	360,000	45,255	3.38
....	748,133	362,253	385,880	360,000	25,880	3.22
....	.....	.....	318,152	300,000	18,152	2.65

(a) Includes interest earned.

Comparative General Balance Sheet, December 31:

	Assets:				Liabilities:		
r	Property Account	Current Assets	Total	Year	Capital Stock	Undivided Profits	Total
..	$2,222,548	$217,516*	$2,440,064	1918..	$2,400,000	$24,578	$2,440,064
..	1,494,364	147,418	1,641,783	1917..	1,200,000	441,783	1,641,783
..	1,487,018	156,670	1,643,688	1916..	1,200,000	443,688	1,643,688
..	1,439,542	195,528	1,635,070	1915..	1,200,000	435,070	1,635,070
..	1,394,275	166,049	1,560,324	1914..	1,200,000	360,325	1,560,325

* Includes supplies, etc., $189,585.

Dividends:	Amount	Rate %		Amount	Rate %
.....	$0.30	3	1915.....	$2.50	25
.....	1.40	14	1916.....	2.00	20
.....	2.40	25	1917.....	2.00	20
.....		30	1918 old Co.....	0.30	3
.....		30	1918 new Co.....	0.45	4½
.....		25			

In September, 1919, quarterly dividend was passed to conserve surplus for development.

Property: the Nickel Plate and Sunnyside mines, 31 claims, crown-granted, and a mill site, 1,370 acres in all, on Nickel Plate Mountain, and in Similkameen Valley, Osoyoos mining division, Boundary district, Hedley, B. C. Also owns the Copper Flat property near Silver City, N. M.

Geology: the Hedley ore deposits are of contact metamphoric origin, and occur at contact of dikes and sheets of gabbro in altered limestones; they are irregular in outline, usually have a well-defined boundary on the side of the gabbro, and dip about 24°. Ore occurs in shoots. Nickel Plate shoot is 15' wide, 40' thick, and 1,500' long. Principal ore mineral is arsenopyrite, with which occurs chalcopyrite, pyrrhotite, sphalerite, pyrite, gold and sometimes tetradymite; the valuable content of the ore is gold alone. In the association of gold with arsenopyrite in deposits of this origin the Nickel Plate ore deposits are unique and have no known counterpart in North America, excepting perhaps the White Caps at Manhattan, Nevada.

Development: 2 tunnels, 900' and 1,160' long and a 35° incline shaft 970' deep. Greatest depth of workings are at 5,200' elevation, 670' below the outcrop. Company plans sinking to 1,000' level. Shrinkage stoping is used, and no timbering required. New work in 1918 totaled 490', compared with 1,03[illegible] in 1917, in addition to 3,766' of diamond-drilling.

Reserves: Jan. 1, 1919, were 263,000 tons of $9.40 ore, 87,650 tons of $[illegible] ore. The 900' level has the highest grade ore, and which is said to extend lower so that deeper development will give increased reserves. On account of low prices the mill was closed during winter (1919-'20); and development work only carried on.

Ore is transported from the mines to the mill at Hedley by means of electric and gravity tramways. The former is 1 mile long, while the 45° gravity tram is 10,000' long, with a 4,000' drop.

Equipment: includes an air hoist, two compressors, each of 2,000 cu. ft. capacity and driven by 440 h. p. motors; also a 200-ton 40-stamp mill equipped with 24 Frue vanners and 12 Deister tables.

Electric power supplied by company's hydro-electric plant on the Similkameen river, with 2,100 h. p. twin turbines. Powerhouse has a 1,250 k. v. a. alternating current generator. Total cost of plant, $192,009, charged to capital account.

Recent production:	Ore Tons	Ave. Assay	Gold Rec.
1919	60,000	$8.00	$497,000*
1918	67,313	10.34	690,711*
1917	71,207	11.29	737,840*
1916	73,491	10.65	711,997
1915	74,625	11.65	796,592
1914	78,494	10.80	797,340
1913	70,796	12.03	802,330
1912	70,455	11.19	748,133

* Including sale of arsenic to Tacoma Smelting Co., recovered in concentrates.

Conditions in the lower levels of the mine have changed considerably in the past four years. While the orebodies are larger and stronger and of practically the same grade, the specific gravity has increased due to an increase in arsenopyrite, which adds to the cost per ton of ore milled. Concentrate tonnage rose from 3,831 tons in 1913 to 6,218 tons in 1915, and to offset this increase in costs the company installed a cyanide plant. War conditions during 1918 prevented extensive development and not enough new ore was opened to maintain the amount milled. The president says, "The mine still looks fairly well and when prices for labor and supplies come down to near pre-war-time levels, as we expect to earn a fair rate of interest on our stock; with more development we can get the mine back into better shape." Hedley is a good [illegible]

ERCULES MINING CO. **BRITISH COLUMBIA**

Idle. Nearest P. O.: Jedway, Queen Charlotte island, B. C. Claims are ar the Ikeda mine, on Moresby island. Apparently has little or no development.

EWITT-LORNA DOONE MINES **BRITISH COLUMBIA**

Operated by Clarence Cunningham, Sandon, B. C., under lease and bond om Silver Tip Mining & Power Co.

Property: 12 crown-granted claims, 1,200 acres timber, and a 125-ton tation mill, located at Silverton, in Slocan mining district. Ore is lead-zinc.

Development: by tunnels to depth of 1,200′; lowest level, No. 8, pro- les most of output.

Production in 1918, reported as 19,400 tons ore, grade not given.

IGHLAND VALLEY MINING & DEVELOPMENT CO. **B. C.**

Office: 610 Hutton Block, Spokane, Wash. **Mine address:** Ashcroft, itish Columbia.

Officers: Frederic Keffer, pres. and gen. mgr.; Sigmund Dilsheimer, v. Chas. G. Hall, sec.-treas., with H. C. Haas, Jos. McCarthy, C. L. Baker, S. S. Clintock, and E. H. Knight, directors.

Inc. 1915, in Washington. **Cap.,** $1,500,000; shares $1 par, non-assess- e; 1,219,712 outstanding. Bonds outstanding, March, 1919, $25,000 at 7%.

Total receipts from ore shipments and concentrates in 1917 reported as 6,584.

Property: the Chataway and Sanson or Tamarac groups, 15 claims, ut 600 acres, 28 miles S. E. from Ashcroft, a station on the C. P. R. Com- y paid $50,000 for the Chataway group and has the Sanson group of 11 claims ler bond.

Copper ore with small silver and gold values occurs in a contact vein between nite and quartz-feldspar porphyry. Vein is from 3 to 17′ in width, and an body has been opened by a drift for 400′. Ore carries chalcopyrite in a aceous gangue. Average assays are 5% copper, with about 25c. in gold and er.

Development: by 500′ tunnel and shaft to depth of 130′. Total work ounts to 1,500′ of drifts and tunnels, with 300′ raises and stopes. Reserves prise about 8,000 tons above the lower level, where 100′ of drifting is said to n 6% ore.

Equipment: includes 1,000′ tramway and 50-ton mill using flotation and ing a 90% extraction.

Producton: in 1917, 48 carloads of concentrate and 4 of crude ore net- $106,584 at smelter.

The mine was idle during the greater part of 1919, pending financing. If er development proves satisfactory the mill will be enlarged and better sportation provided. Reported November, 1919, that creditors had agreed ccept 1/10 in cash and 1/10 in one, two, three and four months, and the nce in 7% preferred shares.

Is a clean cut and creditable mining promotion.

BSON SILVER LEAD CO. **BRITISH COLUMBIA**

Address: Box 1123, Spokane, Wash., and Ymir, B. C.

Officers: George T. Reynolds, pres.; W. L. McEachren, v. p.; W. B. d, Jr., sec.-treas., Ymir, B. C.; C. H. Harvey, asst. sec. and treas.; preceding F. C. Buchanan, F. R. Monfort and W. A. Buchanan, directors. W. T. owell, mgr.

Inc. 1911, in Washington. **Cap.,** $1,500,000; shares $1 par; outstanding Stock transferred at company's office. Annual meeting in January. ting expenses in 1915, $30,977.

Property: Yankee Girl mine, 3 claims, patented, 126 acres, at Ymir, mining district, B. C., said to show lead-zinc ore in contact deposits granite, slate and schist; strike N. E. S. W., dip 60°. One orebody is e 90′ long, another 400′ long. Ore [illegible] $20 gold, 6.5 oz. silver 6% lead per ton. The main vei[illegible] on 300′ in nnel; is 5′ to 7′ wide and aver[illegible] per ton. kon vein is also ore bearing.

Development: 4 tunnels. No. 1, 1,600′ long; No. 2, 2,100′ long and 40[illegible] below the surface; No. 3, 400′ long and 175′ below No. 2; No. 4, 2,100′ long and 600′ below No. 2, is driven in the footwall and for the first 1,160′ nearly parallel the vein. At No. 4 tunnel level the Yukon vein is estimated to lie 100′ N. E. of the tunnel. Company claimed to have 400,000 tons ore blocked out. Total underground workings over 6,000′.

Equipment: includes 2 air compressors and a 6,000′ tramway.

In 1918, shipments amounted to 8,847 tons ore, most of it going to the Canada Copper Corp. Company ignores requests for information.

HOWE SOUND CO. **BRITISH COLUMBIA**

New York office: 734 Fifth Ave. **Mine office:** Britannia Beach, B. C.

Officers: Evander B. Schley, pres.; W. H. Gelshenen, v. p.; Wm. J. Walworth, v. p. and sec.; K. B. Schley, treas., with exception of Wm. J. Walworth, H. M. Hanna, Jr., G. H. Howard, C. E. Dunlap, Reeve Schley, Chas. C. Raynor, and G. B. Schley, directors. Emil Richter, asst. sec.-treas.; E. B. Schley, chairman executive committee; C. P. Browning, mine supt.

Inc. Aug. 22, 1903, in Maine. **Cap.,** $3,000,000; shares $1 par; 1,984,150 issued. Bankers Trust Co., New York, transfer agent. Chase National Bank, New York, registrar. Listed on New York Curb. Bonds: $4,573,000 20-year 6%. Shares sold, 1918, $6⅞ high, 2⅞ low; in 1919, 5⅞ high, 3⅛ low.

Comparative Balance Sheet:

Assets.

	1918	1917	191[illegible]
Mining property	$7,739,915	$7,176,792	$6,7[illegible]
Plant, buildings, machinery	4,023,834	3,582,442	3,3[illegible]
Investments	871,545	1,068,989	[illegible]
Inventory	622,974	602,583	[illegible]
Accounts rec.	451,529	*779,010	[illegible]
Bonds—U. S., Canada, etc.	1,316,414	458,000	[illegible]
Cash	319,116	188,835	[illegible]
Other	10,086	7,812	[illegible]
Total	$15,355,404	$13,864,463	$12,[illegible]

* Includes production in transit, $766,397.

Liabilities.

	1918	1917	[illegible]
Capital stock	$1,984,150	$1,984,150	$1,9[illegible]
Bonds—20-year, 6%	4,573,000	4,842,000	[illegible]
Reserves	4,690,823	3,026,207	[illegible]
Profit and loss	3,597,848	3,554,655	[illegible]
Current	509,583	457,451	[illegible]
Total	$15,355,404	$13,864,463	$12,[illegible]

Comparative Profit and Loss Statement:

	1918	1917	[illegible]
Smelter returns	$7,846,423	$7,019,815	$6,[illegible]
Miscellaneous income	179,571	94,617	[illegible]
Total income	$8,025,994	$7,114,432	$6,[illegible]
Mining, Transp., Mlg., Sm., & Mktg.	5,380,073	4,504,258	[illegible]
Taxes	242,367	[illegible]	[illegible]
Admin. and extraordinary	102,753	*70,047	[illegible]
Depreciation and depletion	1,006,827	[illegible]	[illegible]
Interest	253,951	[illegible]	[illegible]
Balance	440,023	[illegible]	[illegible]

* Includes corporate taxes.

Dividends: 15c in 1918, 20c in 1919, and 5c in January, 1920. The total $793,656.

Company owns the entire stock issue of the Britannia Mining and Smelting .., Ltd., which in turn owns the Britannia Power Co. and the Howe Sound ower Co. Howe Sound also owns 53,800 shares of the total issue of the El otosi Mining Co., which, in turn, owns a large majority of the stock of the ihuahua Mining Co.

Britannia Mining & Smelting Co., Ltd.

Property: holdings at end of 1918, were 317 crown-granted mineral ims and 17 beach lots of 14,822 acres, 212 mineral claims of 8,800 acres; imber licenses of 4,366 acres; a total of 23,622 acres. During the year 8, $113,605 was spent for new property in prospecting, surveying, crown anting, etc.

Geology: the orebodies consist of a series of roughly parallel lenses of alcopyrite and pyrite in schist, and large masses of silicious material ough which chalcopyrite and pyrite are irregularly disseminated. All orebodies developed thus far are confined to about 100 acres, the re-inder of the company's holdings being undeveloped.

Development: by a main working tunnel and various large glory holes nnecting with tunnels 500, 600, 700, 850 and 1,050′ below the outcrop the ter being known as the 1,000′ level. The working tunnel or 2,200′ level 2,200′ below the outcrop and 1,200′ below the old workings. At 3,922′ m the portal a shaft connects with the 1,050′ level. Work on the Daisy mour crosscut, the 3,100 crosscut and the 4,100′ tunnels was continued ring 1918, at a cost of $168,097. These tunnels open up the orebody so t in future all the ore will be dropped to the lowest or 4,100′ tunnel which is to the orebins at the top of the mill. Four levels have portals on h side of Britannia mountain. Two other levels, the 1,200′ and 1,600 are w being driven through the mountain. In 1918 the Bluff mine on the st, and the Empress mine on the east, were extensively developed and ping started. Underground work in 1918 totaled 25,432′.

Ore reserves: Jan. 1, 1918, in Britannia mine, broken ore in stopes has n increased 312,487 tons, increasing the total stored to 1,581,641 tons 3% copper. Reserves in place amounted to 8,205,755 tons, averaging 2% per.

Equipment of the shaft includes a double-drum electric hoist on the 0′ level and a Gates crusher in the rock-raise between the 1,050′ and 0′ levels, placed on the 1,800′ level and run by a 75-h. p. motor. This e, 200′ east of and connected with the shaft, serves as a storage bin ore, with capacity of 4,000 tons above the 1,800′ level and 2,000 tons ow the 1,800′ level. The raise is lined with 12″ by 12″ timbers. Electric ors haul the ore from the chute to the portal of the tunnel. From the tal the ore is hauled 3 miles by electric railway to head of a 33% incline, 0′ long, vertical drop of 1,450′, which leads to the bins of the concen-or at the water's edge. Other similar raises, equipped with crushers, driven in different localities to give flexibility to the operation.

By system of dams, intakes and pipe lines, Britannia creek has been ressed to produce over 8,000-h. p. during most of the year. Work done 917, to develop Furry creek produces over 2,500-h. p., which will be ased by additional installations in the future. As reserve power, there steam turbine plant of over 3,000 h. p. capacity located at the beach.

Equipment: includes 8 compressors, some driven by water wheels, some steam, and some by either [illegible] -generated electricity, with l capacity of nearly 20,000 [illegible] per minute.

The four units of the new [illegible] originally ated to handle 2,000 tons d[illegible] and addi- machinery to care for 2,[illegible] capable reating 800 tons daily, will [illegible] trans-

ferred to the new mill. This will bring the capacity of the new mill approximately 3,000 tons.

In general the system of milling consists of coarse crushing, jigging by Hancock jigs, fine crushing in tube mills and Hardinge mills, and flotation in Minerals Separation machines, Shipments of concentrates to the smelter, resulting from treating 730,303 tons in the mill amounted to 63,055 dry tons and assayed per ton, 0.048 oz. gold; 1.56 oz. silver; 14.37 copper; 3.32% zinc.

There are 2 townsites in connection with the company's operations, one at Britannia Beach, on the shore of Howe Sound, and the other, known as the Mine Townsite, laid out at the portal of the new tunnel. It has all necessary buildings for equipment and men, the mine buildings being the best and most comfortably equipped in British Columbia. There is a large company store at Britannia Beach.

Total tonnage milled in 1918, 730,300 tons; cost per ton, $0.693; mining costs, including development and crushing, $1.77 per ton.

Production is as follows:

Year	Copper Lb.	Gold Oz.	Silver Oz.	Total Value
1918	18,322,482	3,045	98,131	.....
1917	16,357,329	992	91,504	.....
1916	16,288,835	791	91,905	(a)$6,042,[illegible]
1915	9,058,045	397	50,306	1,676,[illegible]
1914	11,841,232	213	68,515	1,640,[illegible]
1913	13,167,000	89	72,300	2,052,[illegible]
1912	14,300,000	...	76,500	2,388,[illegible]
1911	8,685,000	...	46,000	1,074,[illegible]
1910	520,000	1,000	7,500	68,[illegible]

(a) includes lead and zinc values.

The Britannia proved a hard problem to handle for years, but has made money under the present management, which is thoroughly capable. A successful future seems certain, and the results are a tribute to the far-sighted judgment and persistency of Mr. G. B. Schley.

Mexican Properties.

The El Potosi and Chihuahua mining companies comprise 415 acres in the Santa Eulalia mining district, eighteen miles from Chihuahua, where the company's narrow gauge railroad connects with the National Lines of Mexico. The Santo Domingo, the producing claim of the Chihuahua Mining Co., adjoins the 200 acre claim of the Potosi Company. Other claims are within a two mile radius of the Santo Domingo.

Development work in 1918, showed that previous ore estimates were conservative, and a new deposit of galena found in the large iron-silver body, has added greatly to reserves. During 1918, shipments were 140,000 tons of ore classified as follows:

	Tons	Aver. Oz. silver	Aver. % [illegible]
Lead carbonate	73,883	14.92	[illegible]
Lead sulphide	20,014	21.49	[illegible]
Iron sulphide	48,061	36.31	[illegible]

The ore mined was shipped to the A. S. & R. Co.'s plant. Shipments were maintained steadily throughout, almost the [illegible]. The mine workings and development for several years were [illegible] Mexican foremen; the American staff, etc., being held in El Paso until 1918, when they returned. W. J. Quigley is manager [illegible] operations.

UDSON BAY ZINC CO., LTD. **BRITISH COLUMBIA**
Operations carried on by Maurice W. Bacon, of Spokane, apparently thout profit to company. Requests for information not replied to.

)AHO-ALAMO MINE **BRITISH COLUMBIA**
Owned by Clarence Cunningham, Sandon, B. C. Said to show a conlerable tonnage of milling ore which is shipped to the Alamo concenitor at Alamo.

:EDA MINES, LTD. **BRITISH COLUMBIA**
Ikeda Bay, Queen Charlotte Island, B. C. At last accounts, R. R. Mcnnan pres.; S. J. Castleman sec.-treas., both of Spokane. Property was der management of Mr. Ikeda in 1918.

Inc. Sept., 1910, in British Columbia. **Cap.**, $850,000; shares $1 par.

Property: the former holdings of the Awaya-Ikeda Co., Ltd., taken er for $200,000, include 42 claims, 2,100 acres in several groups on Ikeda y, at the southern end of Moresby island, 3 miles from Jedway, and nnected therewith by government rail and telephone. Steamer connecn is had with Vancouver, 450 miles distant. The Lily group, 8 claims, acres, crown patented in 1912, on the southwestern side of Ikeda bay, covered May, 1898, by Arichka Ikeda, and developed by him until taken er by the present company, September, 1910.

Geology: the group shows limestone and slate cut by dikes of greenne and diorite, having well defined flat fissures at right angles to and ween the vertical main fissures. Ore occurs in a series of veins of 2 8′ width, the largest orebodies lying along the horizontal main fissure. e vein principally developed is of 5 to 30′ width, proven for 1,000′ in gth and about 300′ in depth. The ore shoot, up to 20′ in width, carries ses of chalcopyrite, averaging, as mined, about 2.5% copper, with a ngue of silicious country rock and occasional stringers of quartzite l limestone. The ore mined by the former owners averaged about 4% per, 2.2 oz. silver and $2.25 gold per ton.

Development: the Lily mine has 4 tunnels connected by winzes. No. 3 nel, 940′ long, driven on the vein for 660′, has about 5′ of chalcopyrite of d average tenor and ends in a 40x50′ chamber from which considerable has been stoped, the ore in the chamber apparently being not the same that followed in the tunnel, lying about 45′ to the N. and found by sscutting.

Production: smelter returns in 1918 totaled 358 tons of ore, yielding 84 lb. copper, 77 oz. gold, and 987 oz. silver. The property has reached stage where it requires a 50-ton mill to treat the 2nd class ore, of which e is 7,000 to 8,000 tons in sight.

The output in 1919 was 165 tons of ore yielding 54 oz. gold, 800 oz. er and 43,700 lb. copper.

)EX MINING CO. **BRITISH COLUMBIA**
Address: F. J. Edwards, mgr., Slocan, B. C.
Property: the Index mine on south fork of Kaslo creek, near Slocan, aining veins of silver-lead ore. A long crosscut tunnel is being driven ut No. 2 vein and a drift is being run on No. 1 vein. A new compreshas recently been added to the equipment. The Flint claim, also a r-lead property, was acquired in December, 1919, at a cost of $22,500.

)IAN MINES CO., LTD. **BRITISH COLUMBIA**
Property is in Salmon River district, N. E. of Stewart, [illegible]
, a vein from 12 to 20′ wide had been opened [illegible]
shoot assaying from $40 to $120 per ton.

.AND MINING CO., LTD.
Address: Walla Walla, Wash., and Nelson, B.
Officers: Albert Niebergal, pres.; J. F. Talaber
treas.; with C. E. Nye, D. Donovan, H. Ib
:tors W. M. Myers, mgr.
Inc. in Washington. **Cap.**, $1,500,000; shares $1
Property: all near Nelson in the Grand Fork

consists of the Inland gold mine, closed as being unprofitable; the Berlin gold-silver-copper mine, under lease since October, 1918, to the Griswold-Billingsley Co.; the Eureka copper mine acquired from the Eureka Copper Mines, Ltd., in October, 1918; and the Granite-Poorman gold mine, acquired July, 1919, from the Kootenay Gold Exploration Co.

Development: the Eureka and Granite-Poorman have been extensively opened by tunnels and shafts, exposing a considerable quantity of ore.

Equipment: steam and electric power, compressors, hoists, pumps, aerial trams and 10 and 20-stamp concentrating plants with ball-mill.

Production: definite figures are not yet obtainable, but the Eureka has shipped several thousand tons of smelting ore, and the Granite-Poorman has been operating on and off for 30 years. Ore and concentrates are sent to the Granby smelter.

INTERNATIONAL EXPLORATION & DEV. CO. B. C.

Mail returned, 1919, from former address, James McIntire, 525 Rookery Bldg., Spokane, Wash.

Officers: T. A. Farrell, pres.; S. A. Haynes, sec.-treas., with E. T. Smith, R. L. Smith and J. W. Osborne, directors. Leroy Way, Old National Bank Bldg., Spokane, agt.

Cap., $500,000; shares $1 par.

Organized to locate, acquire and develop prospects, eventually disposing of them to operating companies. A 3-year option for $60,000 was taken on 7 claims near Paulsen, 17 miles from Grand Forks, B. C., and several claims were exploited 12 miles from Grand Forks. Company probably idle.

IRON MASK MINE BRITISH COLUMBIA

Owned by Kamloops Copper Co., at Kamloops, Yale district, B. C.

Shaft is down 780′ and diamond-drilling under way. Has 300-ton mill with flotation unit.

IRON MOUNTAIN, LTD. BRITISH COLUMBIA

Address: R. W. Mifflin, treas.-supt.; D. E. McLaughlin, sec.

Property: the Jersey and Emerald mines in Sheep Creek camp, Nelson mining division. The Emerald is the largest producer of lead-silver ore in the district, and employs about 20 men. In 1918 ore shipments totaled 3,176 tons. A concentrator, built in the fall of 1919, handles 30 tons daily, running two shifts.

JACKSON BASIN ZINC CO. BRITISH COLUMBIA

Probably liquidated as property was acquired by Utica Mines, Ltd., in 1919.

JEWEL-DENERO MINES, LTD. BRITISH COLUMBIA

Secretary's office: W. Robertson, 71 George St., Edinburgh, Scotland. **Mine office:** Greenwood, B. C.

Directors: J. Galloway, chairman; J. E. Rogerson and W. W. Stuart. **Inc.** Nov. 22, 1912, in Edinburgh.

Cap., £70,000; shares 5s each; 279,400 shares issued. Authorized bond issue, £12,500, 8%; £11,202 issued.

Property: the Jewel gold mine at Greenwood and the Idaho Alamo mine in the Slocan district, B. C. The Jewel mine is developed to depth of 500′ by shafts and crosscuts and started production in 1911. Produced 16,525 tons of ore in 1914, yielding £31,360. In 1915 only development work was done and in 1916 the mine was being operated by lessees. Equipment includes a 15-stamp cyanide mill.

KAMLOOPS COPPER CO. BRITISH COLUMBIA

General office: 609 First National Bank Bldg., Duluth, Minn. **Mine address:** Kamloops, Yale district, B. C.

Officers: at last accounts, E. G. Wallinder, pres.-mgr.; W. H. Hoch, v. p., with G. Carlson, S. H. Hudson, F. M. Needham, J. J. Eklund, F. Hoch, Theodore Michel, Otto Johnson, directors; W. W. Blackshaw, 1412 Tower Ave., Superior, Wis.; Otto Johnson, treas.; John Jeffatty.; A. E. Wallinder, supt.

Inc. Sept. 7, 1909, in Arizona. **Cap.**, $3,000,000; shares $10 par, part id; 128,561 issued, none preferred. First-mortgage bonds on Iron Mask ne amount to $210,000; and convertible 6% notes, $128,500.

Accounts for period of 2 years show revenue of $337,454 of which ore es netted $109,330. Balance at end of September, 1916, was $77,572. cess of current assets over liabilities was $33,840. No statement since.

Property: 10 claims, 2,041 acres, 228 acres mineral land, including the n Mask mine, 7 miles S. W. of Kamloops.

Geology: the Iron Mask shaft is sunk on a shear zone, mineralized for to 30′ in width, with segregations of better grade ore forming a pay- eak of variable width, carrying chalcopyrite, associated with magnetite in hloritic gangue, containing orthoclase intercrystallized with copper sul- de. The country rock is a diorite with smeary basic patches of gabbroic terial. The Iron Mask orebody averaged 28′ in thickness, and was lenti- ar in shape above the 690′ level; here it was cut off by a horizontal fault. has been found below this level by diamond-drilling from the 750′ level l is being opened up. The ore is troublesome to concentrate by ordi- y methods owing to its chlorite and quartz-orthoclase gangue.

The mine shows several orebodies besides the Iron Mask, all of them to "igneous after effects," and occurring in fresh diorite, filling fissures replacements along fissures and in patches, the ore consisting of ortho- e, chlorite, epidote and other secondary pneumatolytic minerals, with rlocked chalcopyrite, pyrite, magnetite, etc.

The Erin orebody shows excellent ore and numerous pits at various nts on the property all show ore.

See Annual Report of Minister of Mines, British Columbia, 1915, for iled description of geology, workings, etc. Examined by Walter Har- Weed.

Development: includes the 780′ Iron Mask shaft and over 18,000′ of kings, on 9 levels; the 330′ Erin shaft sunk on ore for 300′ with 600′ of ts and crosscuts; the 50′ Lucky Strike shaft and 3 other prospect shafts. tric power is obtained from the City of Kamloops power-station. In and 1918, approximately 8,000′ of diamond-drilling was done.

Equipment: includes 300-ton flotation mill, one 150-h. p. compressor, 225-h. p. motor for the "Iron Mask" hoist and 8 smaller motors, 6′ ple-drum hoist, 3 air compressors of 1,300 cu. ft. capacity, good for 15 s, an electric-light plant and a sawmill. Transportation is by a good on road with steep grades, leading to the railway siding below Kam- s. The management plans a 2½-mile tram, having a drop of 1,100′, n financial conditions are better.

Production: the mill was not operated to capacity during 1918, total nents of copper concentrates amounting to 2,800 tons.

It is understood that the English corporation has extended the time urther payments on the property.

ILOOPS MINES, LTD. BRITISH COLUMBIA

Office: 151 Coronation House, 4 Lloyds Ave., London, E. C., En pany in hands of trustees, as property is under lease and bond to loops Copper Co.

G EDWARD MINES, LTD. BRITISH COLUM

dle. D. Braithwaite, sec.-treas., Fairview, Boundary district, B. nc. 1904, in British Columbia. Cap., $500,000; sh roperty: 10 claims, 500 acres, in the Similkamee of workings, said to show a sulphide orebody 6 pper.

G SOLOMON COPPER MINING CO., LTD

ffice: 206 Penfield Bldg., Philadelphia, Pa. h Columbia.

fficers: A. S. Anderson, pres.; Philip Singleton, Nolte, treas. Directors, preceding and B. L. and Geo. T. Storey.

Inc. July 2, 1908, in British Columbia. **Cap.**, $1,000,000; par $1; issued 685,005 shares.

Property: 133 acres patented claims, near Cowichan, Vancouver Island, B. C., includes the King Solomon and Queen of Sheba claims, showing two fissure veins in syenite and diorite.

Development: by 700' tunnel and two open quarries, 125 by 50 and 50 by 70'. Operations confined to small amount of development work, since 1917, pending construction of railway (C. P. R.)

Equipped with 65-h. p. steam engine, air compressor, saw-mill, house, etc.

About 800 tons of ore shipped to Tyee smelter returned 8 to 9% copper, 1 oz. silver and small amount of gold. No production 1917-1919.

KITSALIS MOUNTAIN COPPER CO. BRITISH COLUMBIA

Address: Usk, B. C.

Officers: J. D. Wells, pres.; Jesse Brooks, v. p.; A. J. Thomson, treas. and mgr., Usk; with S. H. Davis, and Jas. Darby, directors.

Inc. in British Columbia. **Cap.**, $500,000; par $1.

Property: 6 claims in Omineca division, one mile from Usk, with workings but 200' above Grand Trunk R. R., shows several quartz veins opened by cuts and tunnels showing ore carrying argentiferous bornite and chalcocite, with free gold in both quartz and bornite. (See 1917 Annual Report of Minister of Mines, British Columbia).

Development: by tunnels, with several hundred feet of workings. Where cut in the tunnel the quartz vein has practically no sulphides and is of little or no value, but a new vein is said to look encouraging and work will be continued on it.

KOOTENAY BELLE GOLD MINE BRITISH COLUMBIA

M. M. McCune, mgr., Sheep Creek, via Salmo, B. C.

A. W. McCune, Salt Lake City, in 1918, had a bond on this property, together with the Queen Vancouver, and Alexander mining groups, in the Sheep Creek gold camp of the Nelson mining division. The Queen is credited with a past production of $1,300,000, and the Kootenay Belle $100,000 in gold.

Properties had been idle several years, but new management had started a 3,000' crosscut tunnel, which will cut several parallel veins on the property. At last accounts was employing 25 men and planning to build a mill.

KOOTENAY BONANZA MINES, LTD. BRITISH COLUMBIA

Office: 901 Vancouver Block, Vancouver, B. C.

Officers: W. Finch Page, pres., London, Eng.; A. E. Rand, v. p.; R. Lennie, sec.-treas.; preceding with A. C. Burdick and J. A. Hen[illegible] directors.

Inc. in British Columbia. **Cap.**, $3,000,000; shares $5 par; outstanding $200,000. Company organized to take over the Silver King mine from the bondholders of the Hall Mining & Smelting Co., Ltd.; the claims of the Kootenay Development Syndicate, Ltd.; Dandy & Ollie Cons. Mines, Ltd., and of the Starlight Mines, Ltd., as well as other properties.

Silver King and Dandy groups of claims were sold to the Silver King Mines, Ltd. The company now holds 34 other claims, comprising the North Star, Great Western Starlight and Irene groups, comprising practically all the mineral area of Toad mountain, at Nelson, B. C.

KOOTENAY GOLD EXPLORATION CO. BRITISH COLUMBIA

Company defunct. Property acquired July, 1919, by Inland Mining Co., which see.

LADYSMITH SMELTING CORPORATION, LTD.

Address: F. A. Sieberling, Goodrich Tire & Rubber Co., Akron, O.

Operating office: Col. W. L. Stevenson, mgr., H. W. Aldrich, gen. supt., Ladysmith, Vancouver Island, B. C.

Property: 1,247 acres, including 13 claims, crown granted, 342 acres, 45-acre smelter site and 800 acres timber lands. Owns the Ladysmith

ter, and mineral lands on Mt. Sicker, Vancouver Island, purchased from Tyee Copper Co., in December, 1916, for $275,000. In January, 1920, 14 tional copper claims were acquired.

The Tyee mine, on Mt Sicker, in the Somenos district, 11 miles N. W. Duncans, and about 80 miles from Victoria, yielded only 1,200 tons of in 1907, and has been idle since. The orebody was rich, but shallow, and ough it was explored thoroughly, nothing of value was found.

Smelter: known as the Ladysmith works, is well located, on a 45-acre on Oyster harbor, and treated custom ores from as far N. as Alaska as far S. as Mexico. The smelter was remodeled and practically rebuilt -1910. There is a 40x210' wharf, having an electric hoist, connected, by elevated incline trestle with the smelter bins, which are of 5,400 tons city. The works are terraced throughout, permitting handling of ma- l by gravity, and have a capacity of 500 tons daily.

The furnace building has 42x130' and 48x160' Allis-Chalmers blast fur- s, of 200 and 300 tons daily capacity, respectively.

Smelter production was 3,604,474 lbs. copper in 1903; 5,045,000 lbs. in ; 3,039,398 lbs. copper, 103,474 oz. silver and 5,952 oz. gold in 1905; ,431 lbs. copper in 1906; 2,145,058 lbs. copper in 1909; 45,758 tons of ore, ling 3,392,901 lbs. copper, 41,128 oz. silver and 10,041 oz. gold in 1910 911, 42,030 tons of custom ore were treated. Closed down, 1911.

The 250-ton mill was remodeled and flotation installed, 1917.

In 1918, the smelter was in operation for 5 weeks and closed down be- e sufficient ore could not be obtained to keep even one furnace running. orted November 1919 that company had taken a bond on a property be- ing to the Green Lake Mining & Milling Co., located on Thurlow Is- , and that New York interests had bonded the Tyee mine.

IARK MINING CO. **BRITISH COLUMBIA**

Address: Illecillewaet, B. C.

Officers: Wm. B. Dornberg, pres. and mgr., Spokane, Wash.; Geo. L.), v. p.; A. H. Blair, treas., Yakima, Wash.

Inc. in Washington. **Cap.,** $200,000; par 10c.

Property: 16 claims on Revelstoke division, near Illecillewaet, has pro- d considerable high-grade silver-lead ore. The main tunnel or 400' is 700' long; and the ore body has been mined out above this level. A e 140' deep with 100' of drifting is said to expose the downward ex- on of the orebody. Future of property said to depend upon the ex- and value of the new ore and upon development of a quartz vein n is supposed to be an entirely new ore bearing zone.

Equipment: includes 250-h. p. hydro-electric plant to run the compres- hoist, and concentrator.

QUETI ISLAND MINING CO., LTD. BRITISH COLUMBIA

dle and company regarded as dead. Last address: Vancouver, B. C.

Officers: R. A. Mather, pres.; A. D. Tennant, v. p.; John D. Mather, Geo. E. Winter, treas.; Percy Williams, mgr., at last accounts.

nc. 1910. **Cap.,** $50,000 shares 25c par.

Property: 3 claims, 150 acres, on Lasqueti Island, at the S. W. end of da Island, on the Gulf of Georgia, 35 miles from Vancouver.

Development: by tunnel on 30' veins known as St. Joseph, having reaks, of 6 to 24' width, said to carry ore averaging 10% copper an old per ton.

ROI No. 2, LTD. BRITISH COLUMBI

ecretary's address: L. Rowell, 4 Broad St., Plant, [illegible], B. C.

ind. Mine office: Rossland, Trail district, B. C.

Directors: Lord W. Hamilton, chairman; A. B. Dent, [illegible], Harold T. Hawes and Major C. H. Campbell. Alex Hill, [illegible], engineer.

ons. engs.

ic. June 1, 1900, in Great Britain. **Cap.,** £600,000 [illegible] par.

ssued and fully paid.

ividends: 5s. in 1901; 5s. in 1902; 2s. in 1904; 3s. [illegible]; 3s.

ing director and transfer agent, who was sent to the Washington tentiary. The company was reorganized, and a statement ma operations from April, 1914, to April, 1918. The income was which $228,161 was from ore shipments; expenditures totaled $2 ing a balance of $2.653. On the balance sheet was an item $2,99 as over-issued shares. Total assets were $5,533 with indeb $71,291, or a net deficit of $65,758. To avoid litigation, on acc over-issue of stock an increase in capitalization was made to cov

Early in January, 1920, shareholders were notified that the the mortgagees had commenced proceedings to foreclose the mo unless $12.000 was paid on account, company would eventua property. It was suggested that a syndicate be formed to foreclose the mortgage, and reorganize the company with a sm

LYNN CREEK ZINC MINES CO. BRITISH C

Address: Vancouver, B. C. W. C. Woods, pres.; G. Phill last accounts.

Property: on west fork of Lynn creek, near North Vancou lead-zinc ore. Development is by tunnels. In 1918, only the a sessment work was done to patent the claims.

MAPLE LEAF MINING CO. BRITISH CO

Officers: H. W. Young, pres.-mgr.; John Donaldson, sec.-t of Grand Forks; with J. B. Miller, S. B. Sangers, Thos. Dunl Brown, and H. W. Collins, directors.

Property: on N. fork of Kettle river, 40 miles from Grand F to show lead ore, with a small amount of platinum.

Development: tunnels, longest about 200'. Reported, May, a small copper smelter was being built to handle 50 tons of ore

MASTODON MINING CO. BRITISH CO

J. W. Evans, mgr.

Property: 10 claims, 23 miles N. E. of Revelstoke, between and Carnes creeks, N. W. Kootenay district, shows zinc and lead

Development: consists of a 110' shaft with some driving open cut work, said to have been very encouraging.

McKINLEY MINES, LTD. BRITISH CO

Office: Rossland, B. C. Mine near Franklin, Boundary distri

Officers: B. Lequime, pres.: H. W. Warrington, v. p.; A. M. sec.; C. L. Hammond, managing director.

Property: 4 claims, on the N. fork of Kettle river, about 34 m of Grand Forks and 18 miles from the Kettle Valley railway term

Orebodies occur as sulphides and oxides of iron carrying gold per. Several tunnels on property. Results of extensive diamon not reported. Claims were under bond and lease to the British Copper Co., 1912, and a long tunnel driven. James Breen, of Spok 75% of the stock. The company was promoted by P. A. O'Fa spent $30.000 supplied by F. A. Heinze, in diamond drilling, befo abandoned the proposition. Property is too inaccessible to work grade ore profitably. No recent information.

MINING CORPORATION OF CANADA BRITISH CO

For office and directors, see description under Ontario.

Property: gold quartz claims on Proserpine mountain, 4 mi Barkerville, Cariboo district, acquired 1919. In November, 50 employed on preparatory work and exploration under direction Bryce. Diamond drilling was also to be done. Indications said to Later in 1919 the Pioneer mine on Cadwallader creek, Lillooet, by road from Mission station on the Pacific Great Eastern line chased for $100.000.

Development: by a 280' shaft.

Equipment: includes two 3-drill compressors, hoist, stamp 190-h. p. water wheel.

Production: $37,921 in gold from 3,248 tons of ore.

INNEAPOLIS & TEXADA COPPERITE CO., LTD. **B. C.**

Offices: 1311 Washington Ave., N., Minneapolis, Minn., and Vananda, :xada Island, B. C.

Officers: A. Stremel, pres.; E. E. Rorem, 1st v. p.; John Kraft, 2nd p.; A. E. Barker, sec.; John F. Danek, treas.; above, with Eden Schmidt, lmer Olson, B. F. Laflin and W. H. Curtis, directors.

Inc. in Arizona. **Cap.**, $1,000,000; shares $1 par; 400,000 issued.

Property: 5 claims, 225 acres, on Texada Island, 47 miles N. W. of ncouver, said to show 2 main veins, the Swan and the Paxton, contain- copper ore, with gold and silver. Paxton vein is said to be traceable 00′ on surface. Value of property is entirely prospective.

Development: 200′ shaft, with 300′ of drifting; also a number of test s. Considerable mill ore extracted in this work, reported to average copper, 2% lead, and $5 per ton in gold and silver.

In December, 1918, a contract was made with British interests who, s reported, have been making a detailed examination of the property, in- *ding* diamond drilling.

)LLY GIBSON MINING CO. **BRITISH COLUMBIA**

Address: Rossland, B. C.

Property: 8 claims, in Grand Forks mining district, 4 miles S. W. of ılsen, on the C. P. R. R., shows a mineralized area 1,500′ long. Vein ere opened is about 8′ wide, and ore assays up to $14 in gold and 2 oz. silver per ton.

Development: by several hundred feet of tunneling. Reported in Nov., 9, that ore has been found in lower tunnel, assaying $48 to $125 per ton.

)LYBDENUM MINING & REDUCTION CO., LTD. **B. C.**

Address: Riel, B. C.

Property: 21 claims on the Alice Arm branch of Portland Canal, 15 es from Anyox. The group shows a series of quartz veins in a miner- ed zone, 60′ wide, which for a length of about 800′ show small bunches)re containing silver, lead, zinc, and molybdenum. A 4,000′ aerial tram nects the mine and mill.

The property has been tied up by litigation since 1916. In June of that r, the court at Victoria issued an order requiring that the property be ed on the market at a fixed price of $150,000.

THER LODE SHEEP CREEK MINING CO. **B. C.**

Probably dead and property sold, but no confirmation obtainable.

Address: Sheep Creek, B. C.

Officers: Alex. L. Smith, sec., transfer agent and registrar, Cornwall, .; John McMartin, pres.; J. R. Rutherford, gen. mgr., in 1916.

Inc. in Maine. **Cap.**, $1,250,000; shares $1 par. A dividend of 11% was ared in December, 1915.

Property: at Sheep Creek, West Kootenay district, B. C., shows gold in an orebody said to have a maximum width of 35′ on 6th level.

Equipment: includes 10-stamp mill and cyanide plant, connected with mine by a 3,600′ aerial tram.

In 1914 ore mined and milled amounted to 20,000 tons; bullion recov- reported as $100,000. Owing to lack of power the mine has been ating only about 9 months of the year.

UNTAIN CHIEF MINING CO. **BRITISH COLUMBIA**

Address: Renata, B. C.

Officers; J. W. Evans, pres.-mgr.; J. H. Lawrence, sec.-treas., with A. ash, Chas. F. Blacha, and W. A. Gordon, directors. **Inc.** in 1918.

Property: 5 claims, 3 miles from Renata, on Lower Arrow lake. Strip- and open cut work in 1918 is said to have disclosed an orebody 5′ wide 00′ long, in limestone, near the contact with an intrusive granite. Ore s about 2½ oz. silver and 3½% copper. In 1918, about 600 tons of vere shipped from old workings. In September, 1919, a 200-ton ship- was made. A hoist and compressor were installed late in 1919, and ine is being put in condition to ship up to 500 tons per week

MOUNTAIN CONS. MINING CO. BRITISH COLUMBIA

Property: 7 miles from Sandon, B. C., consists of two claims said to show a small, but rich vein in granite. Ore is silver-lead, with a little gold. The mine is in rough country and can be worked only in the summer. Operations each season said to result in a profit. Reported October, 1910, that company expected to realize $25,000 from one carload of ore.

MOUNT SICKER & B. C. DEV. CO., LTD. BRITISH COLUMBIA

Idle. **Office:** 30 George Square, Glasgow, Scotland. Fred L. Smith, chairman; John D. Steel, sec.

Inc. Oct. 20, 1898, in Great Britain. **Cap.,** £125,000; shares £1 par. Lands are on Mt. Sicker, Vancouver Island, B. C.

MULTIPLEX MINING, MILLING & POWER CO., LTD. B. C.

Address: P. O. Box 424, Revelstoke, B. C.

Officers: O. T. Bibb, pres.-mgr.; F. G. Wrightson, sec., with Jos. Stevenson, L. P. Schooling, and J. G. Hilbery, directors.

Inc. April, 1914, in British Columbia. **Cap.,** $1,000,000; par $1; non-assessable; 339,391 shares in treasury.

Property: 18 claims, 830 acres, 1¾ miles E. of Cambourne, at junction of Poole and Mohawk creeks, in Lardeau district, West Kootenay, said to show silver-lead-zinc ore in fissure veins, also gold ore in quartz veins of different type. It is said that $25,000 has been spent on development work by tunnels, with about 1,500′ of workings. Company planned to build a hydro-electric plant in 1919.

NEW CANADIAN METAL CO. BRITISH COLUMBIA

S. S. Fowler, Nelson, B. C., mgr. Control is held in France.

Property: the Bluebell lead-silver mine at Riondel, near Ainsworth, B. C.

Geology: the deposit is a replacement in limestone, irregular masses of ore following the bedding, with tongues projecting into the foot-wall country of pre-Cambrian sediments.

Development: mine is 600′ deep on incline of 35°, with extensive workings extending under Kootenay lake. The mine was flooded 1917, by an inrush of water; the old pump could not handle the water and a new 1,000-gal. pump has recently been added.

Equipment: includes mill and Blake crushers, rolls, jigs, two Huntington mills, Wilfley and Deister tables. The mill was not operated in 1918.

Production: shipped 5,000 tons of oxidized ore from surface workings in 1918.

NEW DOMINION COPPER CO., LTD. BRITISH COLUMBIA

Controlled by B. C. Copper Co. Mines considered exhausted and of no commercial value. For description, see Vol. XII.

NEW ERA MINING CO. BRITISH COLUMBIA

Address. Camborne, B. C. W. E. Morphy, mgr.

Property: lease and bond on 3 crown-granted claims above mine, including the old Beatrice mine, near Camborne, Lardeau mining division. The mine which has 1,400′ of tunnel work, was closed down some years on account of the low price of silver. Ore said to assay about 3% lead and 100 oz. silver per ton. Company expects to work the mine during winter.

NEW HAZELTON GOLD-COBALT CO. BRITISH COLUMBIA

Address: Nicholas Thompson, pres., Vancouver, B. C. R. Daly Thomskill, sec.-treas.

Property: near Hazelton, on W. slope of Rocher De Boule mountain, 5 miles from Carnaby, shows a 2′ vein in granodiorite. This vein contains bunches and bands of ore varying from 3 to 18″ in width; ore is auriferous arsenopyrite with some molybdenum. In 1918, a 25-ton shipment assayed 1.24 oz. gold; 1.4% MoS_2; 1.18% MoO_3; 1.12% cobalt; 0.6% copper; 8.98% arsenic.

Development: by tunnels, the main one is over 700′; a second tunnel lower, in about 200′.

An aerial tram carries the ore 1,000′ down the mountain, from which it it is packed 5 miles to the Grand Trunk railway.

Property shows another vein which is supposed to be a continuation he main Rocher De Boule vein.

BLE FIVE MINING CO. **BRITISH COLUMBIA**

Operated by Jas. Dunsmuir, Victoria, B. C.; Paul Lincoln, mgr.

Property: the Noble Five and Deadman groups between Sandon and y in the Slocan mining division, has been extensively developed during past 8 years. The present lowest level has a 4,000′ crosscut, 1,100′ be- upper workings, and about 3,000′ below apex of the Noble Five and Chance veins, proving the continuity of the veins at depth. The s contain silver-lead ore and development said to warrant the new on mill built in 1919 to replace an old one operated years ago. A 4- artment, 1,100′ raise with 2 ore ways connect the upper workings with ower level which is to be the main haulage way. Company employs een 30 and 40 men. Said to have ore reserves sufficient to keep the busy for 2 years or more.

s an old and well known mine that produced bonanza ore from its r levels.

)NDAY MINES CO. **BRITISH COLUMBIA**

)ffice: 704 Paulsen Bldg., Spokane, Wash.

)fficers: R. C. Lammers, v. p.; J. M. Scott, sec.; J. B. White, treas., H. S. Burdick, directors.

:ap., $750,000; shares 25c par; 1,800,000 issued.

'roperty: the Noonday and other claims near Sandon, B. C.

levelopment: by tunnels, with several thousand feet of workings, which opened 14,000 tons of $17.50 lead-silver ore. A long development tun- to be driven through the properties.

promising prospect. Shipments have been made at various times.

SEMEN EXPLORATION CO. **BRITISH COLUMBIA**

ffice: 1048 McKnight Bldg., Minneapolis, Minn. **Mine office:** Cap- Vananda, Texada Island, B. C.

fficers: E. E. Rorem, pres.; W. H. Curtis, v. p.; C. A. McKenzie, sec.; T. Rorem, treas.; B. F. Laflin, A. E. Barker and Eden Schmidt,)rs; Robt. Forbes, cons. engr.; Jas. Forbes, Sr., supt.

c. in Arizona. **Cap.,** $500,000; shares $1 par; issued, $375,000.

operty: 23 claims, 1,000 acres, 730 patented, on Texada Island, B. C., contact deposits between limestone, granite and diorite. Copper as chalcopyrite and bornite, with gold and silver values. The Cap- :laim has an 80′ vertical shaft that showed 10′ of ore., said to have ed 4% copper and $6 gold and silver. Test shafts along the vein for hundred feet show a continuity of the vein, and crosscutting proved e about 25′ wide. The Cameron claim, adjoining the Texada iron)wned by the Puget Sound Iron Co.—on which extensive develop- as been done, has a capping of magnetic iron with large lenses of yrite. The vein is reported to be over 180′ wide and is thought to 4% copper. The Aladdin claim carries silver-lead ores. It has a tical shaft with about 250′ of crosscutting. The Aladdin, De Ore, zzard claims are leased to the Minneapolis & Texada Copperite Co., hich is now developing.

)orted 1919, that British interests are making a detailed examination)roperty, including diamond-drilling.

npany's property covers about 4 miles along the various veins, is ent to tide water transportation and about 20 miles from a smelter.

T GOLD MINES, LTD. **BRITISH COLUMBIA**

ress: 901 Vancouver Block, Vancouver, B. C.

cers: A. C. Burdick, pres.; Geo. Rorie, sec.; with J. M. Turnb

R. S. Lennie, W. R. Robertson, and W. B. Pool, directors. R. H. Stewart, mgr., 736 Granville St., Vancouver.

Inc. in British Columbia. **Cap.**, $1,050,000; par $1. Cash on hand in November, 1919, amounted to $28,855.

Property: 15 claims, including the Mother Lode, Searchlight, and Nugget groups, in Sheep creek district, 15 miles from Salmo, claims show veins in schistose quartzite.

Development: by tunnels. A 1,250′ tunnel cut vein of the Mother Lode mines in January, 1920, on the Sheep creek side of the mountain, 600′ beneath the old Nugget workings. This work cost $26.84 per foot. The shoot is 12′ wide, 3′ of which is good ore.

Equipment: includes a 14-drill compressor and a 100-ton mill which was on the Motherlode property when it was acquired by present company.

Past production reported as 37,153 oz. of gold.

NUMBER ONE MINE **BRITISH COLUMBIA**

Owned by J. M. Harris, Sandon, B. C., and F. T. Kelly.

Property: 5 claims, 231 acres, shows a fissure vein containing silver-lead ore, cutting through slate, and porphyry.

Development: by 3 tunnels, 200, 500 and 700′ in length. Total output to date, 312 tons of ore. Owners report $22,270 received from ore sales in 1918, with operating expenses of $16,702 and $3,000 paid as dividends.

OLALLA COPPER MINING & SMELTING CO. B. C.

Office: 305 Colt Bldg., Paterson, N. J. **Mine office:** Olalla, Yale district, B. C.

Officers: Robt. Gaede, pres.; Jos. Bamford, Jr., v. p.; John E. Tyler, sec.-treas.

Inc. Oct. 19, 1901, in Maine. **Cap.**, $8,000,000; shares $25 par. Annual meeting, first Monday in August.

Property: 32 claims, crown-granted, 1,183 acres, and a 92-acre mill, smelter and town site in Olalla, in the lower Similkameen and Keremeos camps, Osoyoos district, 4 miles from a railway. Lands show contact deposits between diorite and felsite, with orebodies in both, but mainly in the felsite. Twelve claims adjoin the town site of Olalla, and the Dividend group of 7 claims is 17 miles distant. Vein under development claimed by management to carry bunchy replacement deposits of chalcopyrite, with garnetite and magnetite gangue, in limestone, near intrusive contacts, assaying 1.5 to 5% copper, a little silver and $1 to $7 gold per ton.

Development: by 70′ shaft, and tunnels of 642′, 600′, 150′ and 112′, with 1,504′ of workings. There is no power equipment. Property idle, but under 25-year lease to Yale Development & Construction Co., organized among the stockholders of this company. No recent information.

OREGON & B. C. MINING & DEV. CO., LTD. **BRITISH COLUMBIA**

Office: 826 Northwestern Bank Bldg., Portland, Ore. Mine at Copper Mountain, near Princeton, B. C.

Officers: W. J. Peddicord, pres.; Walter T. Woodew, v. p.; G. Evert Baker, sec.-treas.-gen. mgr. at last accounts.

Inc. Jan. 6, 1906, in Oregon. **Cap.**, $150,000; shares 10c par; non-assessable; issued, 1,455,000 shares.

Property: 8 claims, crown-granted, 379 acres, well timbered, in the Yale district, B. C. Claims show diorite cut by diabase carrying pockets, stringers and disseminations of chalcopyrite, bornite and magnetite, without quartz. The ore carries from 1½ to 3½% copper and is said to show as high as $4.50 gold per ton.

Development: a 176′ tunnel, reported to show 40′ of mineralized ground carrying chalcopyrite and bornite, the last 8′ of the tunnel said to show an 8′ vein of solid ore, with 18″ to 2′ of talc gangue. Claims adjoin the Sunset mine and other properties of the British Columbia Copper Co. Management expects to resume development work. No recent information.

UTSIDER MINE **BRITISH COLUMBIA**

Owned by Martin Woldson, Spokane, Wash., and associates.

Property: 8 claims, at Maple bay, 35 miles from Stewart, formerly own as the Brown Alaska property which was equipped in 1916 with an rial tram from the mine to the beach. Several thousand tons of ore as- ying about 2.8% copper, were shipped during 2 years operations. Shows veral veins from 6 to 30′ in width. The ore is low grade and silicious.

Development: by tunnels, the longest about 800′. Five hundred feet of w work in 1918, opened an oreshoot 200′ long and 16′ wide, assaying 2% pper.

Equipment: includes two compressors. Power is supplied by a 24″ lton water wheel.

NAMA MINE **BRITISH COLUMBIA**

H. Giegerich, Kaslo, B. C., owner. The mine, W. of Whitewater, in Slocan country, is developed by 2,000′ of tunnels and drifts to depth of ′. Reported to carry a contact vein, from 3-5′ wide, that averages 120 oz. ver. Small shipments made to the Trail smelter. Developing with a all force. No recent information, probably idle.

RADISE MINES **BRITISH COLUMBIA**

Owned by R. Randolph Bruce, Invermere, B. C., Robt MacDonald, supt.

Property: in Windermere mining division, shows silver-lead carbonate in limestone. Ore assays 35 to 45% lead and 35 to 45 oz. silver per ton.

Development: by tunnels, with 7,000′ of workings.

Production: in 1918, shipped over 2,700 tons of ore, an increase of 400 s over previous years. Employs 35 to 40 men.

ONEER MINE **BRITISH COLUMBIA**

Sold in 1919 to Mining Corporation of Canada, which see.

RTLAND CANAL TUNNELS, LTD. **BRITISH COLUMBIA**

E. J. Hearn, sec., 214 Belmont House, Victoria, B. C.

Officers: R. I. Elliott, K. C., pres.; J. A. Mara, R. M. Stewart and J. Waghorn, directors.

Inc. Aug. 23, 1912, in British Columbia. **Cap.**, $700,000; shares 25c par.

Property: 10 claims, crown-granted, near Stewart, Portland Canal, B. Company was organized to drive a crosscut tunnel to intersect the series of Glacier Creek, previously worked in the Portland Canal and he Stewart Mining Co.'s properties. The tunnel, over 3,000′ long, has ar failed to disclose orebodies of permanent commercial values. Idle 1914, owing to lack of funds.

EMIER MINING CO., LTD. **BRITISH COLUMBIA**

Address: R. K. Neill, mgr., Premier mine, via Stewart, B. C.; or Ameri- Smelting & Refining Co., 120 Broadway, New York City.

Officers: R. W. Wood, pres., Fernie, B. C.; H. A. Guess, of A. S. & o., v. p. and managing director, 120 Broadway, New York; Minor C. , v. p.; with R. K. Neill, mgr., W. R. Wilson, H. B. Price, W. C. Potter, tors, W. E. Merriss, sec.; L. A. Chapin, treas.

Property: the Premier or Bush mine, with the 8 Cascade Falls claims, ed in 1910 by William Dilworth and the Bunting brothers. Claims 4 and 8 contain the Premier mine. The property is adjacent to the a line, on the east side of Cascade creek a tributary of the Salmon and 14 miles from Stewart at the head of Portland Canal.

he claims were formerly owned by the Salmon-Bear River Mining Co., Canadian Mining Journal' of October 7, 1919), which did a little ing and tunneling, but neglected to open the great outcrop of the ade vein now being worked. The claims were idle until the summer 4, when W. J. Rolfe examined them for a Canadian company. The was traced for 800′ down the hill, the surface stripped and the es cut at regular intervals all exposed pay ore, some high-grade. ine was then bonded to New York interests and work re-started in ter of 1914, in charge of H. P. Plate, who drove 3 exploratory tun- After 18 months work, at cost of $60,000, the option was given up.

In 1918 R. K. Neill examined the ground and bonded it for $100,000. A few yards crosscut work in the reopened tunnel showed that it paralleled the vein and was 6' from it. An 82' crosscut showed ore that averaged $ per ton in gold and silver. Recent work has blocked out 1,000,000 tons $30 ore.

Development: by an adit, 600' long, opening milling ore the entire length, also 2 shoots 70' long, assaying $100 and $200 per ton, respectively. Two lower adits, 250 and 710' below the upper one, were in 400 and 5 February, 1920. Diamond-drilling is under way from the upper adit.

Production: during the winter of 1918-'19, 512 tons of ore shipped, averaged $350 per ton in gold and silver. In 1919, 490 tons of ore yielded oz. of gold and 108,285 oz. silver.

In October, 1919, the American Smelting & Refining Co. obtained a interest in the mine.

In December, M. D. W. Bacon, of Los Angeles filed suit against M Neill, claiming a half interest in the mine, based on an alleged partnership between them.

The Premier is evidently a big potential producer, equal, if not greater than the Tonopah Divide in Nevada.

PRINCETON MINING & DEV. CO. **BRITISH COLUMBIA**

Address: Princeton, B. C.

Officers: F. F. Foster, pres.-mgr.; G. E. Murphy, v. p.; Perley Russell, sec.-treas.

Inc. Oct. 12, 1917, in British Columbia. **Cap., $150,000:** par 10c; non-assessable; 500,000 shares issued.

Property: the Copper Farm group of 3 claims, 156 acres, 4½ miles S. of Princeton, on Great Northern R. R.

On the upper levels the vein shows 6" of ore assaying up to 16% copper and 2 oz. silver. On the lower level the vein is shattered and displaced. It is said to have large tonnage of milling ore blocked out.

In 1918, only $1,000 was received from ore sales; operating expenses reported as $6,000. Work was resumed in December, 1919, and machinery is to be erected in the Spring of 1920.

PTARMIGAN MINES, LTD. **BRITISH COLUMBIA**

Address: care H. H. Johnson, Victoria, B. C.

Property: 8 claims at 5,300' elevation, 15 miles inland from the mouth of Bear River, on Bedwell Sound, Vancouver Island. Considerable development work was contemplated on this property, but all work was suspended shortly after the outbreak of the European war.

Claims are on Big Interior mountain and show gossan outcrops underlain by chalcopyrite-magnetite ore. No recent information.

QUATSINO COPPER CO. **BRITISH COLUMBIA**

Dead. Succeeded 1916 by Coast Copper Co., which see.

QUEEN BESS MINE **BRITISH COLUMBIA**

Owners: Clarence Cunningham, London, B. C., and Dr. J. G. Cunningham, Spokane.

Property: 9 claims, N. W. of Sandon, show silver-lead ore in three veins developed by tunnels and by a 300' shaft. Spent $50,000 for equipment in 1918. Shipments, reported to aggregate several hundred tons per month, are made to the Alamo mill at Alamo, owned by the same people. Record of output not available.

QUEEN BESS MINES CO. **BRITISH COLUMBIA**

Address: O. A. Thomas, pres. and mgr., Hoge Bldg., Seattle, Wash.; E. Max, sec., Kamloops, B. C.

Property: 6 claims on E. side of North Thompson river, 2 miles south of Blackpool Station on Canadian Northern Ry., said to show fissured greenstone, with silver-lead and zinc ores. Veins are from 2 to 6' wide.

Development: 300' shaft and several tunnels, with several hundred feet of workings in which sufficient ore was considered in sight to warrant building a 50-ton concentrator which began operating in February, 19

UEEN MINES, INC. **BRITISH COLUMBIA**

Address: E. V. Buckley, mgr., Salmo, B. C.

Property: the Queen, Yellowstone and Alexandria mines and a mill- e on Sheeps Creek, near Salmo, said to show several veins containing gold e. Recent work has been concentrated on the Queen group, developed by)' shaft with drifts run every 100'.

Equipment: includes 20-stamp mill.

Property was under option to Tonopah Belmont M. Co., in 1916.

Mine credited with total production since 1908 of $700,000 in gold.

Reported in 1919 that property had been bonded to A. W. McCune, Salt ke City. See Kootenay Belle Gold Mine.

JESNEL FORKS GOLD MINING CO. **BRITISH COLUMBIA**

See Bullion Mining Syndicate.

\MBLER-CARIBOO MINES, LTD. **BRITISH COLUMBIA**

Address: Three Forks, B. C.; Sandon P. O., B. C.

Officers: A. F. McClaine, pres.; Alfred Coolidge, sec.-treas; W. A. meron, supt., with J. F. Hall, C. L. MacKenzie, Johnston Armstrong and Cornwell, directors; A. E. Cable, asst. sec.; J. A. McPhee, asst. treas.

Cap., $1,750,000; shares $1 par; all issued. Listed on Spokane Exchange.

Balance sheet of December 31, 1918, covering 8 months, showed total re- pts of $83,708, which included balance forward, $20,833; ore in transit and smelter, $62,775. Disbursements were $38,777, including $17,233 for ore duction and development, $10,119 for general mine expense, and $7,606 for ling expenses. Net earnings amounted to $44,930. Cash on hand amounted $44,930, not including $10,800, ore on hand and in transit. At end of Jan- y, 1920, cash amounted to $20,000.

Dividends: 1915-'16, $52,500; 1916-'17, $87,500; 1917-'18, $17,500. The ıpany is reported as having paid 22c per share in as many consecutive install- ıts prior to suspension of dividends in 1903. Total dividends including Sep- ıber 1, 1917, said to be $542,500; exact records not available.

Property: 5 crown-granted claims, at the head of McGuigan creek, near ·ee Forks, Slocan mining district, has been operated for many years as a er-lead and zinc mine, and has been extensively developed at depth. On 14th level a 5,000' crosscut was run, but development there was disappointing, orebody apparently not extending that far. The Jennie and Last Chance ms were acquired for $65,000, of which the final payment of $25,000 was le in January, 1920.

Development: for last 8 months of 1918, amounted to only 200'. In uary, 1919, the superintendent stated that there was sufficient ore in sight ceep the mill operating for one year. In July, 1919, company purchased 2 ›ining claims, mentioned above, which are said to have 1,600' of the vein. November, 1919, company was mining ore from the 1,000', 1,200' and 1,300' ls.

Concentrator during last 8 months of 1918 treated 5,400 tons of ore, pro- ing 400 tons lead concentrate and 310 tons zinc concentrate.

The product is lead and zinc concentrates and crude lead ore. The first- s crude ore runs from 148 to 165 oz. silver and 50 to 58% lead, and the lead :entrate averages from 70 to 100 oz. silver and 32 to 40% lead. The zinc :entrate runs 35 to 37% zinc and about 25 oz. silver; it is sent to the lter at Trail.

Management is considered "honest, efficient, and extremely conservative," gives out but little information.

:O MINING & MILLING CO. **BRITISH COLUMBIA**

J. M. Harris, pres. and mgr., Sandon, B. C.; F. T. Kelly, sec.-treas., ion.

Inc. Sept. 18, 1896, in British Columbia. **Cap.,** $1,000,000; par $1; out- ding 958,200; non-assessable.

Gı earnings for 1918 were but $4,023, and operating expenses $3,020.

Dı **ends:** to 1919 totaled $332,492.

Property: the Reco mine, a formerly famous producer, 5 claims, near

Sandon, B. C. Claims show 2 fissure veins in slate and porphyry carrying silver-lead ore.

Development: by tunnels, with about 15,000′ of workings. Output in 1918 reported as only about 37 tons of ore.

RECORD MINING CO. **BRITISH COLUMBIA**

Address: Exchange Nat'l Bank Bldg., Spokane, Wash.

John R. Cassin, trustee; W. H. Turner, mgr.

Cap., $100,000; shares 10c par; 600,000 issued.

Property: the California mine, about 3 miles from Nelson, said to show a 4-8′ vein with 6″ shoot of gold-silver-zinc ore, developed to 500′ vertical depth with 1,300′ of workings. Shipments by former owners reported to total $50,000. In 1918 considerable development was done, but no shipments made. Employed about 8 men.

RED CLIFF MINING CO. **BRITISH COLUMBIA**

Idle. Bankrupt. Mine at Stewart, Skeena district, B. C. See description in Vol. XII.

RELIEF MINING CO. **BRITISH COLUMBIA**

Address: Erie, B. C., and Bayfield, Wis.

Officers: Frank Stark, pres.; H. J. Wachsmuth, v. p. and treas.; W. C. R. Liehy, R. J. Nelson and A. D. Westby (mgr.), directors; F. V. Holmes, sec.

Inc. March, 1914, in Arizona. **Cap.,** $300,000; shares $1; 250,000 shares issued. First Nat'l Bank, Bayfield, Wis., registrar. Annual meeting, first Tuesday in May.

Property: 6 claims, patented, 186 acres, on Salmon river, in West Kootenay, Nelson mining division, 14 miles N. from Erie B. C., said to show sulphide ore in a quartz fissure vein in diorite. Vein strikes N.-E. with dip of 85°. Pay ore occurs in shoots, from 50-170′ wide, and is said to average $ per ton in gold.

Development: to 416′ depth by 4 tunnels, each 1,200′ long.

Equipment: includes 14-drill compressor, pump, steam power and 75-ton cyanide mill.

Mine is credited with production of over $500,000. In 1918, shipments to Greenwood smelter amounted to 85 tons concentrates resulting from 1,241 tons ore treated. Eleven men were employed and $13,700 was spent on new equipment. In July, 1919, a fire destroyed much of the surface equipment. Work will be resumed.

ROCHER DE BOULE COPPER CO. **BRITISH COLUMBIA**

Temporarily idle.

Office: 419 D. F. Walker Bldg., Salt Lake City, Utah. Mine at Hazelton, B. C.

Officers: M. S. Browning, pres.; A. Fred Wey, v. p., and S. A. Douglas, directors.

Inc. Oct. 15, 1911, in Arizona. **Cap.,** $1,000,000; shares $1 par; non-assessable; fully issued, fully paid. Listed on Butte (Mont.) Exchange. Annual meeting, October 20.

Property: 6½ claims, crown grant, 325 acres with 50 acres millsite and 100 acres other lands, in Hazelton district, 9 miles from the Grand Trunk Pacific railroad.

Ore occurs in fissure veins in granite, veins having an E.-W. strike with dip of 60°. Five ore-shoots developed had average width of 5½′, 3,000′ long and proven to depth of 150′, according to management.

Development: by shaft and 800′ tunnel. Copper occurs as chalcopyrite and bornite.

Mine was under lease to Montana Continental Dev. Co. from 1917 to February, 1916, and during this time value of shipments totaled over $700,000.

Equipped: with 240-h. p. hydro-electric plant, aerial and surface tramways, compressor and saw-mill by lessees who worked mine on royalty basis.

For several years this mine was the most important in the district. The exhaustion of the developed orebodies in the upper levels caused a decrease

duction in 1918, and in October, 1918, the property was shut down until cons should become normal.

Production: from April, 1915, to the time it closed down, was 39,833 s of ore, containing 4,214 oz. gold, 62,865 oz. silver, and 5,746,306 lb. copper. detailed descriptions, see the 1914, 1916, 1917, and 1918 Annual Reports the Minister of Mines, B. C.

SEBERY SURPRISE MINING CO., LTD. BRITISH COLUMBIA

Head office: Nelson, B. C. **Operating office:** Sandon, B. C.

Officers: H. L. Hollis, pres.; W. C. Boyden, v. p.; Otto T. Langbein, treas. J. P. MacFadden, gen. supt.

Property: company operates the Surprise and Ivanhoe mines near don, shipping to concentrator at Rosebery, and the Canadian mine, now er development; it also operates the Bosun mine at New Denver, the nhoe mill at Sandon, and the Rosebery mill at Rosebery, B. C.

Bosun mine: near shore of Slocan lake, half-way between New Denver Silverton, was worked about 15 years ago, but only acquired by present ıpany in 1917. Vein is large and carries lenses of galena ore carrying zinc ıde, but running high in silver. The blende ore is said to assay 70 to 90 oz. er and between 45 and 55% zinc. Old workings consist of 5 tunnels driven the vein and opening it to a depth of 400'. Recent work comprises an exion of old workings and driving the lower or No. 6 tunnel a half mile to ı a depth of 800' on the vein. Sixty men employed. Production for 1918, ɔrted as 27,764 tons of ore; grade not given.

Surprise mine: 3 crown-granted claims, 93 acres, 2 miles N. E. of San-, has lead-zinc ore in a fissure vein in slate. Development: a main tunnel 3,000' long, with total workings of 15,000'. Mill feed assays 62 oz. silver, lead, and 16% zinc. Output in 1918 totaled 13,998 tons of ore.

Ivanhoe group: acquired under option in 1918, from **Minnesota Silver** located in the divide between Sandon and Four-mile crek, though in elopment stage, is producing. Its output in 1918 was 53 tons, but in Sepber, 1919, it had reached 1½ cars daily. The company also owns the Moni-Ajax, and Canadian groups in the same locality.

Rosebery concentrator: acquired in 1917, was built by original owners he Monitor, Ajax, and Bosun properties. Present owners have spent over 00 in remodeling the mill. Ivanhoe concentrator operated until February, on Surprise ore, then closed temporarily. All concentrates are shipped to United States under a long-term contract.

It is probable that the Surprise mine has passed its zenith, but with the ent efficient management and the acquisition of new properties the com- has a most promising future.

SSLAND KOOTENAY MINING CO., LTD. BRITISH COLUMBIA

Idle since 1904. **Office:** 325 Crown Court, Old Broad St., London, E. C., **Mine office:** Rossland, Trail district, B. C.

Officers: C. Williamson Milne, chairman; Dr. G. Schack-Sommer and el W. Harris, directors; W. S. Gregg, sec.

Inc. May 17, 1902, in Great Britain, as a reconstruction of Rossland-t Western Mines, Ltd., and Kootenay Mining Co., Ltd. **Cap.,** £150,000; es £1 par; issued, £148,607.

Property: 171 acres, at Rossland, carrying auriferous and argentiferous er ores, of low grade, and 113 acres placer at West Kootenay. The com- also owns 2,615 shares of the Santa Eulalia Development Co., Ltd., owning Nueva Chihuahua property at Santa Eulalia, Chih., Mex. Revolutionary conns have prevented any work for several years in Mexico.

'H MINES, LTD. BRITISH COLUMBIA

In 1917, company went into voluntary liquidation and property was offered ale. Reported in March, 1919, that company was being reorganized. No ls of officers or capital.

Property: the Ruth and Hope mines, near Sandon, were worked during and small shipments made. In September, 1919, reported that the vein

had been cut in the lower tunnel 600′ from the portal, and where cut had a width of 8′.

SALMON BEAR RIVER MINING CO. **BRITISH COLUMBIA**

Property: the Bush mine, now operated by the Premier Mining Co. Ltd., which see.

SILVER BELL MINE **BRITISH COLUMBIA**

Owners: R. F. Green and Sam Green, Kaslo, B. C.

Property: a high-grade silver-lead mine on S. fork of Kaslo creek. **Development:** by tunnels. Several carloads of ore shipped in 1919.

SILVER CREEK MINES, LTD. **BRITISH COLUMBIA**

Address: Revelstoke, B. C. D. Woolsey, mgr., Albert Canyon, B. C.

Officers: J. H. Brasetti, pres.; D. Molsey, v. p. and mgr., with Patrick Treanor, directors; H. C. Forsyth, sec.; J. B. Watson, treas.

Inc. Sept., 1918, in British Columbia. **Cap.,** $750,000; par 50c; issued 700,000 shares; non-assessable.

Property: the Woolsey group, 11 claims, unpatented, about 500 acres, 7 miles by trail from Albert Canyon Sta. on C. P. R., shows a fissure vein in slate and gneiss. Ore is silver-lead, with a quartz gangue.

Development: by tunnels. Property is a promising prospect.

SILVER CROWN MINING CO. **BRITISH COLUMBIA**

Office: 505 Rookery Bldg., Spokane, Wash. **Mine office:** Trout Lake, B. C. **Officers:** Fred Hamilton, pres.; A. C. Bartels, v. p.; A. Herman, sec.-treas., with Geo. Skore and H. C. Weyerhoist, directors.

Inc. Feb., 1917, in Washington. **Cap.,** $125,000; shares 10c par; assessable; 852,250 issued.

Property: 3 claims, 150 acres, in West Kootenay mining division, B. C.

Geology: fissure vein in granite and limestone, dipping 45° and pitching N. W. Shoots are from 18 to 36″ wide. Ore contains silver and lead, assaying $125 per ton. **Development:** by 1,300′ tunnel to depth of 550′.

Production: in 1917 was $65,000. No recent information; probably idle.

SILVERED-COPPER MINING CO. **BRITISH COLUMBIA**

Office: 1621 Madison St., Denver, Colo. **Mine office:** Aldermere, Omineca district, B. C.

Officers: F. Thoman, pres.; C. W. Peaslee, v. p.; C. A. Hubbard, sec.-treas.; C. E. Thoman, gen. mgr.

Inc. March 23, 1908, in Arizona. **Cap.,** $1,000,000; shares $1 par; non-assessable; issued, 568,754 shares. Debentures, $50,000 authorized and issued.

Property: 6 claims, 300 acres, in the Hunter Basin, Omineca district, about 15 miles from the railway at Telkwa, shows a bedded agglomerate of volcanic rocks, chiefly diorite, beds standing almost perpendicular and strike N. 35° E. Orebodies occur as true fissure veins in diorite. Ores contain bornite and chalcocite. Three cars ore shipped to smelter in 1914 said to have averaged a little over 100 oz. silver and 5% copper per ton.

Development: by a short tunnel, numerous pits and open cuts, with a total of about 200′ of workings.

SILVER HOARD MINING CO. **BRITISH COLUMBIA**

Reorganized as the Dellie Mining & Milling Co., which see.

SILVER KING MINES, LTD. **BRITISH COLUMBIA**

Office: Trail, B. C. **Mine address:** Nelson, Kootenay Lake, B. C.

Officers: Jas. J. Warren, pres.; S. G. Blaylock, v. p.; T. W. Bingay, sec.; W. M. Archibald and R. S. Lennie, directors. Company is owned jointly by the Kootenay Bonanza Co., and the Consolidated Mining & Smelting Co., of Canada, Ltd., in the proportion of ¼ and ¾, respectively.

Property: 5 claims, on Toad mountain, back of Nelson, B. C., including the old Silver King mine, formerly owned and operated by the Hall Mining & Smelting Co., Ltd. Mine is opened by a shaft to the 10th level, showing 3 well-defined veins in diabase schist. The ore occurs where the veins are intersected by 2 dikes, and in the altered surface zone is principally bornite, with tetrahedrite, iron pyrites and silver occurring in the unaltered zone below. Gold is present

small amounts. Considerable ore was extracted in the past from above the level in the Main vein. The South vein and the K. vein were practically unched. Ore reserves are estimated at 100,000 tons. Ore in the Main vein has n proven to a depth of 1,130′ by diamond drill borings.

Equipment: includes electrical motors of 50-h p., a 100-h. p. electric np, an 1,850′ tramway, and all necessary mine buildings. Shut down 1915-16. 1918 mine was kept unwatered and 6,180′ of diamond-drilling was done. ore was shipped.

LVERSMITH MINES, LTD. **BRITISH COLUMBIA**

Offices: Sandon, Slocan district, B. C. John B. White, pres., 1017 Paul- Bldg., Spokane, Wash.; Oscar V. White, gen. mgr.

Company is the successor of Slocan Star Mines, Ltd., which went into liquiion in 1917. Present company organized in 1918, acquired entire assets of can Star Mines by assuming a $98,000 bond issue and a $24,000 floating inedness. Shareholders of Slocan Star were given share for share, upon ment of 3½c additional. For every $5 so paid in, shareholders received one re of preferred stock.

Cap., $750,000, of which $150,000 is 7% preferred, par $5, and $500,000 mmon stock, par 20c; assessable, of which $165,193 and $103,044 issued, rectively. Preferred stock must be retired before dividends can be paid upon mmon. In February, 1920, preferred shares could be retired at rate of $5 h without interest, and common to be issued at 15 cents. At end of 1919 standing bonds were reduced to $40,000. Cash assets at end of 1919 were 513, plus $40,000 for concentrate in transit. The profit in 1919 was $41,754.

Failure of Slocan Star Mines is laid to excessive construction costs due to milling, hydro-electric, and other equipment, failure to keep development ad of extraction, and largely lack of sufficient capital.

Property: at Sandon, Slocan district, consists of the Slocan Star and bbit Paw groups of 12 crown-granted claims, which were involved in the tracted and costly apex litigation between the Star Mining & Milling Co., intiff, and the Byron N. White Co., in the Supreme Court of B. C. for about years. Holdings also include a patented millsite and extensive water rights.

Ore carries silver, lead and zinc, occurring as large shoots in the Slocan r lode, a strong fissure vein in slate, traceable over a mile. This strikes E.-S. W., dips S. 47° and is 6 to 8′ wide, bulging in places to as much as across.

Development: by 10 main tunnels, No. 10, the lowest, is 2,300′ long; l workings over 15,000′. Reserves have been practically exhausted down to level. From the 6th level to surface several shoots of sphalerite with side- gangue were left intact in former years. Reported in May, 1919, that the rk disclosed a new oreshoot 400′ long, that had a width of 7′ for half this dice and averaged 4′ wide for the other half. It continues up to the 200′ level, a fault cuts it off on the 400′ level. Shipments totaling 500 tons are said to e averaged $121 per ton. In June, a new orebody 3′ wide was reported cut the 8th level. On No. 10 level the main shoot is 450′ long and 4′ wide. Reves were given as 90,000 tons at end of 1919.

Equipment: added recently includes 15-drill compressor, 1,500-h. p. elecal plant, 4,000′ aerial tram connecting mill with shipping bins at Sandon, and ation units added to the 100-ton concentrator, increasing capacity to 250 tons l is level with No. 10 adit. There are 64 men employed.

Production: in 1919 was $219,432 from crude ore shipped and concenes from 14,235 tons milled. Expenses were $175,382.

VER STANDARD MINING CO. **BRITISH COLUMBIA**

Office: 506 Winch Bldg., Vancouver, B. C. **Mine office:** W. C. Norrieventhal, New Hazleton, B. C.

Owners: J. W. Stewart, Angus Stewart, D. McLeod, and the estate of A. L. McHugh.

Gross earnings in 1916 were $49,000, and $65,000 in 1918.

Property: the Silver Standard mine, 14 crown grant claims, 700 acres, iles N. of New Hazelton, in Omineca district, said to show 9 fissure veins

in calcareous sandstone, dipping 62° and pitching N. 50° E. Veins are fr
12 to 72" wide and 3 of them carry profitable ore. Shoots are 100 to 200' lo
Ore is a sulphide, mill ore averaging 0.10 oz. gold, 30 oz. silver, 3% lead a
11% zinc.

Development: by 1,300' tunnel to be extended 200', and total of o
4,000' of workings to 500' depth. Mining is by shrinkage stoping. Reser
are 15,000 tons. No. 4 vein has a continuous shoot over 400' long.

Equipment: includes Jenckes hoist, 350 cu. ft. compressor. In 191
50-ton concentrator of the Faust type was completed on Two Mile creek, abo
miles from the mine. Ratio of concentration is 5 to 1. Ore is hauled by tru
from mine to mill. In 1918 lead concentrate assayed ½ oz. gold, 200 oz. s
55% lead and 4% zinc, shipped to Trail, B. C. Zinc concentrates that ave
0.3 oz. gold, 140 oz. silver, 35-40% zinc, and 5% lead, were shipped to U. S
Zinc Co., Okla.

Production: in 1916, 707 tons of ore yielded 444 oz. of gold, 269,624 o
silver, 110,868 lb. lead, and 297,372 lb. zinc. The 1917 figures are not availab
In 1918, 3,370 tons of ore were milled, producing 185 tons lead and 500 tons zi
concentrates, containing approximately 600 oz. gold, 450,000 oz. silver, 950,000 l
lead, and 860,000 lb. zinc.

The property was closed down early in 1919, but work was resumed May
The mine is well located for cheap mining; wood and water are plentiful and ra
way transportation is within a short distance.

SILVER TIP MINING & POWER CO. **BRITISH COLUMBIA**

Office: J. H. Beattie, 718 Green Bldg., Seattle, Wash.

Officers: at last accounts, A. Julian, pres.; G. B. Gilfillan, v. p.; M. S
Davys, engr.

Inc. Jan. 15, 1910, in Washington. **Cap.**, $1,000,000; shares $1 par; 615,8
issued. Bonds, $700,000 of 7%.

Property: the Lake Side mines, 557 acres, Skagit county, Wash., ad
the Hewitt and Lorna Doone mines in Slocan district, B. C., acquired fro
Silverton Mines, Ltd., in 1917, and which are now operated under lease a
bond by Clarence Cunningham. See Hewitt-Lorna Doone Mines, in this volu

SILVERTON MINES, LTD. **BRITISH COLUMBIA**

In 1917 assets were transferred to the Silver Tip Mining & Power Co.
Described in Vol. XIII.

SIMILKAMEEN CONSOLIDATED COPPER CO.
BRITISH COLUMBIA

At last accounts property was worked by Pacific Syndicate, Ltd., on wh
there is no recent information. Company, etc., described in Vol. XII.

SIMILKAMEEN MG. & SM. CO., LTD. **BRITISH COLUMBIA**

Idle. No recent information. Described in Vol. XIII. Address, at la
accounts, care Bank of British North America Bldg., Vancouver, B. C. M
near Princeton, B. C.

SITTING BULL MINING CO. **BRITISH COLUMBIA**

Address: F. W. Wonn, Seattle. E. D. Smith, supt.

Property: the Sitting Bull mine on Boulder creek, Windermere mini
division, said to have high-gr[illegible] silver-lead ore.

Development: on 5 le[illegible] tunnels. In March, 1919, company had
tons of o[illegible] for shi[illegible] averaged 132 oz. silver and 29% lead.

SLOCA[illegible] MINES **BRITISH COLUMBIA**

Went[illegible]ion [illegible] ve assets acquired by Silversmith Mi
Ltd., whic[illegible]

SOUTH [illegible] **BRITISH COLUMBIA**

A subsi[illegible] ines, Ltd., of Cobalt, O
A. S. Holme[illegible] Islands, B. C.

Property: [illegible] quartz veins,
with commercia[illegible] 10' wide and
says $8 to $15 gol[illegible]

Development:
50 and 100 levels.

Equipped with a small, efficient plant, including a compressor. Owners hope levelop sufficient tonnage to warrant building a mill.

OKANE MINING & DEV. CORP. BRITISH COLUMBIA

Office: Nelson, B. C.

Officers: J. A. McLean, pres.; F. A. Starkey, v. p.; Chas. F. Caldwell, .; C. M. Leamonth, sec.; W. F. Baker, treas., with H. T. Hodge, and M. C. nahan, directors. C. M. Moir, mgr.

Inc. May, 1917, in British Columbia. **Cap.**, $1,500,000; par $1.

Property: the Monarch mine, 7 claims, in Nelson mining division, 37 es from Trail, said to show 2 fissure veins between diorite footwall and nite hanging-wall. Vein matter consists of quartz, calcite, pyrite, and chal- yrite. No. 1 vein is proven for 800′ by open cuts and pits, and varies up 20′ in width. Several cars of ore shipped assayed 3½% copper, and $1.50 to 0 gold and silver per ton. No. 2 vein opened by open cuts and 150′ tunnel, aid to be traceable for a mile on surface. Shipments amounted to about 170 s in 1918.

OKANE ROCHER DE BOULE MINING CO. B. C.

Officers: P. J. Jennings, pres., 1314 Addison St., Spokane, Wash. P. A. dy, v. p.; John J. Jennings, sec.-treas., at last accounts.

Inc. April, 1916. **Cap.**, $100,000; shares 10c par; 600,000 shares sub- bed by incorporators, balance in treasury.

Property: 7 claims, including Spokane & Washington and has bond on y West group, near New Hazelton, B. C. Ore so far developed said to y 7% copper, $2 gold and 15 oz. silver per ton.

Development planned is 1,000′ drift tunnel on vein giving 1,000′ back at and cutting beneath four ore-shoots. In 1917, $30,000 was to be spent in alling compressor plant, power station on Mission creek, an aerial tram and on road, an ambitious program for this amount of money.

No recent information; probably idle.

ANDARD SILVER LEAD MINING CO. BRITISH COLUMBIA

Offices: Empire State Bldg., Spokane, Wash., and Silverton, B. C.

Officers: W. J. C. Wakefield, pres.; Geo. H. Aylard, v. p.-gen. mgr.; s. Hussey, sec.-treas., Victoria, B. C., with Henry White and W. A. Corey, ctors.

Inc. Dec., 1910, in Washington. Operated under present management e 1911. Controlled by the Finch-Campbell-Clark estates of Spokane. ., $2,000,000; shares $1 par; fully paid; non-assessable; all issued. An- l meeting, first Tuesday in May. Security Transfer & Registrar Co., New k, registrar and transfer agent. Listed in Spokane and on New York b.

Annual report for 1918 showed a profit for the year of $114,764, compared $377,494 in 1917. The surplus increased from $202,801 to $317,565. In 1919, the mine earned a profit of $8,788, but June operations were at a of $15,637. Balance at end of 1919 stated to be about $300,000.

Dividends: 1912, $425,000; 1913, $650,000; 1914, $475,000; 1915, monthly at of 2½% commenced September 10, total for year, $250,000; in 1916, $600,- in 1917, $300,000; none since; a total of $2,700,000 to 1920.

Property: 10 full claims, 6 fractions, 600 acres, 2 miles N. E. of Silver- located on Slocan Lake, B. C. The claims carry fissure veins in slate and bitic schist. Ore carries silver, lead and zinc in a quartz-pyrite gangue. occurs as gray copper and ruby. The orebodies occur in the form of ular masses along the vein, varying in width from 1′ to 25′.

Development: tunnels numbered from 1 to 7, inclusive, open the to a depth of 800′; tunnel No. 8, now being driven, gives an additional 400′ e reserves are not reported, but management claims that reserves any years of profitable operations. By December, 1919, a new ore , 5 and 7 levels had been opened for over 300′ in length. The idth, and averages 16% zinc, 5% lead and some silver. es are readily concentrated and constitute the bulk of the wever, a large amount of material in the vein in

which ruby silver and zinc blende occur as streaks and coatings and in which galena is found in a very finely divided state in graphitic schist and slate. Such ores are treated successfully by using Wyman pneumatic flotation machines which have given a total recovery of 93-95% of the value in the mill feed. The ore as sent to the mill averages 24% lead, 35 oz. silver and 14% zinc.

Equipment. 150-ton concentrator, hydro-electric power plant on Four Mile creek and an 8,000′ tramway connecting mine and mill. Seventy-five men employed.

Production: in 1918, silver-lead ore realized $112,898, and zinc ore, $227-338, a total of $340,236, compared with a total of $881,616 in 1917. Other years follow:

Year	Ore, tons	Silver, oz.	Lead, lb.	Zinc, lb.
1916	69,764	.....	.....	.....
1915 (b)	39,447	.....	.....	.....
1914 (a)	49,720(b)	1,050,000	10,000,000	5,000,000
1913	13,959	1,081,849	17,988,805	.....
1912	9,702	811,823	13,497,260	.....

(a) Approximate production. (b) Gross; tons milled, 44,806 in 1914, 35,920, in 1915.

Mill shut down by labor trouble for four months preceding August, 1919, when work was resumed and concentrates shipped.

STAR MINING & MILLING CO. **BRITISH COLUMBIA**

See Silversmith Mines, Ltd.

SUNLOCH MINES, LTD. **BRITISH COLUMBIA**

Officers: R. H. Stewart, pres. and mgr.; W. P. Tierney, v. p.; with W. J. Wilson, H. Rindal, Stuart Campbell, and R. J. Winters, directors, all of Vancouver.

Inc. 1917. **Cap.,** $1,000,000; par $1.

Property: Sunloch group, 22 claims, on Jordan river, 42 miles by road from Victoria; also an option on adjoining Vulcan group. A logging railway connects the property with tidewater.

Development: has been confined almost entirely to one claim, Sunloch No. 6, on which there are 3 well-defined ore-bearing zones, known as the River, Cave, and Archibald lodes. A tunnel on the River zone cut 5′ of 1.9% copper ore, 20′ of 3.7% ore, and 3′ of 3.8% ore, partly opening 280′ along vein at a depth of 240′. An adit on the Cave zone passed through 60′ of 4% ore; at 180′ a crosscut S. cut 60′ of 0.9% ore, 20′ of waste, 36′ of 2.58% ore, including 11′ of 5.1% ore, this at a depth of 240′ from surface. A diamond drill hole, 150′ farther in than the crosscut and at a depth of 400′ cut about 15′ of ore assaying 0.65 to 7.9% copper. Less work has been done on the Archibald zone, but it is considered equally promising. Work on opposite side of river shows that the Cave zone continues into the Vulcan group.

Development on the property has shown that property has merit and that warrants further development. Reported in October, 1919, that Cons. Mng. & Sm. Co. is considering building a 500-ton mill to treat the ore.

SURF INLET GOLD MINES **BRITISH COLUMBIA**

Corporation sold its property to Belmont Surf Inlet Mines, Ltd., for 20% of the capital stock of that company.

SURPRISE MINE **BRITISH COLUMBIA**

Owned and operated by Rosebery Surprise Mining Co., which see.

TACOMA STEEL CO. **BRITISH COLUMBIA & WASHINGTON**

Tacoma Bldg., Tacoma, Wash. **Mine offices:** Van Anda, Texada I., and Darrington, Snohomish county, Wash.

R. Balkwill, pres.; E. M. Shelton, v. p.; A. F. Eastman, sec.-tr.; D. C. Stephens, supt.

Organized originally $5,000,000). Paid five $35,000 dividends [illegible] at Darrington, carrying gold-copper ore, idle for [illegible] coal-bearing properties in Washington, 208 acres of [illegible]

s lands on Vancouver Island, B. C., and the Marble Bay copper mine, 3,000 res. crown-granted, near Marble Bay harbor, at the northern end of Texada and.

The Marble Bay mine, about one-fourth mile from the Cornell and Copper ieen mines, has ore of similar nature occurring as lenticular shoots, carrying gentiferous chalcopyrite, with bornite, in a garnetiferous marble. The mine developed by a 1,600′ three-compartment shaft, showing, on the lower levels, vein of 18′ width, with copper values unchanged and gold values gaining with pth. Recent development work mainly between 1,600′ and 1,750′ below sea el.

Development: work in 1919, entirely by diamond drilling between 16th d 17th levels.

Equipment: includes steam and electric power, with 5 hoists, 5-drill and -drill air compressors. There is a wharf, on Marble Bay, having large ore nkers, connected with the mine by a ground tram. In connection with the ne there is a limestone quarry and 4 kilns, with daily capacity of 300 bbls. lime.

Production: 11,697 tons of gold-silver-copper ore in 1917; 626,422 lb. of pper in 1918. Employs 80 to 100 men.

ARHEEL COPPER CO., LTD. **BRITISH COLUMBIA**

C. J. Lincke, supt.

Property: the Tarheel group of claims, near Golden, B. C., on the ddle fork of the Similkameen river, Golden mining division. Reported in ptember, 1919, that company expected to ship several carloads of ore that ould assay about 15% copper.

ASSOO MINING & SMELTING CO., LTD. **BRITISH COLUMBIA**

Out of business. Property now owned by F. C. Elliott, of Victoria, B. C., d J. E. Cortell, of Seattle, Wash., described , Vol. XIII.

AYLOR MINING CO., LTD. **BRITISH COLUMBIA**

Office: Victoria, B. C., and at Dolly Varden mine, Alice Arm, B. C.

Officers: A. J. . Taylor, pres.; with R. P. Butchart, H. C. Chiene, C. M. owlson, and J. F. Tener, directors. D. E. Young, gen. mgr.; R. B. McGinnis, st. supt.; H. S. Brownin, accountant.

Inc. in June, 1919, with capital of $1,500,000, $1,200,000 paid up, by the aylor Engineering Co., to take over the property of the Dolly Varden Mines . This ended a legal squabble that tied up the property for some time, and as a much discussed matter in the Provincial Legislature. The Taylor Engiering Company constructed a railway from tidewater to the mine, but the ines company failed to pay for the work done, which drove the Engineering mpany into financial distress as it owed $462,500 borrowed to pay construcn bills. Meanwhile, the Dolly Varden company gave the Temiskaming Ming Co., of Ontario, an option on the mine for $900,000. Finally, the Legislature ve owners 10 days in which to pay off all labor claims and the Engineering mpany's account. The D. V. mines company defaulted, so the Engineering mpany took possession, paid off the debts and organized the Taylor Mining . for development of the mine. In December it was announced that the lidity of the legislation ordering the transfer was to be contested in the ominion courts.

Property: the Dolly Varden and Wolf silver mines, 480 acres of pat- ted ground, on the Kitsault river, 18 miles from Alice arm, near Granby bay. ilroad connects mine with tidewater, 18 miles distant. Mine is described in ng. & Min. Jour." of March 13, 1920, by Robert Dunn.

Geology: ore occurs in a shear zone in andesite, the ore being con- ered as secondary. Near the surface native silver occurs in extremely rich eaks. Lower down, ruby, silver, argentine, and stephanite also occur and at 0′ in depth ruby silver is the principal mineral. Fine-grained pyrite, carrying ld ues occurs from surface to bottom level (300′ in 1919). Faulting g is common and make a complex structure.

to depth of 300′ by 3,000′ of drifting in several tunnels, Besides this tunnel work, 9,000′ of diamond drilling has

shown ore to depth of 500'. The work so far done is said to have developed about 45,000 tons ore, an amount which will probably be increased by further work. Samples of shipping ore gave 244 oz. silver, 18% lead, 12.4% zinc.

Equipment: includes 18-mile railway from mine to Alice Arm and 2.00 aerial tram, etc. The railway was extended to the Wolf mine in 1920.

Company was reported to be planning a 150-ton concentrator with final separation by flotation, 700 h. p. hydro-electric plant, etc.

Production: total shipments amount to 7,000 tons, and silver output in 1919, was 400,336 oz. from 6,373 tons of ore.

The Wolf group: 2 miles N. of the Dolly Varden, on opposite side of river, also belongs to the Dolly Varden group. Ore is similar to the Dolly Varden, though a little lower in silver.

Development: consisting of 85' of tunnels, 770' of open cuts, and 4,80 of diamond-drilling has shown probable existence of 120,000 tons ore containing about 1,800,000 oz. silver, and over 400,000 tons of lower-grade ore.

TIDEWATER COPPER CO. **BRITISH COLUMBIA**

A subsidiary of the Alaska British Columbia Metals Co., 74 Broadway, New York. H. B. Price, pres.-gen. mgr. The A. B. C. Co. owns 90% of entire stock issue. Dan M. Drumheller, Jr., supt.

Inc. in Washington. **Cap.**, $1,000,000; par $1. **Bonds:** $300,000, 7-year 7% first mortgage conv., guaranteed by A. B. C. Co.

Property: 8 claims, 300 acres, also an 80-acre manufacturing site on the beach, 200 miles N. W. of Seattle, Wash., by boat to Sydney inlet on west coast of Vancouver Island, B. C. Property formerly known as the Indian Chief claims, has been worked by many different companies since 1897, and is said to have produced 15,000 tons of 4½% copper ore. Ore is a contact deposit of garnetized limestone containing bornite, with small quantities of chalcopyrite and chalcocite, capping a granodiorite hill.

The present company acquired the property in 1916, and in 1917 built a 100-ton flotation mill, operated a few months at a considerable loss, due, it is reported, to unsatisfactory machinery, and to an irregular ore supply, often of low grade. A new 300-ton mill was under construction, March, 1920. A 3,000' aerial tram connects the mill and mine, which is opened by tunnels.

The Provincial Mineralogist reports that (Annual Report of Minister of Mines of B. C. for 1917): "The south orebody in the No. 2 adit has a length of 480' with a width of 4' to 40' and a vertical development of 180'. Until further work is done, no reliable estimate of tonnage is possible. There are no well-defined walls, but vein material merges into barren rock similar to the gangue, and this change is erratic and irregular."

The company claims to have 500,000 tons of developed ore assaying 2% copper, 1 oz. silver, and 40c gold per ton, with a net value of $4 per ton. Production costs when milling 200 tons of $8.20 ore per day are estimated by company (January, 1919) as follows: Mining, $1; milling, $1.25; tramming, 10c; freight and smelting, $1; new development, 30c; amortization, 10c; overhead, 25c; a total of $4 per ton, an estimate which is regarded as far too low. (See Annual Report of Minister of Mines, British Columbia, for 1917, pp. 248-250, and in the 1918 report, p. 266.)

TRAIL SMELTER **BRITISH COLUMBIA**

Owned by Consolidated Mining & Smelting Co. of Canada, Ltd., and described under that title.

TREASURE MOUNTAIN MINING CO. **BRITISH COLUMBIA**

Officers: W. B. Dornberg, pres.; J. C. Edwards, v. p.; W. W. Dreyfus, sec.-treas., all of Spokane, Wash.

Cap., $1,000,000; par $1; non-assessable.

Property: 6 claims, 20 miles N. of Tulameen on Kettle Valley R. R., Similkameen division, Yale mining district, shows veins with silver-lead ore developed by several tunnels, longest over 800', with about 1,500' of workings. Ore is said to be of good grade. Property is 20 miles from railroad. No information since 1918.

'RUE FISSURE MINING & MILLING CO. BRITISH COLUMBIA

Officers: G. F. Park, pres.; T. W. Mitchell, sec., both of Cincinnati,)hio. A. C. Houston, supt., Ferguson, B. C.

Cap., $2,500,000; par $1; non-assessable.

Property: 8 crown-granted claims, and 160-acre millsite on Trout Lake ivision, West Kootenay district, ½ mile from Ferguson, shows silver-lead-inc ore with some gold, which assays to 75 oz. silver, 35% lead, 25% zinc, and .15 oz. gold. Developing in 1918 and 10 men employed.

'YEE COPPER CO., LTD. BRITISH COLUMBIA

Smelter and assets sold in December, 1916, to the Ladysmith Smelting Cor-oration, Ltd., which see.

'NION MINING CO. BRITISH COLUMBIA

Address: Grand Forks, Lewis Johnson, part owner and mgr.; company ot incorporated.

Property: 4 claims, 150 acres, Gloucester camp, Grand Forks division, 'ale district, shows gold-silver ore.

Development: by 4 tunnels, with several hundred feet of workings. 'he mine is 27 miles from rail, and transportation and smelting charges absorb ost of the value. Owners have been trying to raise money to build a mill.

Production: in 1916, 605 tons of $35 ore; in 1917, 751 tons shipped re-urned $31.80 per ton; in 1918, 153 tons assaying $6.20 to $12.80 gold and 31-50 z. silver per ton.

'NITED METALS MINING CO. BRITISH COLUMBIA

D. J. Hancock, supt.

Property: 3 claims, 14 miles up Illiance river, showing numerous quartz eins in sedimentaries; continuity of ore-shoots in length and depth is very rregular. Mineralization consists of galena and zinc-blende, carrying high sil-er values. Property has been undergoing exploration, no ore being shipped, hough high-grade ore has been sacked, ready for shipment.

Reported in September, 1919, that all right, title, and interest in the com-any had been sold to D. J. Hancock for $25,000, and that the only interest the tockholders have remaining is the division of the money to be paid by him.

JTICA MINES, LTD. BRITISH COLUMBIA

Office: Kaslo, B. C.

Officers: Chas. F. Caldwell, pres.; T. R. French, sec.-treas., with H. R. Vade, F. T. Abey, and V. D. Williamson, directors. W. C. Sivyer, R. H. Voor-ees and W. Tolman, directors.

Inc. in British Columbia. **Cap.,** $2,000,000; shares $1 par; non-assessable; ,600,095 issued; 200,000 shares offered at 10c each in December, 1919, to pay ressing debts. Auditors' report, January 12, 1918, showed cash on hand, $213; uildings, equipment, etc., $28,470; mine, $1,427,945; stock discount, $184,628; otal assets, $1,690,310. Liabilities included accounts payable, $6,994; bills pay-ble, $7,500; profit and loss, $75,690. An initial dividend of 2c was paid in June, 917, followed by 2c in September. These two dividends, together with fact that melters refused to accept the ore on account of the high zinc content, left the reasury in a depleted condition at end of year.

Property: silver-lead-zinc holdings in Ainsworth district, B. C.

Development: by tunnels to 1,200' below vein outcrop. Workings cover ver 6,000'. In 1918, the mine operated only about 3 months, due to lack of unds. Output was 222 tons of ore, which produced 13,661 oz. silver, and 10 ons lead. Operations were suspended in April, 1919, but in November some re was being mined.

/ALDEZ ISLAND COPPER CO. BRITISH COLUMBIA

Address: Victoria, B. C.

Officers: F. E. Rosher, pres.; C. B. Rosher, sec., with G. A. Fraser and E. Brammer, directors. T. H. Kerrnish, supt.

Cap., $500,000; shares non-assessable.

Property: 19 claims, Copper Mt. group, about 730 acres, at head of Gowland harbor, on Quadra Island, 120 miles N. W. of Nanaimo, is one of oldest locations on coast, but has never been thoroughly prospected until re-

cently. Ore is chiefly chalcocite and bornite, occurring along joint planes and shear zones, apparently as isolated ore bodies of lenticular shape. The Senator claim is said to have the best showing, and yielded most of the ore shipped in 1918. Property needs further development. See Annual Report of Minister of Mines, British Columbia, 1918.

VAN ANDA COPPER & GOLD MINES CO., LTD. B. C.

Inactive. H. W. Treat, gen. mgr., and L. Goodacre, trustees; Jas. Ryan, agt., Van Anda, B. C. Company is presumably alive, but not operating.

Property: 20 claims, crown-granted, 840 acres, including the Copper Queen.

The Copper Queen mine has lenses of rich ore, mainly bornite with some chalcopyrite along a diorite-limestone contact. The deposit has one main ore-shoot, 150′ long and 30′ wide. See Texada Id., B. C., by R. G. McConnell, Geol. Survey Canada Memoir 58, 1914, pp. 566-64.

The Copper Queen shaft is 600′ deep with a winze 240′ deep on the 300′ level. In 1918 the mine was operated under lease by Thomas Davis, of Seattle, Wash.

VANCOUVER MINING DEV. SYNDICATE BRITISH COLUMBIA

Address: Vancouver, B. C.

Directors include Nicol Thompson, A. M. Whiteside, J. H. Gross, A. H. Wallbridge, and A. E. Smith, all of Vancouver.

Inc. in 1919. **Cap.,** $500,000; $100,000 issued. The Syndicate was formed to bring mining prospects of British Columbia to the attention of the investing public, helping prospectors who have located promising properties, but who lack the means to develop them.

VAN ROI MINING CO. BRITISH COLUMBIA

Controlled by Le Roi No. 2, Ltd., Rossland, which holds 63,193 ordinary and 10,483 preference shares, out of 90,000 and 30,000 issued.

Office: Leonard Rowell, 4 Broad St. Place, London, E. C. 2, Eng.
Mine office: Silverton, B. C.

Directors: Lord Ernest Hamilton, chairman; A. B. Dealtry, T. Lloyd, supt.

Inc. July 9, 1908. **Cap.,** £34,500 in 30,000 £1 pfd. and 90,000 1s. ordinary shares.

Property: the Vancouver group of claims in Slocan district, B. C. Operations were resumed early in 1917 at mine and mill. Ore contains silver, lead and zinc.

VERONICA GOLD MINING CO. BRITISH COLUMBIA

Inc. 1916. **Cap.,** $250,000; par 25c. T. T. McCredy, Dr. J. W. Talledge, D. A. McIntosh, Geo R. Leask, Fred Bryan, and Ed. McMahon, of Spokane, Wash., incorporators.

Property: Eclipse group of 6 claims, adjoining Homestake group on Perry creek, Southeast Kootenay district. No recent information.

VICTOR SILVER LEAF MINING CO. BRITISH COLUMBIA

Officers: R. Abernethy, pres.; E. R. Abernethy, sec.; C. E. Berry, treas., all of Spokane, with Geo. F. Gundry, and John Tospon, directors.

Cap., $1,500,000; par $1; non-assessable.

Property: 3 unpatented claims, 10 miles E. of Fort Steele, said to show gold-silver-lead-zinc ore in 3 shoots. No shipments have been made, though sorted ore is said to assay $100 per ton.

Development: by tunnels, longest 400′. Early in 1918 company was planning to erect a mill, but funds failed to materialize and little work was done on the property. In November, 1919, reported that company was again trying to finance the erection of a 50-ton mill.

VIKING COPPER CO. BRITISH COLUMBIA

S. D. Craig, John Vedaa and J. G. Vedaa, owners. Van Anda, B. C.

Property: 3 claims, 143 acres, on S. side of Texada island, 65 miles N. of Vancouver, shows copper-gold-silver ore. Small shipments reported 7.9% copper. Developed by shallow shafts.

ASHINGTON MINE, LTD. **BRITISH COLUMBIA**

Idle.

Directors: J. L. Retallack, O. T. Stone and W. H. Burgess, sec., all of aslo, B. C., and Clive Pringle, Ottawa, Ont.

Inc. in British Columbia. **Cap.,** $300,000; par $1; assessable.

Property: Washington and Slocan Bay groups, in McGuigan basin, ocan district, was, for several years, the largest shipper of that section. t ore became baser in depth and property was closed down in 1911. ine is said to contain large bodies of complex lead-zinc ore in its lower els, which can now be profitably concentrated.

ESTERN BELLE MINING CO. **BRITISH COLUMBIA**

Address: S. R. Green, sec.-treas., Spokane, Wash. Colen Smith, pres., th Samuel Smith, L. V. Wells, A. McCormick, directors.

Cap., $200,000; par 10c; assessable.

Property: 4 claims, 7 miles N. E. of Idaho-Continental mine, but in Kootnay district, B. C., said to show silver-lead ore in vein 12 to 20′ wide, aceable for 3,000′. **Development:** by tunnels.

ESTERN MINE EXPLORATION SYNDICATE **B. C.**

Address: Vancouver, B. C. Is doing development work on a copper operty at Tacla lake in central B. C., and on a placer gold property at orsefly, in Cariboo mining district.

ESTERN MINING & DEVELOPMENT CO. **BRITISH COLUMBIA**

Dead.

Inc. July, 1915, to take over the Yreka group, Quatsino Sound, Vanuver island, B. C., but apparently never did so. See Vol. XIII.

EST KOOTENAY POWER & LIGHT CO., LTD. **B. C.**

Controlled by Consolidated Mining & Smelting Co.

Office: Rossland, B. C.

Company owns three hydro-electric plants with a revenue-producing ad of 22,360 h. p., current being supplied to mines and works along the International boundary. Company is an important accessory to mining in itish Columbia.

HITEWATER MINES, LTD. **BRITISH COLUMBIA**

Controlled by J. L. Retallack & Co., of which W. H. Burgess, of Kaslo, mgr. Mine was one of the earliest producers in Slocan district, and as sold over 20 years ago to Whitewater Mines, Ltd., of London. Reorted that Retallack & Co. are now operating it under lease.

Property: at Retallack, on a branch of the C. P. R. R., was worked der lease in 1918; 15 men employed.

Production: 1918, consisted of 409 tons of silver-lead ore, and 135 tons ver-zinc ore.

HOLE CHANNEL MINES CO. **BRITISH COLUMBIA**

Company organized in December, 1919, to develop 6 claims on Prinss Royal island, 3 miles north of the Belmont Surf Inlet mine. A 1,500′ nnel is to be driven to open a 12′ vein which has been traced for 3,500′ on rface.

OLF GROUP **BRITISH COLUMBIA**

See Taylor Mining Co., Ltd.

OLVERINE MINING & DEVELOPMENT CO. **B. C.**

Succeeds Kootenay Dev. Co., Ainsworth, B. C. Jere Madden, pres., apid River, Mich. J. Cleveland Haas, Wellington Apts., Spokane, manag- g director, and J. F. Carey, of Spokane, Wash., director.

Property: the Nicollet group of 14 claims on Kootenay lake, north of nsworth and adjoining the Highland and Florence mines (Florence Mng. .). Veins in metamorphic rocks are said to carry rich silver-lead ores.

[redacted] since 1917.

[redacted] **MINE** **BRITISH COLUMBIA**

[redacted] Clarence Cunningham, Sandon, B. C.

[redacted] claims, in 2 groups, acquired from Miller Creek Mng. Co. [redacted] Mg. Co., in 1913, for $75.000. Ore is lead-silver.

New owner seems to have found the main vein so unsuccessfully sought by former owners, as it was reported in 1918, that $125,000 worth of ore had been shipped, and the daily output in September, 1919, was 100 tons. Ore is milled in the Alamo concentrator at Alamo, on the Kaslo-Nakusp Ry. See Alamo mine.

YALE DEVELOPMENT & CONSTRUCTION CO. B. C.

Has a 25-year lease on property of Olalla Copper Mining & Smelting Co., which see.

YMIR-WILCOX DEVELOPMENT CO., LTD. BRITISH COLUMBIA

Office: J. C. Breese, 1580 Sherman Ave., Evanston, Ill.

Officers: W. S. Mason, pres. and treas.; J. C. Breese, sec., with C. F. Poppenhusen, E. R. Johnston and B. J. Jayne, directors.

Inc. June 29, 1911, in British Columbia. **Cap.,** $500,000; shares $1 par, non-assessable; 400,000 issued.

Property: 6 patented claims, 188 acres, near Nelson, B. C. Examined by Arthur Lakes, Jr. Ore carries gold and some silver. Under development in 1917, but no later information.

MANITOBA

The Province has a richly mineralized belt that extends easterly for 100 miles from the Saskatchewan border, at Lake Athapapuskow, to Flin Flon lake (formerly called Wekuska). The deposits at Flin Flon, Schist and Copper lakes are near the west end of this belt, and include the Great Sulphide mine, Mandy mine and several other properties. The Pine River area, on the east arm of Athapapuskow lake, is said to rival the Flin Flon. At Herb lake, at the east end of the belt, the Rex mine, Dauphin and other properties are being opened up.

The Flin-Flon and Schist Lake districts have attracted much attention since 1916, because of the large size and richness of the copper deposits found there. They are situated 650 miles N. W. of Winnipeg and 90 miles N. W. of The Pas, northern Manitoba, and reached by steamer from The Pas to Sturgeon lake, thence 40 miles east to Flin Flon lake.

The rocks are greenstones, conglomerates, etc., intruded by quartz porphyry dikes and masses. The ores are sulphides and carry copper, gold and silver, with some zinc.

BROOKLYN MINING CO. MANITOBA

Bert Clarkson, pres., Buffalo, N. Y., A. L. Anderson, supt.

Property: in Gold Lake area has been worked since March, 1919. In November, drifting was in progress on the 100′ level.

BRUCE CONS. MINING CO. MANITOBA

Address: Winnipeg, Canada.

Officers: Col. Wm. Grassie, pres., with E. D. Alderson, W. B. Tayl[illegible], J. J. Papineau and Dr. Halpenny, directors.

Cap., $2,500,000; par $1.

Property: 275 acres in Gold Lake area.

CALUMET-CORBIN MINES CO. MANITOBA

Succeeded by Dominion Gold Mining Co., q. v.

Wm. Bracken, pres.; J. K. Heath, s. p.; Erik Honeiker, [illegible], last accounts.

Inc. Jan. 11, 1915, in Maine, as a reorganization of the Calumet-Corbin Mng. Co. **Cap.,** $2,500,000; shares $1 par. Paul Revere Trust Co., registrar. Shares in [illegible] Calumet-Corbin Co. [illegible] tain terms for those [illegible] Leased on [illegible]

Company had a [illegible] Gold [illegible] in Gold Lake mining [illegible] of gray quartz, in [illegible] tive of the [illegible]

AREA OF MANITOBA
251,832 SQUARE MILES

AREA OF NORTHERN MANITOBA
178,100 SQUARE MILES

UNITED STATES

SHOWING THE NEW MINING DISTRICTS.

ton gold with no silver contents. Some development work is said to have been done in 1916.

It appears that the Gold Lake lease covers a swamp in which quartz is found. Such quartz exposures are known at a great many places in Western Canada, but so far as known none of them are now commercially worked.

The New Era mine near Idaho Springs, Colo., taken under lease for $150,000, was lost through default of semi-annual payments of $7,500 in 1916, with local debts of $10,000. The Montana holdings were previously abandoned.

It appears that the company had no real property and its stock represented nothing but paper. The sponsors for the stock were apparently interested in stock dealing, not mining, and caveat emptor applies to all stock buyers.

DOMINION GOLD MINING CO. MANITOBA

(See Calumet-Corbin Co.) **Office:** 802 Pioneer Bldg., St. Paul, Minn.

Officers: at last accounts, Bernard Noon, pres.; J. P. Fetsch, v. p.-treas.; J. E. Liebe, sec., with N. L. Watson and George Werner, directors.

Inc. Oct. 5, 1915, in Arizona. Cap., $2,500,000; outstanding Dec. 1915, $1,500,000; shares $1 par. Registrar & Transfer Co., New York, registrar and transfer agt. Cash on hand, November 8, 1915, $5,500. Outstanding shares, 1,500,000, used in the purchase of property.' Of this amount 1,000,000 shares were set aside to be given to stockholders of the Calumet-Corbin Mines Co. of Maine, in exchange for stock of that company, received by them in exchange for stock of the old Calumet-Corbin Mining Co., of Ariz., when the reorganization was effected early in 1915. "Reason for the gift of this stock to the stockholders of the Calumet-Corbin Mines Co. is stated by those giving it to be because they feel a certain measure of responsibility for the failure of the old Calumet-Corbin Mining Co., to make good, and because their efforts to bring it to a successful issue through its reorganization into the Calumet-Corbin Mines Co. failed." If the whole 1,000,000 shares are exchanged it will make the Dominion Gold Mining Co. a stockholder in the Calumet-Corbin Mines Co. to that extent.

Property: 6 claims, 280 acres, held by location, not contiguous, in the Gold Lake mining district, 100 miles N. E. of Winnipeg, Manitoba. Nearest P. O. is Manigotagan, at mouth of Manigotagan River, on eastern shore of Lake Winnipeg. Mine reached by boat to Manigotagan from either Selkirk on Red River, 23 miles north of Winnipeg, or from Gimil, or Icelandic Riverton, on the Gimil branch of the C. P. R. R.

The Gold Seal and Gold Pan claims, which were said to belong also to this company and to the Calumet-Corbin, were reported "abandoned 1915" at the office of the New York Curb.

The property is practically undeveloped. The country generally is covered by a swamp. Claims are said to show quartz veins "well exposed at the surface, except where covered by the swamp," and to contain considerable free gold. Stock is a rank gamble and unfavorably regarded. No recent information.

FLIN FLON SYNDICATE MANITOBA

See Great Sulphide Co.

GABRIELLE MINES, LTD. MANITOBA

Office: Winnipeg, Canada.

Inc. in 1919. **Cap.,** $1,000,000; par $1.

GREAT SULPHIDE CO. MANITOBA

Address: J. E. Hammell, [illegible]

Property: the Hammell [illegible] Pas, northern Manitoba. [illegible] have been put down to [illegible] over a length of 2,500' and [illegible] per ton in gold, silver, [illegible]

)00,000 tons of ore, averaging 1.7% copper; 1.5 oz. silver, and $1.40 gold ton, while 50,000,000 tons is considered a possibility, if not a probability.

Property requires an 80-mile railroad connection to the Pas and it was orted, that the Government had definitely promised this road, if the idicate would erect a smelter with a capacity of not less than 2,000 tons lay. A year's option on the property was given to W. B. Thompson erests in March, 1920. The price is $1,500,000 cash; $200,000 is to be nt in exploration.

)LD PAN MINING CO. **MANITOBA**

Officers: Jas. H. Ashdown, pres.; F. O. Fowler, v. p.; Gordon McTavish, -treas., with E. F. Hutchings, S. Hart Green and Sam Scott, directors. J. B. ell, cons. engr., Toronto. Frank Phillips, mine supt.

Property: at Big Rice Lake, 130 miles N. E. of Winnipeg, was idle for ie time previous to the reorganization in 1919 and the finances of the company e in bad shape. In November, 1919, 200,000 shares of 8% preferred stock ; offered to the public.

Development: by 150' shaft, from which some rich specimen ore is said iave been taken during the past 3 years.

Though an adverse report on property was made by R. W. Brigstocke in ruary, 1920, management decided to continue work awhile.

:RB LAKE GOLD MINES, LTD. **MANITOBA**

Offices: Herb Lake, via The Pas, Manitoba, Canada, and Makeever s., 170 Broadway, New York City.

Officers: M. M. Makeever, pres.; J. S. Cooper, v. p.; Sanford Makeever, -treas., above with C. C. Pringle, J. R. Campbell, Barney Asran, directors. lter Neal, mgr.; J. R. Campbell, Supt., Herb Lake, via the Pas, Manitoba.

Inc. in Manitoba, Canada. **Cap.,** $1,000,000; par $1; all issued.

Property: 7 claims, about 300 acres on N. E. shore of Herb lake, Pas ing district, Manitoba, Canada. Claims said to show a quartz fissure vein vide in hornblende schist, traceable for a distance of 1,700'. Ore is free ling gold reported to average $27 per ton. Pay ore shoot is 75' long, depth determined. Overhand stoping methods are used for mining ore.

Development: by 65° inclined shaft, 130' deep, and 420' of workings. blocked out is estimated at 4,000 tons.

Equipment: 5x7" steam hoist, 300 cu. ft. air compressor, pump, 30-ton lgamation mill with Deister and Overstrom tables.

Production: from May to November, 1918, reported to have shipped l bullion to value of $27,323.

Mine closed since 1918 on account of labor shortage.

URA MINES, LTD. **MANITOBA**

Inc. in October, 1919. **Cap.,** $2,000,000.

Property located in the Rice Lake district, Manitoba, Can.

NDY MINING CO. **MANITOBA**

Address: H. C. Carlisle, supt., The Pas, Manitoba, Canada.

Subsidiary of the Tonopah Canadian Mines Co (holds 85% of shares), h is controlled by Tonopah Mining Co. of Nevada, with head office at itt Bldg., Philadelphia, Pa.

From December 1, 1916, to December 31, 1917, the income was $223,055, expenditures left a deficit of $6,489. During 1918 the income was $537,043, hich $68,199 was profit. Current assets at the end of 1918 were $268,421, liabilities, including $208,260 loan from Tonopah Mining Co. of Nevada, $225,321.

Property: at Schist lake, north of The Pas, Manitoba, is developed by shaft and diamond-drill exploration below this depth. A shoot of high- copper ore has almost all been extracted to the bottom level, yielding 20,000 tons. The remains 200,000 tons of low-grade ore, too poor to mine r present condi

Equipment: steam hoist, tramway.

Production: for 1916 the total output was 3,588,000 lb. copper, the former year, and 5,904 tons valued

at $88 per ton in 1918. In 1919 company expected to ship 15,000 tons, the total value for 10 months' production was $750,000. Ore is taken by teams and barges to The Pas, 161 miles distant, and from there by rail to Trail, B. C., for reduction.

NORTHERN MANITOBA MINING CO. **MANITOBA**

Address: The Pas, Manitoba.

Officers: H. S. Hohnson, pres.; R. Kerr, sec.

Cap., $1,000,000; par $1.

Is a local enterprise, financed by The Pas people.

Property: 3 gold claims at Herb lake. Developed by 120′ shaft. A one-car shipment in 1918 is said to have given returns of $81 per ton, but work was stopped on account of lack of money.

Equipment: costing $12,000, includes a 40-h. p. boiler, and a compressor.

NORTHERN MANITOBA MINING & DEV. CO. **MANITOBA**

Operated by Canadian Exploration Co., Makeever Bros., 170 Broadway, New York, hold a stock interest.

Property: the Moosehorn and Rex gold claims on Herb lake, via The Pas, northern Manitoba. In August, 1917, an 80′ shaft in the former had opened 30″ of ore, while at 110′ in the latter there was 49″ of $36 ore.

A 40-ton mill erected in 1917 was operated for 3 months and then closed down with total production of $28,000.

Reported late in 1919, that property had been sold.

PAS CONSOLIDATED MINES, LTD. **MANITOBA**

Address: The Pas, Manitoba.

Reported in February, 1919, that company had acquired the Dauphin-Elizabeth mine and would operate it. Makeever Bros., of New York, gave up their option after sinking a 50′ shaft.

STAR LAKE GOLD MINES, LTD. **MANITOBA**

Office: 509 Merchants' Bank Bldg., Winnipeg, Manitoba, Canada.

Officers: W. R. Milton, pres.; J. H. Hicks, sec.; J. W. Harris, treas.; with E. R. Potter and John Smith, directors.

Inc. Nov., 1915, to purchase the property of the Penniac Gold Reef Mines, Ltd. Terms of purchase were as follows: owners agreed to take 333,333 shares of stock and to set aside 33,333 shares for development purposes. Stockholders in the Penniac Mines to receive 200,000 shares and to pay to the Star Lake $25,000 to liquidate liabilities of old company, amounting to $15,000, and leave a surplus for development work. Star Lake Co. agreed to have $100,000 in treasury within 6 months from November, 1915, otherwise vendors could cancel agreement. 125,000 shares offered to public at $1 par.

Cap., $1,000,000; shares $1 par; non-assessable; 500,000 issued. "An extraordinary 'speculative investment' is offered to the public for a limited number of 6% preferred shares at par, to be redeemed later at 15% above par," the wording of a circular.

Property: 6 patented claims, 200 acres, on Star Lake, eastern Manitoba, said to show a quartz vein in a shear zone of Keewatin conglomerate near contact between granite and schist. Vein minerals include quartz, gold-bearing pyrite and arsenopyrite. Samples cut for 10 to 15′ across the vein said to run $3.50 to $5.80 per ton. The Penniac company is reported to have spent $100,000 on development work, consisting solely of test pits and a 90′ shaft, said to close two lodes. The main shear zone is said to be 200′ wide, with two veins and several lesser parallel quartz veins with strike N. 35-45° E. and dip N. W., all showing gold in payable quantities. Property reported on by R. C. Wallace, University of [illegible]; W. H. Jeffrey, [illegible] Tretheway of Toronto, and [illegible]

[illegible] shaft and [illegible] Reserves estimated [illegible]

[illegible] mill, [illegible] ral buildings. Mas[illegible] [illegible] platinum content of [illegible] [illegible] ly idle.

NEW BRUNSWICK

STERN CANADIAN COPPER CORPORATION, LTD. **N. B.**
Mail returned 1918, from former address.
Fully described in Vol. XIII.

TERCOLONIAL COPPER CO. **NEW BRUNSWICK**
Office: P. O. Box 294, Pawtucket, R. I. **Mine office:** Dorchester, West-eland county, N. B.
Officers: Darius L. Goff, pres.; T. J. Edwards, sec.; F. J. Powers, treas.
Has been idle several years. Property described in Vol. XIII.

NOVA SCOTIA

ADFORD MINES, LTD. **NOVA SCOTIA**
Halifax, Nova Scotia.
Officers: E. F. Heifler, pres.; A. E. Abrams, v. p.; v. p.; W. C. Milner, -treas., with Paul J. Engel, Jr., 37 Wall St., New York, and G. J. Partington, ifax, directors.
Inc. Oct. 3, 1914, in Nova Scotia. **Cap.,** $500,000; shares $1 par; out-ding, 440,000 shares. Transfer office and registrar, Security Reg. & Transfer New York. Listed on New York Curb.
Property: at Sheet Harbor and Tangier, Nova Scotia, contains ore i gold and silver values.

PE BRETON COPPER CO., LTD. **NOVA SCOTIA**
Mine near Coxheath, Cape Breton county, N. S.
Cap., $2,000,000.
Property: the old Coxheath mine and adjoining lands, 10 miles from ney, Cape Breton, shows several cupriferous veins, of which the principal, aging 10′ width, traverses felsite and diorite, carrying argentiferous and ferous chalcopyrite, in a silicious gangue, ore averaging about 4.5% copper. pest shaft, 420′. Idle many years.

ETICAMP COPPER CO., LTD. **NOVA SCOTIA**
Idle. **Office:** 37 Sackville St., Halifax, N. S. **Mine office:** Cheticamp, rness county, N. S.
Officers: Edward Staris, pres.; John W. Regan, sec.-treas.; Milton V. idin, supt., at last accounts.
Inc. May, 1904, in Nova Scotia. **Cap.,** $3,000,000; shares $1 par, as a ger of the Eastern National Copper Co., Ltd., and 3 other corporations.
Property: 950 acres, freehold, also a 200-acre mill and smelter site, 1,000 s timber lands, and 200 acres water frontage, with a government license exploring and locating mines on 50 sq. miles.
Property shows a mineralized zone, in micaceous schist, of 350′ width, eable 1½ miles, carrying 4 orebodies, of which 3 are developed by a 200′ t and by tunnels of 25′, 35′ and 115′, claimed by company to show 250,000 of exclusively sulphide ore, averaging 2.5 to 3.5% copper, 18% lead, 30 oz. r and $2 to $30 gold per ton. Nearest railroad is 38 miles, but mine is only 6 miles from tidewater. Property considered promising, though estimates onnage and values are excessive.

MINION MINING CO. **NOVA SCOTIA**
Tangier, Halifax county, N. S. W. J. Prinsk, mgr. Company owns a mine at Tangier. Last production reported was 419 tons ore, yielding 57 old. No recent information.

DENVILLE CONS. MNG. CO., LTD. **NOVA SCOTIA**
cy: 170 Summer St., Boston, Mass. **Mine office:** Goldenville, county, N. S. Can.
E. Makepeace, pres.; E. B. Estes, sec.; J. A. Floyd, treas.;

foregoing, with A. C. Post, W. E. Bremner, G. F. Rooke, T. H. Richardson and H. N. Wright, directors.

Inc. June 16, 1916, in Nova Scotia, as a reorganization of the Goldenville Mining Co., Ltd. **Cap.**, $2,400,000; shares $1 par; 2,000,000 outstanding. Bonds authorized, $60,000, all outstanding.

Property: 501 acres on St. Mary's river, Goldenville, N. S., said to show narrow quartz veins in quartzite, with E.-W. course. Pay ore occurs both in shoots and streaks. Gold is coarse.

Development: by vertical and incline shafts to 750′ depth. Workings total 5,500′.

Equipment: 500-h. p. hydro-electric power plant, 50-h. p. electric hoist, 1,000 cu. ft. compressor, turbo-pump, 40 stamps (20 dropping) using amalgamation. Seems a promising mine, but results are withheld.

Production: 45,388 tons to 1919. No yield given, but recovery is about 90%.

GOLDENVILLE MINING CO., LTD. NOVA SCOTIA

Reorganized in 1916 as the Goldenville Consolidated Mining Co., Ltd., which see.

GREAT BRAS D'OR MINING CO. NOVA SCOTIA

Baddeck, Victoria county, N. S. **Mine office:** Middle River, Victoria county, N. S. D. J. Patriquin, mgr. Operates a gold mine. Last production reported was 775 tons ore, yielding 262 oz. gold. No recent returns.

LAKE COPPER MINING CO., LTD. NOVA SCOTIA

Idle. **Office:** care Dr. H. Mackay, New Glasgow, N. S. Mine office: Polson's Brook, Antigonishe county, N. S. A. G. Baillie, gen agt.

Inc. January, 1908. **Cap.**, $2,500,000; shares $1 par.

Property: 6,400 acres, on Polson lake, said to show a vein 5′ wide traceable a mile and carrying auriferous and argentiferous copper ore. It has a 103′ shaft with 554′ of workings.

LOON BROOK MINING CO., LTD. NOVA SCOTIA

Office: 1 Leys Ave., Letchworth, Herts, Eng. **Mine office:** Montague, N. S. E. Romilly Smith, mgr.

Operating a gold property and 10-stamp mill with cyanide unit in Montague district, N. S.

Last production reported was 118 tons of ore, which yielded 400 oz. gold. No recent returns.

MONTAGUE GOLDFIELDS, LTD. NOVA SCOTIA

Head office: 80 Granville St., Halifax, N. S. **Mine office:** Montague, Halifax county, N. S.

Officers and directors: Jas. Farquar, pres.; E. S. Romilly Smith, mgr.; R. G. Rent, sec.-treas.; A. Gerhardie, supt.

Property: in Halifax county, shows a 4″ quartz vein, between slate hanging and slate foot-wall. Ore is free milling. In 1918 a recovery of more than 2 oz. gold per ton was being made.

Development: by 300′ shaft. Reported in July, 1919, that 5 ore shoots had been cut on the 300′ level and that sufficient ore was blocked out to keep a 10-stamp mill a year. The present mill will be replaced by a new one.

Examined 1918, by C. A. Burdick.

NOVA SCOTIA MOLYBDENUM CO., LTD. NOVA SCOTIA

In 1918 company was operating a molybdenite deposit at New Ross, Lunenburg county, under management of H. C. Burchell of Windsor. Ore occurs in a pegmatite dike and is said to assay ½-1% molybdenum sulphide. Shaft is by 100′ shaft.

RENFREW GOLD [illegible] LTD. NOVA SCOTIA

Controlled by M. J. [illegible] Ltd., Cobalt, Ontario.

SCHEELITE MINES NOVA SCOTIA

Controlled by M. J. [illegible] Cobalt, Ontario.

TOMMY BURNS GOL[illegible] LTD. NOVA SCOTIA

Controlled by Tomm[illegible] Co. of Toronto, Ltd., tion of Pope and Ches[illegible]

Property: 134 acres, ½ mile from Brookfield, the nearest R. R. station, to show a fissure vein, 2½-3½′ wide, running E.-W., with dip 30°, and :able at surface for 900′.
Development: by 108′ shaft, sunk on the vein and drifts on the 50′ and levels.
Equipment: includes a 5-stamp mill, boiler, hoist and pump. A pleas- prospect.
According to T. A. Rickard, who made a report on the gold deposits of a Scotia for the Provincial government, none of the Nova Scotia gold de- s can be relied upon to carry their values to any great depth.
No recent information, presumably defunct.

NTWORTH COPPER CO., LTD. **NOVA SCOTIA**

Idle. **Address:** Wentworth, Cumberland county, N. S.
Inc. 1907, to acquire lands, bought at foreclosure sale, of the Cumber- Copper Co. Company apparently holds property for speculation purposes work has been done since purchase.

ST GORE ANTIMONY CO. **NOVA SCOTIA**

Address: N. O. Carpenter, mgr., West Gore, N. S.
Property: the Rawdon mine, opened 1884, worked intermittently until ber, 1914, and regularly since then. Company is closely allied with the St. n's Smelting Co., Manchester, England, which refines the product.
The main deposit is up to 4′ wide and has been opened for 200′ on one The ore consists of stibnite and native antimony, associated with pyrite, z and calcite. Country rock is a soft slate.
Development: by shafts, the main one, 502′ deep, with a 332′ winze be- his level.
Production: about 1,200 tons of ore monthly, yielding 110 tons of con- ates containing 38 to 45% antimony. No recent information.

ONTARIO

The mining companies of the Cobalt, Porcupine and Kirkland districts are ed under those headings. All others are grouped in a general section, precedes the districts named.

XO MINES, LTD. **ONTARIO**

ddress: Porquois Junction, Ontario.
fficers: G. F. Haning, pres.; Maj. E. F. Pullen, v. p.; H. N. Roberts, eas., with Capt. Frank Pullen, Lt.-Col. C. W. Allen, and F. J. Stewart, ors. Wm. Anderson, mgr.
nc. January 3, 1913, in Ontario. **Cap.,** $40,000; shares $1 par; 30,005 issued.
roperty: the Alexo mine, in Dundonald twp., Timiskaming district, ated in 1908 and active work starting in 1912. The ore, a nickeliferous ...ide, averages 4% nickel and is shipped to the Mond Nickel Company's ...
...lopment: by 400′ shaft, crosscuts and drifts.
...tion: 8,618 tons in 1918; total 49,746 to January 1, 1919. About 20 ...ployed.

...MA CUSTOM SMELTING & REFINING CO., LTD. **ONTARIO**

...le several years. **Works office:** Thessalon, Algoma, Ont. See Vol. ...pper Handbook.

...MA STEEL CORPORATION **ONTARIO**

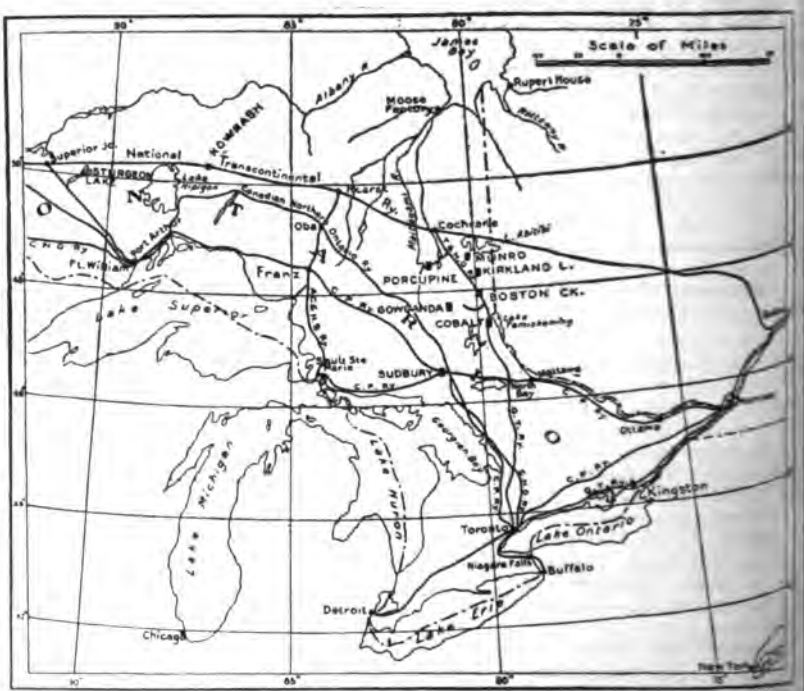
...bsidiary ... Superior Corporation.
...n. office ... Marie, Ont. **Secretary's office:** Traders' Bank ... Toronto. ... pres. and gen. mgr.; Alex. Taylor, sec.
...roperty: ... iron mines, old producers, at Michipi- ... Ont., with ... of Ste. Marie. The Helen, opened in 1899 ...veloped to ... is a steady producer of iron ore, which ... as goethite ...

The Magpie, opened up in 1911, is developed by a 4-compartment shaft to depth of 250', with main levels at 125' and 205'. The orebody, mainly siderite, is said to be 50' wide over a distance of 1,500' and when roasted makes a fair Bessemer ore.

The Helen high-grade sulphur ore is mixed with Magpie raw ore and roasted, product being a very desirable Bessemer ore, which runs 52% iron and 0.04 phosphorus. Shipments from the Magpie are sent to the Sault blast-furnaces. Employs about 250 men when working to capacity.

ALGUNICAN DEVELOPMENT CO. ONTARIO

Haileybury, Ont., Canada. Holding company of the Jualin-Alaska Mine Co., which see. Also has done development work on a molybdenite property in Brome Twp., Renfrew Co., Ont. Hector Drolet, mgr. at last report.



MAP SHOWING MINING DISTRICTS OF ONTARIO

ALLIED GOLD MINES, LTD. ONTARIO

Address: 55 Yonge St., Toronto; and 1905 Dime Bank Bldg., Detroit, Mich. **Mine office:** Boston Creek, Ontario.

Officers: F. L. Smith, pres., Detroit; Angus Smith, v. p.; A. W. Bruning, sec.-treas., with J. H. Remick and W. H. Muir, directors. F. C. Combs, engr. R. W. Norrington, mgr. Shares offered by R. M. Norrington & Co., 30 E. 42nd St., New York.

Inc. October, 1918, in Ontario. **Cap.**, $2,000,000; par $1; outstanding $1,250,000; non-assessable. Listed on New York Curb. Prices, 1⅛ to 1⅜, 1918. Management states that $30,000 was spent on development in 1918.

Property: 12 claims, 7 patented, 480 acres, in Boston Creek district, Ontario. The company was organized to acquire large acreage of gold-bearing land in this area, following the success of the Miller-Independence Mines,

joins on the S. the Renaud-Cullen group of the Allied company. The group said to have several quartz veins with one well-defined fissure showing almost oss the property. This is developed by a 100′ shaft, and diamond-drilling rk.

Company also has an option on the O'Donald property, which shows comrcial ore at depth, and also on the property of the Boston Creek Mining Co. the eastward.

Equipment: electric hoist and compressor.

No ore is blocked out as yet; but property is considered a promising prost fully warranting development.

LIE ISLAND COPPER MINE. **ONTARIO**

Office: 225 Water St., Kenora, Ont., Can. Owned by F. W. Moore et al.

Property: 4 claims, the S 777, K. 312, K 314 and K 315, 156.64 acres in all, the east end of Allie Island, about 15 miles from Kenora.

Geology: claims cover an outcrop of serpentine, or chlorite-schist, rying small pellets or crystals of native copper. Country rock is dolomite, red trap and greenstones. Orebody claimed to be ½ mile long, with a maxim width of 700′.

Development: is surficial only, 40 and 20′ pit-holes, showing ore in bot-. Ore said to average 1½% copper. Owners planned development work last account.

ERICAN MOLYBDENITE, LTD. **ONTARIO**

Formerly known as the Dominion Molybdenite Co. Property sold to Molybum Products, Ltd., which see.

GONAUT GOLD MINES, LTD. **ONTARIO**

Address: Royal Trust Bldg., Montreal, Quebec.

Officers: J. H. Rainville, pres.; John W. Morrison, gen. supt.; J. E. rdman, cons. engr.

Organized 1919, to take over La Mine D'Or Huronia (which see), at Gauer, Larder Lake district. Reported in November, 1919, that the shaft had n deepened from the 80 to the 200′ level, and the re-modeled stamp-mill put operation. Electric power is obtained from Associated Goldfields at Larder e.

Production: in 1919, was 125.34 oz. gold, valued at $2,619.

SOCIATED GOLDFIELDS MINING CO. **ONTARIO**

Controlled by Associated Gold Mines of Western Australia, Ltd.

Office: 306 C. P. R. Bldg., Toronto, Ontario.

Officers: Geo. A. Mackay, pres.; C. G. Daimpré, gen. supt.

Inc. 1914, in Ontario. **Cap.,** $5,000,000; $1 par; 2,500,000 issued.

Property: about 2,000 acres, includes the Harris-Maxwell the Kerr-Addi-, and the Reddick mines, now known as Blocks B, C, and D, respectively, ted in Larder Lake district, Ontario. Block B mine is opened to the 500′ l, with workings practically all in silicified dolomite. In 1918, 400′ of work done in this mine; and 700′ in the Reddick. An extensive development paign is now under way.

Block D, 2 claims, shows alternating lands of dolomite and green schists, former containing a network of quartz veins some of which show coarse l. The mine has a shaft 100′ deep with several hundred feet of underground kings and considerable diamond-drill exploration. On the Kerr-Addison a little surface work has been done. The two properties have been worked desultory manner since about 1908.

Equipment: electric power, hoist, 2,700 cu. ft. compressor, 30-stamp , etc.

GOLD MINES, LTD. **ONTARIO**

$2,000,000, par, $1. Listed on Toronto Standard Stock Exchange. c. low, 40c. high, 1918; 35c. low, 40c. high in 1919.

: 42 acres, and options on 400 acres additional in four separate arts of the West Shining Tree district, 60 miles S. of Por- veins, five of which have been stripped and examined.

Veins well defined, and about 2′ in width. Company was planning develop in 1919-20.

AURUM MINES, LTD. ONTARIO

Office: 420 Bank of Hamilton Bldg., Toronto, Ont., Canada.

Officers: Sir Henry M. Pellatt, pres.; Col. J. B. Miller, v. p.; with W. Reid, A. E. J. Blackman and A. H. Jeffrey, directors. C. H. Manuel, H. M. Asling, treas.

Inc. in Ontario. **Cap.,** $1,500,000; shares $1 par; 800,000 shares ing.

Property: 2 patented claims, 80 acres, adjoining the Croesus Munro Township.

Ore: occurs in quartz and schist veins in basalt, dipping N. W. average value of the gold contents is as yet undetermined. Mine exa W. J. Trethewey and A. G. Kirby, who recommended diamond-d attempt to pick up the Croesus vein. No recent returns.

BEAVER AUXILIARY MINES CO. ONTA

Seventy-five per cent. of company's capitalization is held by Beav Mines, Ltd., which see. H. Donaldson, supt.

Property: 120 acres, at Elk Lake, Ont., carries silver ore, milling grade. **Development:** 330′ main shaft, crosscuts and drifts. ment: hoist and surface buildings. No work has been done on the for several years.

BOSTON CREEK GOLD MINES, LTD. ONTA

Address: Imperial Bank Chambers, N. F. Ont.

Officers: F. M. Richardson, pres.-mgr.; W. B. Albright, Quillman, sec.-treas.

Inc. in 1916 to take over mine from the R. A. P. Syndicate, Sherwin-Williams Paint Co. interests, who spent $250,000 on the **Cap.,** $2,000,000; shares $1 par; 1,050,000 shares issued and 999,995 for two years. Security Transfer & Registrar Co., New York. Listed on New York Curb, and on Toronto Stock Exchange. low, 39c. high, 1918; 18c. low, 33c. high, 1919.

Property: 21 claims, 100 acres, in Boston Creek township, 45 of Cobalt and 382 miles N. of Toronto and crossed by the T. & N. simple gold-quartz, like those of Porcupine, occur in two parallel 250′ apart. The Kenzie vein is of replacement type in a "pillow stone, a few inches to 5′ wide, showing spectacular free gold greenish quartz, with associated iron and copper pyrites, galena

Development: by 300′ shaft with drifts on vein at 100′, 200 a winze to 400′ level. Brokers letters claimed $1,500,000 worth out and that the company was sacking high grade ore. Equipment gasoline and electric hoists and buildings, etc., for 40-50 men

Property considered good and directors are as high grade as the stock offered at 50 cts., boosted to $1.50 and declining to 60c. is so extravagantly lauded by various brokerage houses as to suspicion.

Property will, it is believed, eventually be a milling prop well with the various Porcupine companies. Mine was idle for account of disagreement between company and R. A. P. Syndicate the Boston Creek was using. Reported that the two companies solidated.

BOSTON-PARRY SOUND COPPER CO.

Mine office: Parry Sound, Parry Sound district, Ont. in Maine. **Cap.,** $1,000,000; shares $1 par. Is a close cor

Property: 200 acres, in the vicinity of the Wilcox mines. Idle some years, but owners are well-to-do and expect erty some day.

BRITISH-AMERICAN NICKEL CORP., LTD.

Office: Citizens Bldg., Sparks St., Ottawa, Ont. **Mine** Nickelton, Sudbury, Ont.

Officers: J. H. Dunn, pres.; W. A. Carlyle, v. p. and managing direc.; H. Coade, sec.-treas.; F. J. Brule, chief engr.; E. Hibbert, supt. of mines; J. Carlyle, supt. of smelter; R. L. Peek, supt. of refinery; J. H. Gillis, supt. onst.; Frank E. Lathe, chief chemist; T. N. Hay, purch. agt.; R. F. Howard, . engr.

Inc. August, 1913, in Canada. **Cap.,** $20,000,000 common stock, all issued: 00,000 first mortgage bonds, 6%, all issued; $10,000,000 6% debenture k authorized, of which $3,500,000 has been issued: $14,000,000 stock and 00,000 bonds held by British Government, out of $25,000,000 issued.

Property: in the Sudbury nickel district, Ontario, the Corporation owns 90 acres, of which 12,590 acres are within a mineral bearing zone, the nce being non-mineral and required for smelter townsites, etc. Included he above are the following mines: Murray, Whistle, Wild Cat, Jackson, el Lake group, W. D. 16, Elsie, Gertrude, Victor, Lady Violet and Falconge. Lands contain 21 known orebodies, 7 of which have been developed. company has spent $900,000 on diamond-drilling from 1907 to 1918.

Development: the Whistle mine has been developed and is ready for proion, but the Murray mine, having shown a much larger orebody has been ted as the property on which work is to be concentrated. In all, the com- has developed by diamond drilling over 18,000,000 tons of ore, 14,000,000 of h is in the Murray mine, about 4 miles N. W. of the town of Sudbury.

Equipment: the surface works at the Murray mine consists of steam . rock crushing and sorting house with a capacity of 200 tons of ore per air-compressors, and the usual shops and change-house.

Plans made for the smelter provide for the construction of 2 blast furnaces hearths 50x360″, 3 Pierce-Smith converters, 13x30′, to be erected in a rn plant with full equipment of cranes, flues, stacks, bins, shops, power and tramming system, all machinery to be steam driven. An electrolytic ry, using the Hybinette process for the separation of copper and nickel he precious metals from the matte, is constructed at Deschemes, Quebec, ill have a capacity of about 10,000 tons nickel per annum. The smelter is kelton, 3 miles N. W. of Sudbury. The new plant was blown-in on Jan- 17, 1920, and 3 days later No. 1 furnace was reducing 660 tons of charge One converter was at work on the 21st.

is the intention of the management to have all employees reside in the of Sudbury, and cars or suburban trains will be provided for their transion. The mines are connected with the Canadian Pacific, the Canadian rn Ontario and the Algoma Eastern railroads.

E MINES, LTD. **ONTARIO**

ad. Mines sold to Mond Nickel Co. in 1915.

MET & ALGOMA MINING CO. **ONTARIO**

dress: Lucas Hermann, sec., 109 Fifth St., Calumet, Mich. Mine near , Algoma, Ont.

icers: Jos. Vertin, pres.; Chas. Schenk, v. p.; Lucas Hermann, treas.

. 1905. **Cap.,** $1,000,000; shares $5 par, assessable; issued, $100,000, . $1.75. A reconstruction of the Copper Queen Mining Co., Ltd. In 1919, had no debts, and had $400 in the treasury.

erty: 957 acres, freehold, shows a 45′ fissure vein, traceable about carrying medium-grade chalcopyrite ore, more or less auriferous, with al bornite and malachite, giving assays of 5 to 25% copper. Has 2 No. 1 being 138′ deep, and 2 tunnels, longest 195′. Lands are heavily d and well watered. Idle several years.

MET & MONTANA CONSOLIDATED MINING CO. **ONTARIO**

icers at last accounts: H. A. Oswald, Minneapolis, pres.; Jas. A. Pat- v. p.; John Boyle, sec.-treas.; above with W. W. Sloan, C. H. Collins, eichel, directors. Geo. G. Thomas, gen. mgr.

. 1912, in South Dakota. **Cap.,** $5,000,000; shares $10 par; outstand- 000 shares. Annual meeting, second Tuesday in October.

pany is a reorganization of the Calumet & Montana Mining Co., which last accounts the company had one claim of 51 acres in Coleman Town-

ship, Cobalt, Ont., said to show fissure veins in diabase carrying silver. Developed by 225' vertical shaft with 500' of underground workings.

Reported in 1918, that a new company, Three Star Mining Co., was operating the property of the C. & M. Cons. Mining Co., of which company there is no recent information. Former office was at Cobalt, Ont.

CAMBURN SILVER MINES, LTD. ONTARIO

Address: Toronto, Ont.

Inc. in 1919. **Cap.**, $1,500,000; par $1.

Property: company is doing exploratory work in the old Leroy Lake property, Gowganda district.

CANADIAN AMERICAN RESOURCES, LTD. ONTARIO

Address: 927 Fifth Ave., New York.

Officers: Alex. Alexander, pres., New York; L. E. Denyes, v. p., Toronto; Dr. R. G. Bogart, sec., Kingston, Ont.; Geo. B. Leighton, treas., New York; with Jacob Ruppert, and Geo. B. Gifford of New York, and S. W. Jenkins of Catherines, Ont., directors.

Inc. in Ontario late in 1919. **Cap.**, $50,000,000. Company was organized to aid the development of mining and oil properties.

CANADIAN COPPER CO. ONTARIO

Entire stock of company taken over by International Nickel Co. of Canada Ltd. and company dissolved.

CANADIAN EXPLORATION CO., LTD. ONTARIO

Offices: 28 Victoria Sq., Montreal, and Naughton, Ont.

Mine closed and plant sold, property was described in Vol. XIII.

CANADIAN SMELTING & REFINING CO. ONTARIO

Out of existence, described in Vol. XIII. Former office, Orilla, Ont.

CANE SILVER MINES, LTD. ONTARIO

Company was organized by Toronto interests several years ago, to operate silver property in Cane Twp., near Kennebeck Station. Reported late in 1919 that company proposed to give a 10-year lease on the property, but some owners were opposed to the plan. A little development has been done.

CATHERINE GOLD MINES, LTD. ONTARIO

In October, 1919, company expected to commence sinking a shaft on property in Catherine Twp., Boston Creek district, which is said to have good surface indications.

CHENEY COPPER CO., LTD. ONTARIO

Office: 5 Melinda St., Toronto, Ont.

Officers: D. M. Robertson, pres.; R. P. Gouch, v. p.; G. Taylor, treas.; preceding with J. S. King, G. P. McCallum, J. L. Coffee and G. Wade, directors, all of Toronto.

Inc. in Ontario. **Cap.**, $2,000,000; shares $1 par; fully paid and assessable. No bonds. No stocks in hands of the public.

Property: 700 acres, of which 400 are held by Crown patent and balance under Mines Act of Ontario. 28 miles from Thessalon, Ont., on railway and 40 miles east of Sault Ste. Marie.

Geology: Lands show a series of three parallel veins exposed by outcrops, trenches and open cut for 1½ miles, with width of 4' to 12'. Strike north 16° west with dip of 75° to south. Veins are mostly quartz with pockets or lenses of specular iron, iron pyrites and copper minerals.

Development: by a 10' shaft, crosscuts and surface pits. Property now idle.

COBALT-FRONTENAC MINING CO., LTD. ONTARIO

Address: [illegible] Flecher, mgr., Flinton, Ont.

Officers: [illegible] Millan, pres.; Noah Dyment, v. p.; M. Dyment, treas.

Property: [illegible] Fleece mine, near Flinton. Developed by shaft.

Equipment: [illegible] mill and cyanide plant.

Production: [illegible] gold, yielding $300.

MBIA COPPER MINING CO. **ONTARIO**

le. Mail returned, 1919, from former address, 510 Chamber of Commerce, t, Mich. Mine near Parry Sound, Ont.

ficers: Dr. A. H. Cote, pres.; Dean S. Fleming, v. p.; S. S. Souther- ec.; Dr. W. P. Dick, treas.; Alex. Dick, cons. engr.

ip., $3,000,000; shares $1 par, non-assessable. Authorized, 1910, a bond issue.

operty: 200 acres, which adjoins the McGowan claim of the Parry Copper Co., 1 to 2 miles from Parry Sound.

OLIDATED COPPER CO. OF PARRY SOUND. **ONTARIO**

fice: 705 Palladio Bldg., Duluth, Minn. **Mine office:** Parry Sound, Sound district, Ont.

ficers: Robt. Forbes, pres.; Robt. Millard, v. p.; J. G. Harris, sec.- preceding, with A. C. Le Richeux, Frank Cox, E. E. Rorem, Dr. J. D. nd C. J. Jackes, directors.

c. February, 1902, in Ontario. **Cap.,** $5,000,000; shares $1 par; issued $3,100,000. No stock for sale.

operty: 1,500 acres, patented, carry considerable standing timber, in McDougall, Hagerman and Cowper townships. Part of property formerly ld by Hattie Belle Gold, Copper & Nickel Co. and the Valentine Mica Co.

ology: contact deposits between slate and quartzite, and fahlbands chalcopyrite ore with occasional bornite and chalcocite, mainly low in but with occasional seams of high-grade ore. There are 18 different ies, as shown by test pits and stripping, 4 of which are slightly developed. hlbands show a width of more than 1,000', carrying 7 bands of ore, of timated aggregate width, amenable to concentration. Ores assay 1.5 to pper, 3 oz. silver, and from a few cents up to $8 gold per ton.

velopment: by 180' vertical shaft, and about 25 pits of 10 to 100' The Spider Lake mine has a shaft house, and steam hoist good for 500', ecessary mine buildings. A considerable orebody has been exposed by ng.

e Lefex mine, about 220 acres, has an iron gossan, carrying up to 2% and $2 to $3 gold per ton. A 600-lb. test shipment, from the 65' level, d 30% copper, and various samples have shown from 1.5 to 3% nickel, m nothing to $20 gold per ton.

OVA MINES, LTD. **ONTARIO**

fice: Sun Life Bldg., Toronto, Ont., Canada. **Mine office:** Cordova Peterboro county, Ont.

ficers: P. Kirkegaard, pres.; Wm. H. Price, v. p.-treas; Edw. Willan, th C. M. Kirkegaard and C. M. Garvey, directors.

:. 1911, in Ontario. **Cap.,** $500,000; shares $5; all issued. Company is d as a close corporation.

operty: 670 acres, owned in fee simple, in Belmont twp., Peterboro Ore occurs in veins in diorite which are said to be from 8 to 30' wide e shoots from 50 to 400' long. The ore consists of quartz, calcite, and lphides, and is estimated to assay about $3.50 gold per ton.

velopment: by shafts of 160', 400, and 500, depth, with a total fo over f underground workings.

uipment: the ore and shaft-houses and the mill burned March, 1917, placed 1918, and a new 30-stamp mill and cyanide plant added. Other ent includes two 1,500 cu. ft. compressors, hydro-electric power plant h. p., pumps and 1,800' tramway. Up to 1919 mill has treated f a total value of $360,000.

INES, LTD. **ONTARIO**

Broadway, New York.

ller, pres.; H. M. Thompson asst. sec.; S. W.

ntario. **Cap.,** $2,000,000; shares $1 par;

all other deductions; deducting the preferred dividend of $133,689, left a balance of $41,240, or only 2c. a share for the $41,834,600 outstanding common stock. Report for 6 months ended September 30, 1919, shows surplus, after charges, Federal taxes and preferred dividends, of $510,602, equivalent to 30c. per share, compared with $2.04 in corresponding 6 months of 1918. For the 9 months ended December 31, 1919, net profits were $1,799,957, compared with $5,072,45 in this period of 1918.

Copper-nickel properties consist of mines with an estimated developed reserve of 20,000,000 tons, smelting plants at Copper Cliff, Canada, handling 15 tons daily, separating and refining plants at Constable Hook and Camden, N. J. Company also absorbed the Orford Co., Anglo-American Iron Co., Vermilion Mining Co., American Nickel Works, Nickel Corporation of Great Britain and the Société Minière Calédonienne.

Property: company is the world's largest producer of copper nickel ores and copper nickel matte. Ore was discovered 1884, mining commenced 18 and smelters were started in 1888. It consists of about 18,000 acres, mostly the south range of the Sudbury nickel belt. The ore consists of a mixture chalcopyrite, pyrrhotite and pentlandite in a norite gangue. The ore may massive sulphides, as in the Creighton mine, or disseminated sulphides scatter through the gangue, as in Crean Hill mine. For geology, see Eng. & Min. Jo Vol. 101, No. 19.

Total production is obtained from Creighton and Crean Hill mines 19 miles from Copper Cliff.

The Creighton mine has 3 incline shafts with vertical depth of 1,000'. pit mining was practised until 1912, when underground stoping began. mine is developed to the 12th and partly developed to the 16th level.

The No. 3 incline shaft, with 5 compartments, handles the entire No. 2 shaft being used for handling men and supplies only. Tramming main levels is by electric locomotives, with 4-ton cars.

Primary crushing of ore is done underground. The crusher is the jaw 42x30" and is set at 6". Shafts are equipped with electrically-driven operating in balance, mechanical appliances being in use for quick loading skips. All buildings are of concrete, steel and brick, fireproof construction.

Secondary crushing is carried out in the ore-house, which has a capacity 500 tons per hour, followed by screening and hand sorting on picking Concrete bins of 3,000 tons capacity are situated under the picking belts.

The electric hoist is operated on the Ilgner system, hoisting 9-ton skips 2,500' per minute. The mine has 4 compressors, 3 of 5,000 cu. ft. capacity, one of 2,500 cu. ft., sufficient for 175 drills. Production is 3,500 tons per

The Crean Hill mine, about 2 miles east of the Victoria, has an inclined 4-compartment shaft, 780' deep. The production is about 450 tons daily.

Surface equipment includes rock-house for crushing and sorting ore, power house, workshops, warehouses, etc.

No. 2 mine at Copper Cliff, is developed to a depth of 860', and produces about 200 tons of sorted ore per day. Equipment is similar to that at Crean Hill. The total output of ore in 1918 was 1,230,509 tons.

A quartz quarry about 15 miles south of Copper Cliff produces silica for fluxing, during the summer months, and is so arranged to provide storage for crushed quartz need in the winter.

The International through the Huronian Co., a subsidiary, has a hydro-electric plant at High Falls, 30 miles from Copper Cliff, utilizing an effective head of 85', which yields about 10,000 k. v. a. The current is transmitted at 35,000 volts.

Ore from the Crean Hill mine goes to the smelter; that from the Creighton mine to the roast yard about 13 miles from Copper Cliff, in part to the smelter. The yard is about 7,500' long and contains space for 122 roast beds, using wood as fuel. Ore is re-loaded by steam shovel, taken to the smelter, and dumped into bins.

The blast furnace building contains 8 furnaces, 5 of which are 4' deep, a 3' 6" jacket having been inserted between the upper and lower sections to lower the settlers sufficiently to receive molten converting slag.

The charge of raw and roasted ores is practically self-fluxing, but about % coke is used. The slag carries about 32.5% silica. This matte averages CuNi.

The reverberatory department contains a fine grinding plant, 4 Wedge sters and 2 reverberatories, one working. The ore is ground in ball mills roasted in Wedge furnaces. The reverberatory furnace smelts about 500 in 24 hours. It burns pulverized coal, crushed so that 75% will pass 200 h and is blown in by fan blast; about 100 tons a day is consumed. Matte ages 23% CuNi.

Matte is blown in 5 basic converters of the horizontal type, exactly as in conversion of copper matte, but is stopped as soon as the iron is eliminated. l product contains 24% copper, 55% nickel, and 0.5% iron. Slag contains silica, and 4% copper-nickel, most of it recovered in settlers. Matte is cast iron molds, broken up, and treated in The International company's Canadian ery at Port Colborne, Ontario, and at Bayonne, N. J.

The Port Colborne refinery, near the Lake Erie entrance of the Welland al, erected at a cost of $5,000,000, produces 15,000,000 lb. of nickel and 8,000,000 f copper yearly. The plant finished in June, 1918, is described in Eng. and ing Journal, March 8, 1919.

The year ended March 31, 1917, was the company's most profitable year; that time earnings have rapidly fallen. Demand ceased when the Armistice signed and operations were cut to ⅛ normal.

IES ROBERTSON, LTD. **ONTARIO**

Succeeded by Kingdon Mining, Smelting & Mfg. Co., Ltd.

NYON COPPER MINES, LTD. **ONTARIO**

Option on property of Massey Station Mng. Co. held in 1917, was not cised. Company probably inactive.

GDON MINING, SM. & MFG. CO., LTD. **ONTARIO**

Office: P. O. Box 1704, Montreal, Quebec.

Officers: C. M. Robertson, pres.; J. J. Milne, sec.-treas.; A. G. Munich, dir.

Cap., $750,000. No bonded debt or liabilities.

Property: the Galetta or Kingdon mine on Chats island, in the Ottawa , 5 miles E. of Amprior, Ont., formerly operated by Jas. Robertson, Ltd. mine has a 10′ fissure vein in a fault fissure in schistose rocks. Ore is t containing grains, clusters and crystal aggregates of galena in crystalline e and barite.

Development: by new shaft 300′ deep with over 600′ of work on No. d 3 levels.

Equipment: includes a concentrator and a small lead smelter blown-in ber, 1916, which was turning out 15 tons of lead daily at last accounts. e are 65 men employed under C. M. Thompson. (For geology, etc., see s. A. I. M. E. October, 1917, "Lead Mng. & Sm. at Galetta, Ont., by W. E. nan.)

G EDWARD MINE **ONTARIO**

Owned by J. S. Dobie and Mary C. Dobie, Thessalon, Ont..

Property leased to the National Mines, Ltd.

INE D'OR HURONIA, LTD. **ONTARIO**

Address: Three Rivers, Quebec.

Officers: Chas. Lafond, pres.; P. V. Ayotte, v. p.; A. Lebrun, sec.-treas.; Work, gen. mgr.

Property: 4 claims, 177 acres, in McVittie Twp. and in Gauthier Twp. district, Ont., Can., 18 miles from Dane, shows narrow quartz veins cut by quartz-porphyry dikes.

Development: by 3 shafts, 102′, 75′ and 45′ deep, a 300′ tunnel and workings.

Equipment: includes 15-stamp mill and hydro-electric plant. Power is from the Goldfields mine at Larder Lake. The mill total gold production of $9,165. Operations were

resumed late in 1918. A new co
recently organized to take over th

MAPES-JOHNSTON SILVER

Dead, and property acquired b

MASSEY STATION MINING

Office: 801 Dominion Bank

Officers: Wallace Nesbitt, p
sec.; preceding, with Robt. Means T

Inc. April 24, 1901, in Onta
assessable: fully issued. Company
development and equipment.

Property: 840 acres, crown
in Salter township, Sudbury distric

Geology: the tract is covere
schist, crossed by a mineralized zo
posits of quartzose material contai
bornite, and in depth chalcopyrite.
the 50,000 tons of ore developed is
gold per ton. See Lincoln, in "En

Development: by shaft 600'

Equipment: includes a 200-h.
wood hoists, a 6-drill compressor

A 50-ton experimental mill w
tion process, with Blake and cent
tables was built ten years or so
closed down in 1909 owing to failu

Property was under option to
at the beginning of 1917, but the
can undoubtedly be treated by fl
larger reserves.

MATACHEWAN GOLD MINE

Address: T. J. Flynn, mgr., F

Inc. Oct. 17, 1918, in Ontario

Property: the Otisse gold m
which work was resumed 1919, bu
level and some ore found. A new
other one. All work save drilling

McGUIRE KIRKLAND GOLD

Address: 157 Bay St., Toront

Inc. March 3, 1919, in Canad

The prospectus issued by the c
other information. Original inco
Mary Winnifred Hunt, stenograph
Gray, teacher; Mabel Gray, teach
Toronto. The first three are dire

Company was organized to pur
for 150,000 shares.

METALS CHEMICAL, LTD.

Address: Welland, Ont. J.

Inc. Jan. 3, 1918, in Ontario.

Operates a plant for the trea

Equipment: includes two bl
reverberatory furnace, 22 leachin
plant, 2 bag-houses. Electric po
Output is silver, a
and nickel salts.

MILLER INDEPE

Address: G

Officers: G

eas.; with J. C. Shaexer, Geo. Ozios, Judge Brown of Dayton, Ohio, J. A. ead, Adam Begard, and Frank Groch, directors.

Inc. November 17, 1915, in Ontario. **Cap.**, $500,000; increased to $700,-0 in 1918; par; 650,000 shares outstanding.

Property: 160 acres in the Boston Creek district.

Geology: the vein cuts through fine grained "pillow" lava and horn-ende schist with a feldspar-porphyry dike on the hanging wall. The ore is iite quartz, containing specks of pyrite, galena and telluride of gold. Re-rves: not extensive but of good grade.

Development: by 400′ shaft to be developed to 600′ at last report. A w vein was cut on the 250′ level.

Equipment: includes a mill, recently enlarged to 75 tons daily capacity, ing Grooch flotation unit, 5-drill compressor, 4 boilers, 2 hoists, etc. ectric power is used.

OLYBDENUM PRODUCTS, LTD. **ONTARIO**

Address: Room 24, No. 34 Victoria St., Toronto. **Mine address:** ilberforce, Ont.

Officers: W. J. L. McKay, pres.; J. L. Gray, sec.; with P. J. Dwyer, rectors.

Property: purchased from American Molybdenite, Ltd., is at Wilber-rce, Ont., said to have large body of ore, assaying 0.7% molybdenum, nich is mined and treated in 200-ton mill.

OND NICKEL CO., LTD. **ONTARIO**

Secretary's address and sales office: D. Owen Evans, 39 Victoria St., ndon, S. W., England. **Mine office:** Coniston, Ontario. **Refining works:** ydach, Glamorganshire, Wales.

Directors: R. L. Mond, chairman; Bernard More, gen. mgr.; Sir E. J. iffith, Saxton W. A. Noble, Sir Robert Hadfield, Emile S. Mond, Dr. Carl nger, Robt. Mathias and Sir Edmund Walker, C. V. Corless, Canadian gr.; Oliver Hall, mines supt.; A. Sharp, supt. Garson mine; J. F. Robertson, pt. of smelting works.

Inc. September 20, 1900, in Great Britain. **Cap.**, £3,400,000, including 00,000 in 7% cumulative pref'd shares; par £1; £2,000,000 non-cumulative preferred shares of £1 par, and 900,000 common shares £1 par. Orig-l capital, £600,000, increased July, 1908, to £850,000; in £500,000 cumula-e 7% preferred shares, £5 par; £300,000 ordinary shares, £1 par, and 0,000 deferred shares, £1 par; totaled issued capital £750,000. Reor-nized July 22, 1914, with authorized capital of £2,400,000, in shares of £1; ,000 being in 7% cumulative preferred shares; 1,000,000 in 7% non-cumu-ve preferred shares, and 900,000 ordinary shares increased 1918 to present ital.

Dividends: 7% has been paid regularly on preferred shares; dividends ordinary shares; 6% in 1905; 10% in 1906; 12½% in 1907; 15% in 1908, 9 and 1910; 16¼% in 1911 and 1912; 21¼% in 1913; 35% in 1914; 20% 915 and 1916, on new capital; 20% less tax in 1917; interim of 1s per e. less tax; final of 3s per share free of tax in 1918; interim of 1s per re free of tax to May 1, in 1919.

Dividends: on former deferred shares were 18% in 1906; 33% in 1907; in 1908, 1909 and 1910; 55% in 1911 and 1912; 85% in 1913.

Net profits: £111,320 in 1909; £114,107 in 1910; £140,803 in 1911; 6,650 in 1912; £191,047 in 1913; £248,088 in 1914; £285,282 in 1915; 6,460 in 1916; £327,248 in 1917; £531,845 in 1918. Reserve fund in 1918 £450,000; cash balance £34,888.

Property: over 14,000 acres in the Sudbury district, and mining rights bout 12,000 acres near to and including Bruce Mines, about 29,000 acres ll. In the Sudbury district the Levack, Garson, Victoria, Worthington, e copper-quartz mines are worked. The Blizzard, Frood Extension, cw h Star are held in reserve. The Bruce mine is opened v ucing quartzose-copper ore, used as flux in the con-

Development: the Levack mine, purchased in 1913; is opened by a 3-compartment inclined shaft, 590′ deep, with 7 levels. In 1918, ore had been developed on 5 levels, and proved to a depth of 1,400′; reserves estimated at 6 to 8,000,000 tons of ore.

The Garson mine has a 3-compartment 1,000′ shaft. Diamond drilling has proved ore to 1,300′ depth.

The Victoria for a long time the company's chief producer is the deepest mine in Canada. At last accounts the 3-compartment shaft had reached the depth of 2,600; and was being sunk to 3,000′ depth.

The orebody at the Worthington mine, 750′ deep, is a mixture of very high-grade ore and rock, which is close sorted. The orebody is a brecciated basic dike and not typical of the Sudbury deposits. (For geology see Economic Geology, Vol. X, No. 6.)

The North Star shaft is 400′ deep. The Blezard mine was worked by open-pits.

The Frood Extension mine has a 4-compartment shaft, 1,000′ deep; levels at 400, 750, and 900′. The main orebody lies at 1,000′ depth. Work at this mine was stopped when the war started.

The copper-nickel ratio in the ore from these different mines varies widely.

Smelter: the 1,500-ton smelter at Coniston, Ont., 7 miles E. of Sudbury, was blown-in May 15, 1913. It has 4 blast furnaces, 50x240″, and 4 Peirce-Smith basic converters with shells 10′ in diameter and 25′ 10″ long. Ores are smelted in blast furnaces and matte bessemered to a rich matte containing 41% copper, 41% nickel, 17% sulphur, and less than 1% iron. This product is shipped to the company's refinery at Clydach, in Swansea Valley, South Wales, where the metals are separated and the nickel is refined by the Mond process.

Refining works: at the Clydach works the matte is dead-roasted and treated with dilute sulphuric acid, which permits the extraction of about 65% of the copper and 2% of the nickel. The residue, after drying, assays 45 to 60% nickel, and is treated in charges of 500 kgs. with water-gas in a reduction tower, at a temperature of about 300° C. This tower has shelves and the ore is moved from shelf to shelf by automatic rakes, the lower shelves being cooled. After treatment in the reduction tower the charge is transferrd to a volatilizing tower and treated with carbon monoxide at a temperature of about 100° C. The residue therefrom is returned to the reducing tower and the charge goes forward and back between the 2 towers for 10 to 15 days, and when 60% of the nickel has been volatilized as nickel carbonyl, the residue of the charge is returned to the reverberatory furnace. The nickel carbonyl is treated in a decomposing apparatus wherein the metal is recovered in granules, assaying 99.4 to 99.8% nickel and the copper is turned out as bluestone, of which the company markets considerable quantities for use in agricultural purposes.

All the Canadian plants are up-to-date and operated electrically, power from 3 hydro-electric plants, 2 of which are the property of the Lorne Power Co., a subsidiary of the Mond Nickel Co. The growth of the company's operations within the past several years has been phenomenal.

Production: the mine output for 1911 was 163,352 tons, 117,658 tons in 1912, 408,638 tons in 1915, 382,913 tons in 1918. Production is not reported but unofficial estimates four years ago placed the annual output at about 4,000,000 lb. fine copper and 5,000,000 lb. nickel, with a possible maximum production of 10,000,000 lb. copper and 15,000,000 lb. nickel.

MURRAY-MOGRIDGE MINES, LTD. ONTARIO

Is a reorganization of the Murray-Mogridge Co. The shareholders of old company received 1,928,870 shares of new stock and New York interests took 200,000 shares, at $1 a share, the proceeds to be used to pay off all obligations and to give funds for the development. By November, $100,000 had been paid [illegible]

Property [illegible] Lake, near Bourke [illegible]

is several gold quartz veins which have been under development by a 200' id another 100' shaft, for several years.

ATIONAL MINES, LTD. **ONTARIO**

Operating under lease, the King Edward mine, which see. Development iderway at 1,000' depth and flotation plant erected to treat ore and tailings. o recent information.

ICHOLS CHEMICAL CO., LTD. **ONTARIO**

Subsidiary of General Chemical Co.

Office: 222 St. James St., Montreal, Canada.

Officers: E. S. Pincott, mgr.; H. V. Smythe, mine supt.

Property: the Northern Pyrites mine on Vermillion Lake at North ines, Ont., Canada, shows veins averaging 45' in width for 1,000' in length, ith strike N. E. and dip 55° N. W. Mine said to have the largest pyrite posit under development in Canada.

Equipment: includes 2-mile Leschen aerial tram, Lambert hoist, com- essor and concentrating mill. Shipments to the United States are made a Graham on the Grand Trunk Pacific R. R. and the Great Lakes. Em- oys 130 men. Company does not publish financial or statistical reports.

About 95,000 tons of pyrite produced in 1915; 103,337 tons in 1918. ork resumed in Oct., 1919, after having been shut down. Reported in ovember, 1919, that an ore dock costing $100,000 would be built on the ission River at Fort William, Ont., to handle the pyrites from North nes, and also from the output of a pyrite property at Mokoman, 30 miles . of Port Arthur.

ORTHERN PYRITES CO. **ONTARIO**

Property owned by the Nichols Chemical Co., which see.

RE CHIMNEY MINING CO., LTD. **ONTARIO**

Office: 100 Clyde Block, Hamilton, Ont. **Mine office:** Northbrook, ontenac county, Ont.

Officers: A. E. Fletcher, pres.; F. E. Misener, v. p.; O. E. Dores, sec.- as.; preceding, with C. H. Siple, S. G. McKay, H. A. Baldwin, R. W. omas, Chas. Zinn and S. A. Fletcher, directors. W. G. Anderson, gen. gr.

Inc. October 11, 1909, in Ontario. **Cap.,** $1,200,000, in 3,000,000 shares; r 40c, non-assessable. Increased April, 1918, from $600,000. Annual meet- g, last Tuesday in October. The property was bought for 850,000 shares stock.

Property: about 1,200 acres, in the Eastern Ontario mining district, 50 les from Kingston and about 11 miles from Kaladar, the nearest C. P. R. station. Claims show conglomerate, quartzite and schist, reported to ve a vertical interbedded, jasper vein, of the so-called "iron formation" o 18' wide on the surface, with hornblende schist on the hanging to N. E. conglomerate and quartzite to S. E., and a basaltic footwall. In 1918, ppany acquired the Big Dipper mines a gold property of about 1,240 s.

Development: by 403' shaft, with total workings of 2,000'. Crosscut at is reported to have disclosed a vein of sulphide ore carrying galena chalcopyrite with gold-silver values.

Equipment: includes three 100-h. p. tubular boilers, two 1,000 cu. ft. mpressors, a hoist, 20-stamp mill with amalgamating plates, tables and agnetic separator. The mill capacity is about 200 tons a day. No ore mined in 1918, as an electric plant was under construction.

E EXTENSION MINING CO., LTD. **ONTARIO**

Address: Vineland, Ont., Canada.

Officers: David Fretz, pres.-mgr.; S. Spiece, v. p.; Geo. Laws, sec.-treas., J. O. Moore and S. R. Lupton, directors, at last report.

Inc. November 1, 1913, in Ontario. **Cap.,** $1,500,000; shares 50c par.

Transfer office: 354 Hudson St., Buffalo, N. Y. Annual meeting, 2nd nesday in January.

Property: 167 acres at Northbrook, Lennox and Addington counties, Ontario, said to show gold-silver-lead-zinc-copper ore, in six veins, from a few feet to 40' wide, in diorite and schist. Developed by a shaft 53' deep. A prospect.

PARAGON-HITCHCOCK MINES, LTD. ONTARIO

Address: Collingwood, Ont., Canada. **Mine office:** Wabun, Ont.

Officers: Donald McKay, pres.; W. R. Hitchcock, v. p.; David Melrose, sec.; W. T. Herrington, treas.; E. H. Hitchcock, C. W. Pitt, W. A. Hamilton, R. Fregehen, J. P. Welsh and T. R. Gilpin, directors.

Inc. February 12, 1917, in Ontario. **Cap.,** $1,100,000; shares $1 par; 200,000 issued, non-assessable.

Property: 4 claims in Tudhope Twp., Ont., near rail and 2 claims 4 miles away.

Geology: the Hitchcock property is a heavily-timbered, low-lying tract with diabase showing as the only rock exposure. Four well-defined silver-bearing veins can be traced through this exposure, one of which is opened by a 200' shaft, with a drift said to show native silver.

Reported October, 1919, that two drifts were being driven on the 200' level of the Paragon shaft one of which showed native silver ore.

Equipment: boiler, steam hoist, and compressor, pump, and camp accessories.

PARRY SOUND COPPER MINING CO., LTD. ONTARIO

Office: 500 Germania Life Bldg., St. Paul, Minn. **Mine office:** Parry Sound, Ont.

Officers: Frank Johnson, pres.; Otto Monson, sec.-treas.; president with John Ogren, A. Linderholm and F. X. Benning, directors.

Inc. March 23, 1899, in Ontario. **Cap.,** $5,000,000; shares $1 par; issued $4,500,000. Liabilities are given at $45,000 floating indebtedness. Annual meeting, second Tuesday in August.

Property: the McGowan and Wilcox mines, 10 claims, 1,000 acres, one-half freehold and one-fifth held subject to a $3,000 mortgage, on the east shore of Georgian bay.

The Wilcox mine has 4 parallel veins in a width of about a quarter mile, with a 145' shaft on a 20' vein in granite-gneiss, traceable 1,000', containing auriferous and argentiferous bornite, assaying 2.8 to 11% copper. There also is an opencut, 20x150', 18' deep, showing 3% chalcopyrite ore.

The McGowan mine has shafts of 100', 100' and 250', and a 150' cross-tunnel, showing bornite and occasional chalcopyrite, with quartz gangue. A smelter shipment of 240 tons of selected ore returned 17% copper and $5 per ton in combined gold and silver.

Equipment: includes a 10-stamp mill, hoisting machinery and several buildings. Idle, but management plans further work.

The Wilcox mine reported sold September, 1917, for $30,000. No later information.

PATRICIA SYNDICATE ONTARIO

Formerly the Boston Hollinger, is controlled by Chas. O'Connell and Montreal interests. The 80 acres at Boston creek has been under development since October, 1917. Main vein of bluish quartz said to be 2 to 4 feet and developed to a depth of 200'. Ore which is free-milling is said to run $20 to $22 gold per ton, and is treated in a 40-ton mill with a 92% recovery, but has been idle during winter months due to lack of fuel.

PITTSBURGH & NORTHERN ONTARIO EXPL. & DEV. CO. ONT.

Head office: Toronto, Ont.

Cap., $100,000; par $10.

Company was incorporated about August, 1919. Details of organization and holdings not yet obtainable.

PROSPECTOR'S DEVELOPMENT CO., LTD. ONTARIO

Incorporated August 1919, by John B. Holden of Toronto, Paul Oakes, pres. of Lake Shore mine; H. H. Johnson, of the Tough-Oakes, Wright and others.

Cap., $2,000,000; par $1. No promotion issued, all shares remaining in treasury.

Company plans the systematic development of promising mining prop-s in Northern Ontario, aiding prospectors to do preliminary develop-t.

A. P. GOLD MINING CO. **ONTARIO**

Head office: Toronto.

Cap., $2,000,000; par $1.

This company was incorporated about September, 1919, further details available, but evidently a reorganization of the syndicate of same name, h sold part of its property to the Boston Creek Gold Mines Ltd., and reported, 1918, to be considering a merger with that corporation.

P MINING DEVELOPMENT & PROSPECTING CO. **ONTARIO**

Address: Boston Creek, via Krugersdorf on the Ont. Northern Ry.

Property: the original "find" at Boston Creek shows a gold-bearing tz vein on which shaft has been sunk.

Equipment: includes hoist, compressor, etc. No recent information. R. A. P. Co.

VES-DOBIE MINES, LTD. **ONTARIO**

Address: Marton H. Jacobs, Gowganda, Ontario.

Inc. June, 1917. **Cap.**, $2,000,000; $1 par.

Property: at Gowanda. Operated to 100′ depth with over 700′ of work-Six men employed at mine, 1919, and a mill was to be purchased.

INCO MINES CO. **ONTARIO**

Organized, 1919, to operate the Big Four group of claims in the Gow-a district of Ontario. Details not available, but the statements issued o strongly unfavorable comment in a well-known mining journal.

ERIOR COPPER CO., LTD. **ONTARIO**

Office: Sault Ste. Marie, Ont. **Mine office:** Superior Mine, via Algoma ral Railway, Algoma, Ont.

Officers: G. R. Nicholson, pres.; C. H. L. Jones, v. p.; Emory W. Clark, and treas., at last accounts.

Inc. September 13, 1901, in Ontario. **Cap.**, $3,000,000; originally $1,500,-increased, 1903, to $2,000,000, and again July 29, 1907; shares $10 par; d, $2,402,160. The company was organized with non-assessable stock, special act of the provincial parliament of Ontario rendered the stock sable. Total assessments to December 31, 1910, were $132,080.52. Se-Trust Co., Detroit, registrar and transfer agent. Annual meeting, d Thursday in June.

Property: 11 claims, crown granted, 800 acres, in an unorganized min-district of Algoma, shows granite and chlorite schist carrying fissure of 10′ and 70′ estimated average widths, traceable 7,000′. The quartz carry chalcopyrite with a little chalcocite, estimated by the manage-to average 4% copper, 1 oz. silver and 40c gold per ton.

Development: amounting to 1,233′, includes a 400′ shaft and 949′ tunnel 5 shallow shafts, a 189′ tunnel and many surface cuts.

Ore is reported to show 4,000 tons of ore on the dump, with 140,000 d out, apparently a serious over-estimate.

Equipment: includes a 150-h. p. steam plant, 12-drill compressor, engine changing house, boarding house, machine shop, smithy, office, store wellings, and a 50-ton concentrator.

he mine has been idle since December, 1908.

DISH-CANADIAN GOLD MINING CORPORATION **ONTARIO**

ddress: Mine Centre, Northern Ontario.

roperty: the Foley mine, 6 miles S. of the Canadian National Railroad, ed in December, 1919.

evelopment: by 1,000′ of shaft work with 2,000′ drifts and crosscuts, is o have developed a large tonnage of $14 ore.

quipment: includes 20 stamp mill with cyanide plant; a 1,600′ aerial o be constructed early in 1920.

SYMMES-YOUNG SILVER MINES, LTD. ONTARIO

Head office: Toronto, Ont.

Cap., $2,000,000; par $1.

Company was incorporated in August, 1919, but details not yet ascertainable.

TASH-ORN MINES, LTD. ONTARIO

Office: 1009 Calvert Bldg., Baltimore, Md.

Officers: Jos. Castelber, pres.; L. H. Nachman, v. p.; L. B. Bernei, sec.; J. L. Orn, treas.

Inc. August 2, 1916, in Ontario. **Cap.,** $3,000,000; par $1; 2,454,92[illegible] shares issued. U. S. Corporation Co., New York, transfer agent. Listed on New York Curb.

Property: at Tashota and Kowkash, Ont., where the discovery of rich gold ore in 1917, was followed by a boom.

TAYLOR MOLYBDENITE MINE ONTARIO

Property in Renfrew county is owned and operated by A. M. Taylor, who has shipped ore that assayed 5.3 to 6% molybdenum. A concentrator treats the lower grade ore making an 86% product, with a 92% recovery.

THREE STAR MINING CO. ONTARIO

Reported in 1918, to be developing the property formerly worked by the Calumet & Montana Cons. Mining Co., which see. No recent information.

THUNDER MINING CO., LTD. ONTARIO

Address: Dominion Reduction Co., Cobalt, Ont. Julius Cohen, mgr.

Inc. October 7, 1916, in Ontario. **Cap.,** $2,000,000; **shares** $1 par; 1,6[illegible] issued. Entire capitalization owned by the Dominion Reduction Co. (66[illegible] Kerr Lake Mining Co (22%) and Wettlaufer-Lorrain (12%).

Property: the St. Anthony Gold Mining Co.'s ground at Sturgeon Lake, Ont. Considerable development was done and ore milled in 1918.

TIP TOP MINE ONTARIO

Address: Col. S. W. Ray, owner, Port Arthur, Ont. Mine near Kashaboiwe, Thunder Bay district, Ont.

Property: 4 claims, freehold, 336 acres, 6 miles by rail S. W. of Kashaboiwe station, Canadian Northern railway. The claims are near Rose Lake, and show schist quartzite and greenstone of Keewatin age, cut by quartz porphyry dikes. The ore occurs in lenses 5 to 40′ wide, in the site and quartz porphyry. One body of chalcopyrite and pyrite ore, stoped for 8 to 25′ wide and 70′ long, yielded 4,000 tons of ore said to have averaged 5.3% copper.

Development: by 208′ incline shaft, dipping 70° N. with workings on levels. This work is estimated to show 45,000 tons of ore, of 4 to 6% copper.

Equipment, includes a 150-h. p. steam plant, with 50-h. p. hoists, and a 6-drill air compressor. See Ontario Bureau of Mines Report, 19[illegible] 209. Idle in 1918 and 1919.

TISDALE GOLD MINING CO., LTD. ONTARIO

Inc. October, 1910, in Ontario. **Cap.,** $500,000 shares $5 par. See Dome Mines, Ltd.

TWO LAKES COPPER MINING CO., LTD. ONTARIO

Idle. **Office:** Oil City, Pa. Mine office: Sowerby, Algoma, Ont.

Officers at last report: Dr. E. L. Dickey, pres.; S. F. Amsler, v. p.; D. Bailey, sec.; J. C. Wilkins, treas.; F. W. Bailey, gen mgr.; preceding and J. W. Russell, C. W. Coulter, G. W. Freeman and Edw. Schwabe directors.

Inc. October 12, 1906, in Ontario. **Cap.,** $500,000; shares $1 par, assessable; issued, $270,000. Annual meeting, first Tuesday in Nov[illegible]

Lands: 8 claims, 1 fractional, 300 acres, freehold, including the Thompson and Tupper mines, 8 miles from Thessalon, and 4 from a railway. The property shows pre-Cambrian slate, conglomerate and greenstone, cut by a number of flat ore veins, 3 of 2 to 10′ estimated average width, [illegible]

ılphide ores of about 4.5% copper, with small quantities of silver and gold.

Development: by shafts of 50', 25' and 10'.

Equipment: includes a 60 h. p. boiler and 35 h. p. hoist. At last reports ıe management was planning further development as soon as the finan- al situation improved, but is apparently still adhering to a once popular watchful waiting" policy.

/ACHMAN MINING CO., LTD. **ONTARIO**

Office: Dryden, Ont. **Cap.,** $500,000.

Company was organized in 1918, by Robert Wachman, 4439 So. Michi- ın Bldg., Chicago, Ill., to acquire 2,100 acres of mineral lands at Contact ıy, Vermillion lake.

Main vein of tract is said to be traceable 2,640', and to show silver and ee milling gold ore for a length of 400'.

In November, 1919, 60 men were employed in building camps and nking, as company planned sinking three 800' shafts during the winter, and ection of a 20-stamp mill.

/ASAPIKA GOLD MINES, LTD. **ONTARIO**

To be reorganized in 1920 with capital of $6,000,000; $1 par.

Address: Isbell, Plant & Co., Standard Bank Bldg., Toronto, Ont.

Cap., $1,000,000; shares $1 par. Listed on New York Curb as a pros- ct.

Officers: Geo. R. Rogers, pres. and mgr.. F. M. Connell, v. p.; with J. ahay and Geo. A. Young, directors.

Property: the Ribble claims, 120 acres and 3 more optioned (1919), near asapika lake, West Shining Tree district, in the Sudbury division, Ont., miles from rail. Examined in March, 1917, by G. R. Rogers, who reports e main vein to lie between andesite and rhyolite porphyry. Ore is gray ıartz impregnated with iron pyrite, with some free gold. The vein ex- ısed for 1,800', "averages 5 ft. 1 in." in width; a 7' width sampled in shaft depth of 50' assayed $11.20. R. E. Hore, says: the quartz veins in the asapika are narrow, a foot or two being a good width, but the ore is not vein quartz, but largely silicated rock. The Ribble or main vein is de- loped by a shaft 200' deep, sunk in the hanging wall, the showing on the Y level warranted sinking shaft to 200 feet. A 150-ton mill is planned.

EST TREE MINES, LTD. **ONTARIO**

Officers: Senator Geo. W. Fowler, pres.; C. S. Corson, v. p.; Gidson ant, sec.-treas.; with W. D. McKay, W. J. J. Butler, Geo. R. Rogers, and E. Way, directors.

Inc. in Ontario. **Cap.,** $3.000,000; par $1; treasury 1,000.000 shares. alt in on New York Curb, shares sold 15c low (November), 37c high, ıe, 1919.

Property: 4 claims, 183 acres, in Macmurchy Twp., Sudbury district, ıt., adjoins Wasapika Mines, 60 miles S. of Porcupine district. Pros- ctus issued states that there are 15 veins on the property, all with free ld showing in the quartz.

Development: three 50' shafts, with 10,000' of stripping. Shaft sinking progress October, 1919.

Property: is an attractive prospect that requires further development prove its real value.

HITE RESERVE MINING CO., LTD. **ONTARIO**

Address: 802 Lumsden Bldg., Toronto.

Officers: J. A. McAndrews, pres. and mgr.; A. E. Marks, v. p.; with B. Mayfair, directors, Dan McDonald, supt., Cane P. O., Ont.

Inc. June 17, 1914, in Ontario. **Cap.,** $1,000.000; par $1; outstanding [illegible] shares. Traded on Toronto exchange. Shares sold at 20c, 1919.

[illegible]perty: 3 claims, 2 patented, 130 acres, in Twp. of Whitson, Maple [illegible] and 40 acres, in Twp. of James, both said to show fissure veins [illegible] cobalt and nickel ore, occurs in shoots of variable size [illegible] of value.

Development: several shafts, deepest 140', and total workings of 1,000'. No ore is mined as work is confined to development and exploration in order to block out ore reserves.

Equipment: includes an I-R hoist, and a 9-drill compressor.

COBALT DISTRICT.

ADANAC SILVER MINES, LTD. ONTARIO

Office: Excelsior Bldg., Toronto. **Mine address:** Cobalt, Ont., Can.

Officers: R. A. Cartwright, pres.; Alex. Faskin, v. p.; M. R. Cartwright, treas. and managing director; with E. M. Campbell, and C. L. Sherrill, directors; Jas. Aitcheson, sec.

Inc. March, 1915, in Ontario. **Cap.,** $3,000,000; $1 par.

A merger with the Victory company to form a $3,000,000 corporation, Adanac to get $1,000,000 in shares, will take place in 1920.

Property: in Coleman Twp., Cobalt district, Ont., adjoins the Temiskaming, showing smaltite, niccolite, and a little silver.

Development: by 400' shaft. Work now concentrated on 310' level, where high-grade ore was found. Diamond-drilling from the 310' level was commenced in December, 1919. Property is in the prospect class.

ALADDIN COBALT, LTD. ONTARIO

Liquidators: Frank F. Fuller, sec., 638 Salisbury House, London Wall, London, E. C., England and R. Simpson, Toronto. **Mine address:** Cobalt, Ont.

Directors: D. H. Herbert, chairman, Lt. Col. Chas. Gold, Capt. C. R. S. Jorgensen, and S. B. Peech.

Registered April 23, 1913. Acquired all the capital of the **Aladdin Cobalt Co., Ltd.,** registered in Canada with a capitalization of $500,000, shares $1 par. Canadian shareholders received 5 fully-paid £1 shares for every ten $5 shares held. Controls Chambers Ferland Co.

Cap., £500,000; shares £1 par; 499,993 shares issued. Stock is to be listed on Toronto Exchange. Balance sheet for fiscal year ending April 30, 1916, shows expenditures, £12,432 and a deficit of £28,758.
$5 shares held.

Chambers Ferland Co.

Address: 58 Wellington St., Toronto.

Inc. 1908 in Ontario. **Cap.,** $2,500,000; par $1. Is practically an operating subsidiary of A. C. Co., Ltd.

Company to be absorbed by Kirkland Lake Prop. Ltd. in 1920, shareholders given 7 Aladdin shares for 2 K. L. Prop., i. e. 100 Aladdin shares entitle holder to 28 4/7 new company shares, the fraction payable in cash amounting to 2 shillings.

Aladdin Cobalt Co., Ltd.

J. A. McVichie, mgr.

Dividends: ½% January 24, 1916; 2% February 28, 1917, none reported since. The total is $48,000.

Property: the Chambers Ferland mine at Cobalt, Ont., supposed to have the extension of the Nipissing vein system. Company also controls the Bonetal property at Kirkland Lake. The Chambers-Ferland had 125 acres, but in December, 1919, sold 23 to the Northern Concentrator Co.

Ore: silver in veins of calcite. Property supposed to have good chance of becoming a large producer, but the output has been comparatively small.

Development: work on the whole had been disappointing up to 1919, when 1,300' of work on the 275 and 425' levels was done, opening $150,000 worth of new ore.

Equipment: new equipment installed includes double-drum hoist, 12" crusher, 125-h. p. boiler, ore bins and an ore house with engine.

Production: for fiscal year ending April 30, 1916, amounted to 72 tons. Estimated production from May 1, 1916, to September 30, 1916, 200 tons.

390,523 oz. In 1918 the yield was 107.445 oz. from 3,175 tons of 18.3 oz. e and 40 tons of high-grade ore. Shipping steadily to Northern Customs Concentrator in 1920.

AILEY COBALT MINES, LTD. **ONTARIO**

John L. Woods, pres.; Floyd Weed, supt.

Inc. August 15, 1906, in Ontario. **Cap.**, $5,000,000, shares $1 par. Trust Guarantee Co., Ltd., Toronto, Can., transfer agt. and registrar. In 1914 company, being deply in debt, including about $90,000 owing to E. A. Benson, former esident, a permanent liquidator was appointed. A Protective Committee was rmed by Buffalo stockholders to guard their interests. It is said that E. A. nson. former president, and other promoters issued 4,250,000 shares of stock themselves, retaining 750,000 in the treasury for financing the property. This omotion stock, it is claimed, was disposed of, and the treasury stock remained sold, with the foregone result of such practice. Company now in hands of uidators.

Reorganization Committee: because of the bankrupt condition of the mpany and appointment of liquidators by Supreme Court of Ontario, the foving consented to act as a committee and prepare the plan for reorganization: bert G. Wheeler, Jr., chairman; Wm. E. Stevenson and H. S. Langdon, with alter Laier, sec., 22 William St., New York. Lawyers' Title Insurance & Trust ., New York, is depositary.

Reorganization plan: as finally worked out, provides that the liquidators nsfer the Bailey mine and its assets to a new company, to be known as the iley-Northern Customs, Ltd. Holders of existing stock consenting to plan ill receive one share of new stock for each ten shares of old. The capitalization the new company to be $1,250,000, with $50,000 in the treasury.

The proceedings brought by the Protective Committee of Buffalo against former directors of the Bailey Company in Canada resulted in a default lgment being obtained against all of the directors who are Americans. The ffalo committee requested the liquidators to institute like proceedings in the ited States.

Judgment obtained by E. A. Benson for the $90,000 due him was purchased the Profit Sharing Construction Co. of New York and the Reorganization nmittee, headed by A. G. Wheeler, Jr., negotiated with the Profit Sharing nstruction Co. as the owner of the judgment, for the purpose of bringing ut a reorganization. The Buffalo Protective Committee opposed this action, ich is responsible for the delay.

Property: 38 acres, adjoining the Penn Canadian mine in Coleman Twp., issing district. Several veins have been opened up, from which shipments e been made at different times. Developed by shaft. Lowest workings on fifth, or 280′ level. In 1913 underground work totaled 1,370′.

Property in charge of caretaker since 1914.

Ten years of litigation was settled in favor of majority shareholders, ruary, 1920.

ILEY-NORTHERN CUSTOMS, LTD. **ONTARIO**

Recently incorporated to operate the property of the Bailey Cobalt Mines, which see.

AVER CONS. MINES, LTD. ONTARIO

Lumsden Bldg., Toronto, Ont. **Mine office:** Cobalt, Ont.

Officers: F. L. Culver, pres.; F. C. Finkenstaedt, v. p.; H. E. Tremain, treas.; preceding officers, Wm. T. Mason, F. L. Lovelace, W. E. Stevenson, J. Mercer and H. L. Churchill, directors; L. W. Ledyard, supt., c/o Beaver e, Cobalt.

Inc. February, 1907. **Cap.**, $2,000,000; shares $1 par, fully paid, all issued. on Trust Co., Toronto, and Security & Registrar Co., New York, transfer ts. Annual meeting in April. Stock listed on Toronto Stock Exchange.

Comparative General Balance Sheet, years ending February 28:

Assets.

	1919	1918	1917
Cash	$29,198	$15,702	$151,890
Supplies	20,049	24,733	15,255
Ore and bullion on hand	34,096	54,355	63,876
Beaver Aux. Mines, Ltd., stock	143,250	143,500	143,500
Kirkland Lake Gold Mining Co.	370,958	398,940	88,698
Beaver Mine	1,000,000	1,000,000	1,000,000
Buildings and timbering	93,984	89,990	83,577
Plant and equipment	118,861	118,561	118,975
Development	82,934	82,934	82,934
Discount on shares	863,973	863,973	863,973
Other	315,384	105,306	168,140
Total	$3,072,687	$2,897,994	$2,780,818

Liabilities.

	1919	1918	1917
Capital stock	$2,000,000	$2,000,000	$2,000,000
Depreciation	141,515	130,241	118,375
Profit and loss balance	901,645	744,276	639,823
Accounts payable, etc.	29,527	23,477	22,620
Total	$3,072,687	$2,897,994	$2,780,818

Ore sales, actual, were $341,380 in 1918; $295,878 in 1917; $423,587 in 1916.

Dividends: $60,000 in 1914; $120,000 in 1915; $60,000 in 1916; none since 1916. The total is $650,000.

Property: 2 claims, patented, 60 acres, in Coleman Twp., Cobalt district, adjoining the Temiskaming mine, and 120 acres, James Twp.; also owns approximately 7/8 of entire stock of Kirkland Lake Mining Co., Teck Twp., which see, and a ¼ interest in the Beaver Auxiliary Mines Co.

Ore: silver, cobalt, and arsenic in narrow calcite veins, in diabase and the Keewatin formation. Ore occurs as high-grade in pockets and shoots, not as milling ore.

Development: by 1,650′ vertical shaft, which encountered the diabase-Keewatin contact at a depth of 1,570′. During 1918, underground work totaled 1,441′, compared with 4,952′ in 1917. Naturally, war conditions prevented normal working.

The high-grade ore on the 1,600′ level was the deepest occurrence of such ore at Cobalt. In 1919, management reported that high-grade ore had been found on the 200, 600 and 700′ levels.

Equipment: includes a 150-ton concentrator, giving an extraction of about 80%, blacksmith shop, dwellings, etc.

Production:

Year	Tons Milled	Tons Concts.	Oz. Ag. in Concts.	Total Oz. Ag. Prod.	Earnings
1918	.....	...	.....	385,043	$393,000
1917	.....	...	.....	372,973	354,300
1916	34,766	394	340,549	566,964	488,000
1915	30,093	474	349,900	746,310	351,200
1914	26,724	348	415,707	900,000	156,000
1913	25,256	324	379,764	762,699	165,500

In December, 1919, the president stated that the net profit was between $2000 and $3000 daily.

BRANT MINES, LTD. ONTARIO

Address: W. M. Macdonald, mgr., Gowganda, Ontario.

Officers: J. C. Cohoe, pres.; E. L. Goold, v. p.; O. Hall, sec.-treas.

ith F. L. Mapes, W. H. Whittaker, C. W. Leeming and C. H. Waterous, rectors.

Inc. 1917, in Ontario. **Cap.**, $1,500,000; shares $1 par; 1,000,000 issued.

Property: 87 acres, formerly owned by the Mapes-Johnston Silver lines Co., in Meickle township, Silver Lake district, and near the Miller Lake-'Brien mine.

Development: by 350' shaft and other workings. On 320' level, ore saying 2,000 oz. silver per ton was reported as being mined.

Equipment: includes hoist, compressor, machine-drills, and accessories.

Shares quoted at 57c early in Nov., 1917. No recent information.

UFFALO MINES, LTD. **ONTARIO**

Office: 14 Wall St., New York. **Mine office:** Cobalt, Ont., Canada. Is subsidiary of Mining Corporation of Canada.

Inc. 1906. in Ontario. **Cap.**, $1,000,000; shares 75c par; reduced, 1918, $500,000, 50c par. Planned Nov., 1919, to reduce capital to $150,000, 15c par. isted on Toronto Exchange. U. S. Mortgage & Trust Co., transfer agent. ransfer offices: Imperial Trust Co., Toronto, and U. S. Mortgage & Trust Co., ew York. Registrar, Imperial Trust Co., Toronto. Annual meeting in June.

The Buffalo has been one of the largest producers in Cobalt, its yearly itput having been as much as 2,000,000 oz. While the greater part of the gh-grade ore has been mined, a large tonnage of low-grade ore is left, which n be worked at a good profit. Nov., 1919, control (70%) of company was irchased by the Mining Corporation of Canada.

Income Statement, years ending April 30:

	Total Income	Net	Dividends	Surplus	Total Surplus
20.....	.....	.....	$350,000	.....	.....
19.....	$674,678	$171,239	.....	.....	$636,194
18.....	831,286	264,282	.....	.....	687,240
17.....	...376,465	36,583	.....	.....	669,177
16.....	439,757	231,344	.....	230,920	610,889
15.....	372,260	79,690	50,000	27,158	379,968
14.....	858,825	386,990	660,000	270,218*	352,810
13.....	1,258,864	891,193	650,000	233,450	623,028

* Deficit.

Balance sheet for year ending April 30, 1919, showed assets of $1,189,262, iich includes cash, ore and bullion, $430,249; U. S. and Canadian bonds, $75,000; int and equipment, $154,372; mining rights, $407,092. Liabilities include notes d accounts payable, $32,146.

Property: the Buffalo mine with 40 acres of ground in the town of Co-lt.

Development: by vertical shafts with 21,916' of drifting on veins and ope work at 3,670,242 cubic feet.

Ore reserve on May 27, 1919, was 20,600 tons of broken ore in the stopes, saying 11 oz. Milling ore is not developed for measurement, but with the oken ore will give about one year's mill supply. There are also 33,000 tons of .lings assaying 6.5 oz. per ton.

Production, years ending April 30:

ear	Tons Milled	Oz. Ag. per ton	% Rec.	Tons Cyanided	Oz. Ag. per ton	% Total Product Rec.	Oz. Ag.
19.....	30,572	.....	.....	.....	.....	.....	625,786
18.....	28,481	.....	.....	.....	.....	.....	767,740
17.....	14,452	.....	.....	3,038	.....	.....	394,587
16.....	30,079	19.80	.....	8,078c	25.46	.....	684,274
15.....	51,667	19.50	72.22	8,385	9.86	82.26	822,791
14.....	77,616	25.31	76.14	13,388	10.13	77.80	1,637,809
[illegible]	55,783	45.83	82.64	10,320	15.45	74.70	2,235,853

[illegible] year ending April 30, 1919, the mill also treated 77,239 tons of sand tail-[illegible] 88,534 tons; in 1917, 35,507 tons.

[illegible] by flotation, not cyanidation.

CANADIAN MINING CORPORATION, LTD. **ONTARIO**

Liquidator: V. Layman, Balfour House, Finsbury Pavement, London, E. C. England.

Company, at last account, was in process of voluntary liquidation, shareholders to receive for each £1 share, a fully paid $5 share of the Mining Corporation of Canada, which see.

Dividends: 2½% Nov. 25, 1914; 2½% March 31, 1915; 2½%, interim Oct. 14, 1915.

CARIBOU COBALT MINES CO. **ONTARIO**

Offices: 61 Broadway, New York, and Cobalt, Ont.

Officers: Herman Cook, pres.; F. M. Loper, v. p.; E. H. Westlake, sec.-treas., with J. H. Sussman and Sam A. Lewisohn, directors.

Inc. September 29, 1913, in Maine. **Cap.,** $1,000,000; shares $1 par, all outstanding, of which 837,498 shares were owned by the Kerr Lake Mining Co. Aug. 31, 1915. Listed on New York Curb. The Caribou Cobalt Mines Co. owns the entire capital stock of Cobalt Comet Mines, Ltd., which is the operating company. Dividends to April, 1917, totaled $175,000.

CART LAKE SILVER MINES, LTD. **ONTARIO**

Idle. No recent information.

Operated the Gould lease on Cart Lake during 1914 with a production of 150,000 oz. silver. Production for 1915 not available. Ore came from the extension of the Seneca-Superior vein.

Development: in 1914 amounted to 1,003'. No. 2 shaft is 195' deep with 400' of workings on the 185' level, at last accounts.

CASEY-COBALT MINING CO., LTD. **ONTARIO**

Office: Balfour House, Finsbury Pavement, London, E. C., Eng.

Officers: Col. Sir A. C. F. Fitz-George, chairman of directors; R. F. Eden, sec.

Inc. in April, 1917, in England, to acquire 99,995 fully-paid shares of $1 each, being the entire issued capital, with the exception of 5 shares of the Casey Cobalt Silver Mng. Co., Ltd., of New Liskeard, Ont. Consideration was 199,993 in fully-paid shares, vendors agreeing to provide £15,000 working capital. **Cap.,** £244,950; par £1. Company paid total dividends of $203,249 to end of 1914.

Balance sheet for 1918 showed total assets of £245,995, which include aside from the Casey Cobalt Silver investment, cash £682.

CASEY-COBALT SILVER MINING CO., LTD. **ONTARIO**

Head office: 15-20 Traders Bank Bldg., Toronto. **Mine office:** New Liskeard, Casey Township, Ont.

Officers: W. R. P. Parker, pres.; J. P. Watson, v. p., with G. M. Clark, Capt. R. E. G. van Cutsem and Lieut. Graeme Watson, directors. John W. Shaw, mine engr. Company controlled by the Casey Cobalt Mng. Co., Ltd.

Property: originally 40 acres in Harris Twp., and the Casey-Cobalt mine in Casey twp., 9 miles N. E. of New Liskeard. In 1918 practically all work was done on the property of Casey-Harris Mining Co., Ltd., of which company Casey Cobalt Silver Mining Co. owned a half interest. Since all the available ore of the two properties has been milled and operations have ceased. The only work now being done is on the property of the Harmak Mining Co., which lies S. of the Casey. Operations are charged for at cost, the Casey company to receive 10% of the Harmak Company profits for a number of years.

Equipment: includes hoist at 375' shaft, compressor and mill erected in 1918.

CASTLE MINING CO. **ONTARIO**

Property operated by Trethewey Silver-Cobalt Mine, Ltd.

CHAMBERS FERLAND MINING CO., LTD. **ONTARIO**

See description under Aladdin Cobalt, Ltd.

COBALT COMET MINES, LTD. **ONTARIO**

Office: 61 Broadway, New York, and Cobalt, Ont. Same officers

ribou Cobalt Mines Co., which company owns the entire capital stock of balt Comet Mines, Ltd.

Inc. April 16, 1913, in Ontario. **Cap.**, $1,000,000; shares $5 par; all outnding. Annual meeting, 2nd Thursday of Feb.

Property: 2 part claims, patented, in Coleman Twp., Temiskaming ing district, formerly known as the Drummond mine.

Ore: Fissure veins, contain shoots of variable widths of rich silver ores ose minerals are native silver and cobalt-nickel sulpharsenides.

Development: by two shafts, 100′ and 200′ deep.

Equipment: includes an air hoist, electric pump, compressed air and ctric power.

Production: Practically all ore in sight has been removed and future nings depend on further discoveries of ore. Low-grade ore is treated by Dominion Reduction Co.; high-grade ores are shipped. Mine yielded 203,777 in 1916. No recent production reported.

)BALT PROVINCIAL **ONTARIO**

Cobalt, Ont. Adjoins Nipissing. Reopened Sept., 1917, by John Reding-, who is sinking a shaft on a vein at S. W. end of tract. Reserves estimated 148,000 oz. silver. At last account, July, 1919, was planning to increase mill acity to 100 tons daily. Stock formerly listed on New York Curb.

)BALT REDUCTION CO., LTD. **ONTARIO**

See Mining Corporation of Canada, Ltd.

)NIAGAS MINES, LTD. **ONTARIO**

Offices: St. Catherines, Ont., and Cobalt, Ont.

Officers: R. W. Leonard, pres. and gen. mgr.; Alex. Langwell, v. p.: h R. P. Rogers, F. J. Bishop, R. L. Peek, F. D. Reid and W. D. Woodruff, ectors; J. J. Mackan, sec.-treas.

Inc. November 24, 1906, in Ontario. **Cap.**, authorized and outstanding)00,000; $5 par. Toronto General Trusts Corp., transfer agt. Annual meet- in December. Listed on Toronto Stock Exchange and New York Curb. ire prices $1.45 low, $3.67 high 1918; $2.40 low, $3.15 high 1919.

Owns 2,495 shares of the $100 stock of the Coniagas Reduction Co., Ltd., ich handles this company's product; also 137 preferred and common 137 res, par $100, of Elec. Steel & Eng. Co., Ltd. Company has $700,000 in nadian Victory Loan bonds.

Income Account, Fiscal Years Ending October 31:

ar	Gross income	Net income	Dividends and bonuses	Surplus for year
9	.....	.....	$100,000(c)	.....
8	$1,017,212	$610,045	500,000	$25,045
7	1,065,745	641,334(a)	300,000	.....
6	1,192,424	840,791	600,000	240,791
5	1,013.513	658,730	600,000	58.730
4	1,407.877	968,387	1,320,000	351,613(b)
3	2,186.664	1,693,583	1,640,000	53,583
2	2.172,967	1,676,953	1,440,000	236,953

(a) Before providing for business profits, war tax, or income tax. (b) cit. (c) Feb. 1, 1920.

Balance sheet as of Oct. 31, 1918, showed assets, $5,786,702, which includes iagas mine, $3,985,700. Agaunico mine, $3,655; Maidens McDonald prop- $72,000; Montgomery Maiden property, $65,000; machinery, plant, build- and real estate, $132,049; Coniagas Reduction Co., Ltd., stock, $249,400; in bank and on hand, $553,767; accounts receivable, $510,206, which in- es ore account, $458,773, and general $50,582. Liabilities include surplus 1,533,326. At end of Oct., 1919, current assets were $652,838, and liabilities 092. Reserve for depreciation was $255,000.

Dividends: to 1919, company had distributed $9,240,000, of which $7,200.- or 180% of capital, was paid as dividend, and $2,040,000, or 51%, as

Property: the Coniagas mine, 40 acres on the townsite of Cobalt, Coleman Twp. In 1915 the company purchased 198 acres of Lot 15, Con. I, Bucke Twp., known as the Agaunico mine, in which considerable development work was done a few years ago on a promising vein of cobalt and nickel ore. No work is now being done save on the Ankerite property in Deloro Twp. The Coniagas mine contains a large number of small but very rich veins carrying silver with small amounts of nickel, cobalt and arsenic. Bought Maiden McDonald property, adjoining the Ankerite, for $20,000 in September, 1917.

Development: totaled 33,735' of underground workings on October 31, 1918. New work for year ending Oct. 31, 1918, amounted to 1689'. Development work was confined to following small stringers and exploration on all levels and driving numerous crosscuts through unexplored ground. No important new orebodies were developed during the year, though considerable tonnage of low-grade ore was disclosed.

Ore reserves: management states that extent of low-grade ore is very difficult to determine, but estimates of F. D. Reid, mine engr., indicate that a 3-year supply is available. The company also has 155,000 tons of tailing sand and 40,000 tons of slime tailings which contain 782,900 oz. of silver.

Equipment: complete, including a 60 stamp mill handling 160 tons daily and a cyanide plant, built to treat about 6 tons daily of low-grade concentrate from canvas tables and the decomposed gouge from the mine, but shutdown in November, 1917, as canvas tables were discarded and Callow flotation cells substituted.

During year ending Oct. 31, 1918, mill treated 68,597 tons ore, or an average of 3.38 tons per stamp per 24 hours, compared with 60,929 tons, an average of 3.07 tons per 24 hours for the previous year. Mill heads average 15.94 oz. silver per ton, compared with 18.56 oz. for the previous year, and 25.76 oz. the year before that.

In 1918 a total of 529 tons concentrate was shipped that average 1164 oz. silver per ton, and 867 tons of low-grade slime of 244.8 oz. per ton.

The number of men employed in mine and mill is about 100.

Production, years ending October 31:

Year	High-grade ore, tons	Tons Concts.	Cost per Oz. silver Cts. (a)	Cts. (b)	Ounces Silver	Price Silver
1919.....	...	.....	.....	....	940,267	10[illegible]
1918.....	63	1,396	33.87	7.98	824,264	94 [illegible]
1917.....	124	742	21.36	4.31	1,344,267	70 [illegible]
1916.....	193	648	15.24	4.27	1,773,286	65 [illegible]
1915.....	267	607	13.62	3.25	2,002,053	49 [illegible]
1914.....	485	688	12.44	3.58	2,497,394	56 [illegible]
1913.....	735	1,034	8.76	4.32	3,252,566	64 [illegible]

(a) includes all expenses except shipping, smelting, refining and marketing charges which are under (b).

Total production of mine to Oct. 31, 1918, amounted to 26,254,260 oz.

Ore and concentrates are treated by the Coniagas Reduction Co., which see below.

Coniagas is one of the big producers of Cobalt, having yielded over 000,000 oz. of silver and paid $9,240,000 in dividends and bonuses in 13 years.

Coniagas Reduction Co., Ltd.

Entire stock issue owned by the Coniagas Mines, Ltd., except 6 issued to directors to qualify.

Inc. in Canada. **Cap.,** $250,000; shares $100 par.

Owns a smelter and refinery at Thorold, Ont. R. L. Peek, supt.

During fiscal year ending Oct. 31, 1918, company shipped 2,390,[illegible] silver, and treated 2282 tons ore, dry weight. Company produces silver, and the oxides of cobalt and nickel.

ROWN RESERVE MINING CO., LTD. **ONTARIO**

Offices: Dominion Express Bldg., Montreal, Quebec, 18 Toronto St., oronto, Ont.; and Cobalt, Ont.

Officers: John W. Carson, pres. and man. dir.; W. I. Gear, 1st v. p.; J. G. oss, 2nd v. p.; C. A. Smart, J. W. Ross, A. G. Gardner, R. W. Reford, F. S. eighen, Ziba Gallagher, and C. C. Dickson, directors; Jas. Cooper, sec.-treas.; ohn Reid, asst. sec.-treas.; S. W. Cohen, con. engr.; H. W. Darling, field gineer.

Inc. January 16, 1907, in Canada. **Cap.**, $2,000,000; $1 par; outstanding, n. 1, 1918, $1,999,957, of which $231,143 is held by trustees for the benefit of e company and bears no dividends. Crown Trust Co., Montreal and Toronto, ansfer office and registrar. Annual meeting, fourth Wednesday in January. sted on Montreal Stock Exchange. Dealt in on Toronto Exchange and on ew York and Boston curbs. High 60c. low 25c. in 1919; 31 high, 16½c. low 1918.

Dividends: 20% in 1908; 71% in 1909; 60% in 1910-12; 48% in 1913; % in 1914; 8% in 1915; 5% in 1916; total dividends to Jan. 1, 1917, $6,190,849, 335% on the outstanding capital. None paid in 1917 or 1918.

Balance sheet for 1918 showed assets of $2,551,580, which includes mining ıds, plant and equipment, $2,030,369; supplies, $3,339; ore in transit and on nd, $31,976; cash, $74,578; investments in other companies and properties,)1,002; accounts receivable, $20,316. Liabilities showed accounts payable, 916; and surplus of $547,707.

Income Account Essentials—years ended December 31:

	Ore Sales	Oper. Exp.	Net Earnings	Other Income	Total Income	Div.	Year's Surplus	Total Surplus
.....	$198,011	$191,256	$6,755	$3,361	.....	.....	$10,117	$547,707
.....	265,155	182,582	82,573	73,920	.....	.....	8,178	781,765
.....	193,240	190,267	2,973	145,414	148,387	88,440	59,947	770,584
.....	339,425	326,189	13,236	178,578	191,814	106,128	22,227	793,936
.....	740,093	536,314	203,799	147,882	351,611	424,515	†72,904	771,712
.....	1,056,272	555,296	500,976	*318,213	819,189	795,960	28,228	84,461
.....	1,692,061	583,315	1,108,746	9,084	1,117,830	1,061,288	56,541	821,393
.....	1,833,517	677,681	1,155,836	10,318	1,166,154	1,061,288	104,865	764,852
.....	1,757,824	592,082	1,165,742	6,258	1,172,000	1,061,288	110,712	659,986

* Includes $144,000 (1913, $308,877) profit on Porcupine Crown, Ltd., investment.
† Deficit.

Property: original holdings at Cobalt consist of 23 acres in Kerr Lake, eloped by the Crown Reserve mine, which has been one of the heaviest pro- ers in Cobalt. The company co-operated with the Kerr Lake Mining Co. he draining of Kerr Lake, but the results were disappointing to Crown erve in that no new valuable veins were found. The pumping out of the made it possible to obtain ore containing over 2½ million oz. silver, which rwise could not have been extracted, and the small veins discovered, not hemselves of great importance, were sufficient to pay for the whole cost he operation. Total amount of mud and water removed to Jan. 1, 1916, was it 700 million gallons.

The Crown Reserve Co. owns 60% of the stock of the *Porcupine-Crown es. Ltd.*, from which it received $144,000 in dividends in 1915. This mine closed down in July, 1918, on account of abnormal conditions, but opera- ; will be resumed. It is estimated to have $500,000 in ore reserves. Company s jointly with Kerr Lake Mining Co., Ltd., the Drummond Fraction property l which it received a profit of $9,844 in 1916; no work was done on this erty in 1918. Also operates the Silver Leaf mine of the Silver Leaf Mining Ltd. In 1918, one ton of high grade and 2,216 tons of milling ore were ed from the Silver Leaf. The company closed down the Reward mine in ornia, in 1918, and dropped the Walsh and Alice options.

Development: in 1918 amounted to 2,500′, making 38,144′ to date. In 1919 any purchased 2 claims in Larder Lake area which are said to have prom- showings. Development work in the unexplored east end of the property of rich ore on the 150′ level in December, 1919.

large section of the old workings is to be reworked by quarrying.

Production, years ended December 31:

Year	Ore Prod. Tons	Silver Prod. Gross Oz.	Gross Value	Net Value	Per Ounce Gross Cents	Per Ounce Cost Cents	Per Ounce Profit Cents
1917....	.....	329,670	.....	.....	.....	.....	.....
1916....	.....	274,470	$193,240	$191,822	70.40	69.30	1.10
1915....	94.10	657,395	344,596	339,425	52.40	45.01	7.39
1914....	307.70	1,425,320	740,093	722,873	51.92	28.95	22.97
1913....	312.60	1,766,678	1,056,271	1,040,117	59.45	23.02	36.43
1912....	512.00	2,714,766	1,692,060	1,638,191	62.32	14.02	48.30
1911....	1,048.59	3,430,902	1,833,516	1,751,300	53.46	10.67	42.79
1910....	2,753.00	3,248,196	1,757,824	1,633,716	54.10	11.97	42.13
1909....	3,093.00	4,034,325	2,080,156	1,895,484	51.56	10.31	41.25
1908....	650.78	1,798,954	910,350	854,788	50.64	7.50	43.13
Totals	8,772.77	19,960,676	$10,608,109	$10,067,722	54.78	15.73	39.05

The future of the Crown Reserve Mining Co. depends upon its ability to acquire new properties. It was in following this policy that in 1915 it exercised an option on the property of the Globe Cons. Mining Co. in Trinity county, Cal. (see Globe Cons. Lease, Inc.), but as results were not satisfactory, work was stopped. An option on gold claims in the Boston Creek district of Ontario was given up, owing to poor developments. About 90% of the shares in the Reward mine, Inyo county, Cal., was purchased, but work there was stopped in 1918.

DOMINION REDUCTION CO., LTD. ONTARIO

Offices: Cobalt, Ont.

Officers: D. M. Steindler, pres.; Mortimer B. Davis, v. p.; H. M. Thompson, sec.-treas., with A. A. Allen and L. L. Steindler, directors. Albert Wood, supt.

Inc. 1912, in Ontario. **Cap.**, $2,000,000; shares $1 par; $1,600,000 outstanding. Nearly all stock is held by the directors.

Company took over the Nova Scotia mill at Cobalt. Mill has 40 stamps, and treats custom ore, including low-grade ore from the Kerr Lake and Crown Reserve mines, with which the mill is connected by an aerial tram. All ore is purchased outright and reduced to bullion; payment is made in cash on the bullion. Company also owns and operates the property of the *Croesus Gold Mines, Ltd.*, in Munro Twp., 50 miles E. of Porcupine; has an interest in the St. Anthony, or Thunder mine, at Sturgeon Lake, and operates the Nova Scotia mine.

FOSTER MINING CO. ONTARIO

Owns the Foster mine at Cobalt, closed down for several years, reopened 1918, by lessees, C. L. Campbell of Montreal, and W. Fairburn. Reported in 1919, that high-grade ore had been cut, and 20 men were working under H. G. Carmichael, manager.

GENESEE MINING CO., LTD. ONTARIO

Head office: Cobalt, Ont. **Executive office:** 442 Powers Bldg., Rochester, N. Y. L. F. Steenman, mgr.

Officers. C. F. Wray, pres.; C. F. Crandall, v. p.; Alexander Russell, sec.-treas.; L. F. Steeman, gen. mgr., with A. H. Dewey, C. D. Van Zandt, H. H. Gorsline, J. G. Comerford and G. H. Welch, directors.

Inc. 1915, in Ontario. **Cap.**, 1,000,000 shares; $1 par.

Company has a 6 years lease on the U. S. claim, north of the north claim of the Chambers-Ferland. Property was idle 6 years, but developments in the Chambers-Ferland have given hope to the Genesee management.

Development: 572' shaft, with 1,450' of workings on 500' level. Two veins of low-grade ore are said to have been cut.

GLEN LAKE COBALT MINES, LTD. ONTARIO

Mail to company returned, 1918; probably idle.

Inc. July 9, 1914, in Ontario. Had a lease on the Foster mine of the

ıter Cobalt Mng. Co., Ltd., about 40 acres on and under Glen Lake, Ont. oreshoot, small but high-grade, was found on the 50′ level in March, 6. A long crosscut was run from the old Foster shaft out under n Lake to within 40′ of the Bailey line. The management expected to another crosscut parallel to the Bailey line with the hope of finding ension of the Bailey veins.

Company operated mine on a royalty basis paying 15% for 200 oz. ore l under, and 25% for higher grade ore.

ıRGRAVE CONSOLIDATED **ONTARIO**

A merger of the Hargrave Silver Mines and Reliance companies in cember, 1919. Capital is $2,500,000, of which $1,000,000 goes to the mer and $800,000 to the latter company. Shares $1 par.

ıRGRAVE SILVER MINES, LTD. **ONTARIO**

Company merged, December, 1919, with Reliance Co., to form Hargrave ısolidated, with same capital as H. S. M. Ltd., but free of debt.

Office: Excelsior Life Bldg., Toronto, Ont. **Mine address:** Cobalt, Ont.

Officers: Geo. H. Sedgwick, pres.; Jas. Ritcheson, sec.; J. T. Shaw, r.

Inc. 1908, in Ontario. **Cap.,** $2,500,000; shares $1 par; all issued. Stock ed on New York Curb and in Toronto. Shares sold 2½c low, 8½c high 1919, and 2½ to 12c in 1918.

Property: 40 acres in Porcupine district and 40 acres in Cobalt dis- ːt, adjoining the Kerr Lake mine on the east and on the south, and said carry the extension of the Kerr Lake No. 3 vein. Drifting on this vein orted to have disclosed ore assaying 5,000 oz. silver per ton.

Development: by two shafts connected on the 255′ level with ap- ximately 1 mile of lateral workings.

Under former management property is credited with production of ,000 oz. silver. Shipping about 1,000 tons of dump ore to the Dominion ıduction Works, October, 1917.

Cobalt mine was closed down at the end of 1913 after a report made the former manager, who stated that all known orebodies had been ıausted down to 375′ depth. After three years, in January, 1917, when ːr prices rose to 70c, mine was reopened and some very rich ore found 75′, 375 and 250′. In 9 months of 1918 about 600′ of work was done, and tons of ore shipped returned 15,694 oz. of silver, valued at $13,343.

IDSON BAY MINES, LTD. **ONTARIO**

Office: New Liskeard, Ont.

Officers: F. L. Bapst, pres.; A. A. McKelvie, v. p.; F. L. Hutchinson, .-treas.; with Thos. McCamus, H. P. Burgard, W. H. Kinch, and C. L. ːrrill, directors. C. C. Sherrill, mgr.

Inc. July 16, 1909, in Ontario, as an operating subsidiary of the Temis- ning & Hudson Bay Mining Co. **Cap.,** $3,500,000 shares $5 par, out- ıding September 1, 1915, $3,200,050. Control **Dome Lake Mining & Mill- Co., Ltd.,** through ownership of 1,596,545 shares. Traded in on Toronto ck Exchange.

Balance sheet for year ending August 31, 1918, shows assets of $3,429,782 ich includes: mining claims, at Cobalt, $2,953,228; at Gowganda, $44,900; ms in Teck & Lebel twp., $18,193; plant concentrator and equipment, ,798; accounts receivable, $150,112; ore on hand, $14,100; 894,045 shares me Lake M. & M. Co. stock, $187,506; stock of Mines Water Supply Co., 43; cash $11,926. In fiscal year ending August 31, 1919, net profits were htly over $3,000, and ore reserves estimated to contain 100,000 oz. of sil- Liabilities show: bills and accounts payable, $94,672; wages due, 25, capital stock, $3,200,050.

Receipts in 1918 were $129,861: ore sales giving $124.839. Expenditures e $97,458, leaving a profit of $32,402, plus balance of $100,233 from 1917, ɔtal of $132,636.

Dividends: total to 1919 was $778,909, last one of 2½% paid August 1913.

Property: 9 claims, 340 acres, at Cobalt. No. 1 mine was re-opened in June, 1916, and stoping operations started. Several promising veins have been found carrying good silver value, and are being further developed. The Temiskaming & Hudson Bay was finally absorbed in 1919.

New work for 1918, totaled 564', compared with 1,652' in the previous year.

Ore reserves on August 31, 1918, were estimated at 4,774 tons broken ore with silver content of 24,600 oz.; and 7,450 tons of ore in sight, with 35,550 oz.

No work was done on the Gowganda property in 1918, or at Camp No. 2, or at Kirkland Lake. Company acquired additional interest in the Ferguson mine, now owning two-thirds. Property adjoins the Lake Shore mine on the east, and is one-half mile west of the Tough-Oakes mine. For work done at the Dome Lake M. & M. Co., Ltd., see under Porcupine district in this volume. In March, 1920, it was decided not to spend any more money on the Dame Lake.

Equipment: complete mining machinery and a stamp mill.

Production, years ending August 31:

	Tons Milled	Oz. silver per ton	Recovery %	Cost per ton—Mining	Cost per ton—Milling	Silver cost per Oz., Cts.
1918.....	20,540	9.51	72.02	$2.13	$2.36	62.57
1917.....	18,247	17.3	83.2	2.59	2.09	43.57

KENEBEC SILVER MINES, LTD. ONTARIO

Mail returned, 1919, from former address, W. H. Jeffrey, mgr., Temiskaming district, via Cobalt, Ont.

Development: on the Veteran claim, 2 veins have yielded some high-grade silver ore. Ore occurs in Keewatin formation.

Equipment: includes boilers, hoist, and 5-drill compressor. No recent information; probably idle.

KERR LAKE MINING CO. ONTARIO

Reorganized, November, 1917, into Kerr Lake Mines, Ltd., of Ontario, which see.

KERR LAKE MINES, LTD. ONTARIO

A reorganization, November, 1917, of the Kerr Lake Mining Co., of New York. Owns entire capital stock of Kerr Lake Mining Co., Ltd. The change was made to eliminate the expenses and taxes of the New York holding company.

New York office: 61 Broadway. **Mine office:** Cobalt, Ont.

Officers: Adolph Lewisohn, pres.; Sam. A. Lewisohn, v. p; E. H. Wentlake, sec.-treas.; with J. H. Susmann, J. Parke Channing, D. M. Steindler, J. Steindler, and Wm. B. Joyce, directors. Mine manager, H. A. Kee.

Inc. 1917, in Ontario. **Cap.**, $3,000,000; par $5. Reduced September, 1919, to $2,400,000; par $4. Bankers Trust Co., New York; Federal Trust Co., Boston; Trust and Guarantee Co., Ltd.; Toronto, transfer agents; Equitable Trust Co., New York; Old Colony Trust Co., Boston; Union Trust Co., Ltd., Toronto, registrars.

Balance sheet of August 31, 1919, show assets: $3,039,591, which includes Kerr Lake Mining Co., Ltd., $2,400,000; 150,000 shares, 5c a share; Wettlauffer Lorrain Silver Mines, Ltd.; $7,500; U. S. Liberty Bonds $630,136; cash $1,956. Liabilities include, capital stock $3,000,000; Kerr Lake Mining Co., Ltd., $9,000; other $30,591; total, $3,039,591.

Income account shows dividends received from Kerr Lake Mining Co., Ltd., $653,000; interest $4,641; a total of $657,641. Expenses were $35,0[illegible] dividends paid $600,000; balance forward, $22,153.

Dividends [illegible] predecessor and present companies totaled $8,9[illegible] [illegible]arly has been paid since 1911.

Kerr Lake Mining Co., Ltd.

Office: 61 Broadway, New York. H. A. Kee, gen. mgr., Cobalt, Ont. ntire stock issue owned by Kerr Lake Mines Ltd., of Ontario.

Balance sheet of August 31, 1919, shows assets: $2,885,032, which includes mining property, ore on hand, sold and in transit, $320,285; cash, 787,522; investments in Canadian and U. S. bonds, $1,647,544; Kerr Lake line Ltd., $9,000; other $40,680. Liabilities: 400 shares of capital stock at ar, $100, $40,000; accounts payable, $6,366; accrued wages, $1,030; reserve or outstanding liabilities and taxes, $301,017, leaving a surplus balance of 2,436,619 after payment of $653,000 in dividends.

Total proceeds from ore sales in 1918 were $1,637,144. Operating expenses include $257,626 for production and development, $133,270 for shipment and treatment, $41.510 for general expenses, $13,275 written off on roperty acquired, estimated for taxes, $123,291. Operating profit for the ear was $956,258.

Dividends: to August, 1918, amounted to $7,717,000. Payments are at ie rate of $1 per share annually.

Property: one patented claim and two fractional claims, 57 acres in oleman Twp., Nipissing district, Cobalt, Ont.

Geology: for description of these features see Nipissing Mines Co. The re occurs in small vertical fissure veins in Huronian slate and conglomerate, both veins and ore being of the character typical of the Cobalt district. The ore-shoots vary from a few feet to 400′ in length and occur n an area of about 8 acres.

Development: to depth of 475′ by several vertical shafts, deepest 487′, ith a total of 56,921′ of underground workings. New development for he fiscal year, 1919, amounted to 2,382′, compared with 3,088′ in 1918. ater work has failed to find new veins of importance.

To test the ground below the diabase the winze was sunk on the Keeatin vein to a depth of 150′ below No. 6 level, or 475′ below the surface. he winze is entirely in the Keewatin formation below the diabase contact, and 3 levels driven from the winze show the vein to be weak and less ineralized as it leaves the contact, confirming the general belief that ommercial ore is probably confined to the diabase near or above the ontact.

Ore reserves: on September 1, 1919, approximated 300,000 oz. silver, n the high-grade and 200.000 ounces in the low-grade milling ore, compared with 1918 reserves of 639,800 oz. silver in milling ore, and 997,500 oz. n high-grade ore.

Equipment: includes 12-drill air compressor, 10x12 Jenckes hoist, sorting and jigging-plant of 125 tons daily capacity, fully equipped machine hop and a pot melting furnace to melt the rough metallics into bullion, nstalled in 1915.

Production: for year ended August 31, 1919: 259 tons of ore averaging (with bullion), 3,323 oz. silver, 274 tons averaging 391 oz., 30 tons veraging 644 oz., and 28,362 tons of mill ore containing 17.30 oz. silver er ton. Shipping ore yielded 989,673 oz. The total was 1,482,649 oz. silver. n addition there was produced 90,586 lb. cobalt, and 137 lb. mercury. Cost f production was 40.81c. per ounce. Total production for previous year as 2,582,993 oz. silver, at a cost of 24.74c per oz., 199,331 lb. cobalt, and 45 lb. mercury. In October, 1919, production amounted to 112,000 oz. ilver.

Ore reserves are approaching exhaustion, but during 1920 the company ill explore and develop the areas in the immediate vicinity of the main ein system by systematically crosscutting from the walls of old stopes at avorable horizons.

A ROSE CONSOLIDATED MINES CO. ONTARIO

Dissolved in 1918, La Rose Mines, Ltd., assuming liabilities and assets of ie holding company.

LA ROSE MINES, LTD. **ONTARIO**

Office: 260 St. James St., Montreal, Quebec.

Officers: D. Lorne McGibbon, pres.; Shirley Ogilvie, v. p.; S. J. Le Huray, sec.-treas., with E. W. Nesbitt, Edwin Hanson, David Fasken, V. E. Mitchell, W. M. Dobell and W. A. Black, directors. G. C. Bateman, gen. mgr.

Inc. in Ontario. **Cap.**, $7,500,000; shares $5 par reduced November, 1917, to $1,500,000, par $1. Bankers Trust Co., New York, and Royal Trust Co. Toronto and Montreal, transfer agents. Guaranty Trust Co., of New York, registrars.

Company owns **Lawson Mines, Ltd.**, and **Violet Mg. Co.**, also 97,260 shares 90% of **University Mines, Ltd.**

The report of La Rose Mines for the year ended December 31, 1918, shows: Total receipts, $319,289; cost of mining and all other expenses, $273,745, leaving net profit for year, $45,544, carried to balance sheet. Dividend of $30,000 was paid in 1918. The balance sheet at end of 1918, shows:

Balance sheet as of Dec. 31, 1918.

Assets: total $2,017,530, which includes: mines, mining claims, etc. (including 97,260 shares of stock in University Mines, Ltd.), $1,456,151; advances to Univ. Mines, Ltd., $27,903; buildings and equipment, $49,760; supplies, $113,079; cash in banks, $195,288; call loans, $58,245; Victory Loan investment, $100,000.

Liabilities: capital stock $1,500,000; surplus, $456,046; reserve, Univ. Mines, Ltd., $27,903, accrued expenses on ore, $13,441; accounts payable, $16,300; unpaid payroll, $3,837.

Dividends: total to 1919, $7,505,410. La Rose Cons. Mines Co. during its existence paid $5,911,640.

Property: 6 patented claims, 359 acres, in Nipissing district, Cobalt, Ont., includes the La Rose, Princess, Lawson, University, and Fisher-Eplett mines all practically worked out, and the Violet mine which adjoins the O'Brien on the east. In 1918, new work in the La Rose totaled 438', but no new ore was found. Work was discontinued in 1914 on the Princess and Fisher-Eplett claims as extensive development work failed to find new orebodies. In 1918, investigation of old workings on first level of Princess mine disclosed some ore in the walls of stopes, which was mined and company unwatered second level for same purpose. The Violet shaft, sunk in 1917, is 415' deep, and its levels cut several veins, some with milling ore and a little high-grade ore. A boundary dispute with the O'Brien company was dismissed late in 1919, with costs assessed to the O'Brien.

Equipment: complete and modern in all respects.

Production: total to 1919, 38,238 tons of high-grade ore and concentrates from milling ore, yielding 24,484,052 oz. silver with net smelter returns of $12,606,235.

Year	Prod. Oz. Silver	Net Value	Cost Prod. per oz., c.	Net Sell. Price per oz., c.	Net Profit	Dividends	Surplus
1918.....	288,556	$268,525	87.17	99.83	$45,544	$30,000	$456,046
1917.....	437,338	328,751	68.64	82.94	71,372	320,000	500,502
1916.....	740,065	449,734	46.39	64.89	164,774	333,000	.....
1915.....	1,135,142	526,996	31.64	50.88	230,662	436,000	.....
1914.....	1,368,247	637,555	37.20	53.92	217,979	918,000	.....

La Rose is a liquidating property unless new properties are acquired.

LAWSON MINES, LTD. **ONTARIO**

Subsidiary of the La Rose Cons. Mines Co., Ont.

LORRAIN CONSOLIDATED MINING CO. **ONTARIO**

Officers: D. M. Steindler, pres.; J. Cohen, mgr.; J. G. Harkness, sec. Cobalt, Ont., Canada.

Mark Harris & Co., Standard Bank Bldg., Toronto, Can., are underwriters of 250,000 shares of stock.

Property: at Cobalt is said to show a vein 5-8" wide of calcite and smaltite on which 260' shaft has been sunk. At about 65' vein dipped out of sight but was again found at 263'. No commercial ore encountered yet.

Development: work in progress, 1917, but stock is considered a speculation pure and simple. No later information, probably idle.

cKINLEY-DARRAGH-SAVAGE MINES, LTD. ONTARIO

Offices: Trusts & Guarantee Bldg., Toronto; and Cobalt, Ont. Treas**ers office:** 100 Sibley Block, Rochester, N. Y.

Officers: J. R. L. Starr, pres.: Thos. W. Finucane, v. p.; Harper Sibley, as., with H. W. Sibley, Jas. S. Watson, T. R. Finucane, and G. L. Thompson, rectors; J. H. Spence, sec., Toronto; A. G. Beckwith, asst. treas.; T. R. nucane, gen. mgr.

Inc. 1906, in Ontario. **Cap.,** authorized $2,500,000; issued, $2,247,692; ares $1 par. Traded on New York Curb. Prices 46c. low, 75c. high in 1919.

Comparative General Balance Sheet:

	Assets.					
ar	Mine and Plant	Savage Mine and Plant	Bennett Claim	Current	Inv. etc.	Total
18.....	$2,171,247	.....	.....	$454,615	$56,872	$2,682,734
17.....	2,199,449	.....	.....	398,660	11,849	2,609,958
16.....	1,381,560	$686,055	$100,000	455,073	6,600	2,628,333
15.....	1,385,728	689,104	100,000	444,166	7,731	2,626,729
14.....	1,402,798	694,168	100,000	447,852	7,716	2,652,534

	Liabilities.				
ar	Capital Stock	Surplus	Reserve Govt. Tax	Current	Total
18.....	$2,247,692	$281,197	$22,535	$131,310	$2,682,734
17.....	2,247,692	242,514	30,000	89,752	2,609,958
16.....	2,247,692	264,943	17,500*	98,197	2,628,333
15.....	2,247,692	280,299	2,500	96,238	2,626,729
14.....	2,247,692	313,935	4,000	86,907	2,652,534

* Includes $15,000 for contingencies.

Statement of financial position of company as of December 15, 1919, showed: h and bonds in bank, $331,409; ore in transit and at smelter, $86,500; ore dy for shipment, $76,086; total, $493,995.

Comparative Statement of Operations:

ar	Gross Oper. Profit	Deductions	Net Oper. Profits	Interest	Total Net Profits
18.....	$342,167	$46,505	$295,662	$13,056	$308,719
17.....	299,126	43,977	255,150	4,645	259,795
16.....	304,637	28,967	275,670	6,634	282,304
15.....	260,424	28,991	231,433	5,224	236,657
14.....	328,850	30,876	297,974	9,678	307,652
13.....	816,025	53,098	762,927	8,560	771,487

Dividends: 2% in 1907; 9% in 1908; 10% in 1909; 15% in 1910; 50% in 1; 50% in 1912; 32% in 1913; 18% in 1914; 12% in 1915, 1916, 1917, 1918 1919. Total, 256%, or $5,686,735 to January 1, 1920. Present rate of 3% rterly yields 20% on current price of stock.

Property: 1 claim, 40 acres, the McKinley-Darragh mine at southern of Cobalt lake; 1 claim, 40 acres, the Savage mine, on the east side of Cart ; 40 acres in Bucke Twp., the Bennett claim. The McKinley-Darragh, which oins the Nipissing and La Rose holdings, has been the most important pro**er.** Deepest workings are at 400', where the contact with the Keewatin nation is exposed.

Development: work in McKinley amounted to 8,200' in 1918, the largest age of any year. This large amount of exploration was responsible for the ased costs, but it served to find several payable orebodies. Several small s were developed in the lower levels of the mine, but no large orebodies of ance were found. There is only a small area of favorable ground on the er levels yet to be explored. The Savage is practically worked out.

Ore reserves: estimated January 1, 1919, to contain 852,754 oz. of silver; compared with 1,076,182 oz. January 1, 1918, and 1,714,302 oz. January 1, 1917. Reduction in reserves is due to exhaustion of the Savage mine.

Costs at the McKinley-Darragh mine:

Year	Tons Milled	Costs: Mines	Mill	Mktg.	Total
1918	67,020	$2.75	$1.53	$1.19	$7.36
1917	68,142	2.47	1.33	1.06	6.93
1916	62,676	1.98	0.95	1.08	5.15
1915	50,912	1.78	0.93	1.01	4.71
1914	45,098	2.22	1.44	1.70	6.[illegible]
1913	48,761	2.44	1.39	1.88	7.[illegible]

Extraction on all ore milled was 86.9% in 1913; in 1914, 85.1% on McKinley ore and 64.1% on Savage ore; 80.9% in 1915; 86.98% in 1917; 87.23% in 191[illegible]

Production:

Year	Ounces Silver Shipped: McK.-D.	Savage	Total	Cost per oz.	Profit per [illegible]
1918	886,398	.....	.....	$0.6842	$0.31[illegible]
1917	1,020,545	.....	.....	0.5052	0.3[illegible]
1916	1,055,996	.....	.....	0.4073	0.2[illegible]
1915	803,717	256,419	1,060,136	0.2871	0.2[illegible]
1914	1,051,925	208,121	1,260,046	0.3130	0.2[illegible]
1913	1,672,431	556,066	2,228,497	0.2230	0.3[illegible]

Output in 1919 was valued at $815,902. Total silver shipped to end of 19[illegible] was about 18,900,000 oz.

Future of McKinley-Darragh-Savage has been brightened by develop[illegible] at depth, and property may continue dividends for some time yet, as the [illegible] mill tailings are now being treated in an oil flotation plant installed 1919-20.

MERCER SILVER MINES, LTD. ONTARIO

Offices: 103 Bay St., Toronto and Cobalt, Ont.

Out of business, described in Vol. XIII.

MILLER LAKE O'BRIEN MINE ONTARIO

Address: M. J. O'Brien, principal owner, Cobalt, Ont.

Operating officials: J. G. Dickenson, mgr.; B. C. Crowe, mine supt. Cumings, mill supt.; Alex. Starke, sec-treas.

Property: has been one of the leading silver producers in the Gowgan[illegible] district. Vein said to be 10' wide and to contain five 5" streaks assaying [illegible] oz. silver per ton. Developed by shafts; No. 2, the deepest, 450', at last acco[illegible]

Equipment: includes hoists, 20-drill compressor, and a mill; a hydr[illegible] electric plant between Gowganda and Burke lakes is equipped with 2 turbi[illegible] and a 900 h. p. generator.

Production: figures not available, but reported to be 631,671 oz. [illegible] 1918.

MILLERETTE SILVER MINING CO., LTD. ONTARIO

Controlled by M. J. O'Brien, Ltd., Cobalt, Ont. No information is avail[illegible]

MINING CORPORATION OF CANADA, LTD. ONTARIO

Office: Bank of Hamilton Bldg., Toronto. **Mines and works:** Cob[illegible] Ont.

Officers: Sir H. M. Pellatt, pres.; J. P. Watson, 1st v. p.; W. P. [illegible] Parker, 2nd v. p.; with G. M. Clark, R. E. G. van Cutsen, D'Arcy Weather[illegible] J. G. Watson, directors. W. W. Perry, sec.; C. E. Watson, mgr., Cobal[illegible] M. F. Fairlie, mill mgr. Scott Turner, cons. engr.

Inc. March 20, 1914. **Cap.,** $2,075,000; shares $1 par; all issued; 1,911,[illegible] shares were held by the Canadian Mining Corp., Ltd., in liquidation.

Capital increased to $8,300,250, shares $5 par, in 1917. Traded in [illegible] Toronto Stock Exchange, shares sold, $2.12 low, $4 high in 1918; $1.50 low $2.50 high in 1919.

April 1, 1914, the Mining Corp. of Canada acquired the mining prop[illegible] ties formerly operated by the Cobalt Townsite Mng. Co., Ltd., Cobalt [illegible]

g. Co., Ltd., City of Cobalt Mng. Co., Ltd., and the Townsite Extension ies, Ltd., total area, 183½ acres, at Cobalt. In 1915, the property of the le Nipissing Mining Co., 40 acres, was acquired. On January 1, 1917, iness and assets of Canadian Mng. Corp'n. were acquired.

Owns entire capitalization, $250,000. of Cobalt Reduction Co., Ltd., rating a 300-ton mill and 140-ton cyanide plant.

In November, 1919, company bought control (70%) of the Buffalo ies Co.

Comparative Balance Sheet, years ending December 31:

Assets.

	1918	1917	1916
h in banks and office	$300,823	$1,032,815	$846,368
in transit and on hand	144,954	867,869	715,834
from smelters	89,665	100,961	73,993
asury bills and war loans	1,517,805	1,154,816	943,843
ds, Province of Ontario	101,574	.....	.....
and loans	18,064	104,941	60,638
ounts received	117,318	235,922	96,947
entures — Can. Industrial Minerals, td.	86,000	.....	.....
dings, equipments, stores, etc.	291,564	305,725	350,056
by Cobalt Red. Co., Ltd.	373,177	.....	.....
es, Cobalt Red. Co., Ltd.	249,083	249,083	249,083
ional and other properties, etc.	330,035	114,462	41,049
sian prospects	240,471	200,216	97,640
ing rights	7,553,124	7,553,123	1,327,874
Total	$11,413,657	$11,919,933	$4,803,425

Liabilities.

	1918	1917	1916
tal stock	$8,300,250	$8,300,250	$2,075,000
it and loss account (balance at edit)	3,025,347	3,448,377	2,447,583
ounts, dividends, taxes, royalties y	88,060	171,306	180,197
y Cobalt Silver Mng. Co., Ltd.	.....	.....	100,645
Total	$11,413,657	$11,919,933	$4,803,452

Comparative Profit and Loss Account, years ending December 31:

	1918	1917	1916
nce forward from preceding year	$3,448,378	$2,447,583	$1,167,376
t at mines	990,473	2,604,434	1,913,880
r income	273,031	326,387	230,575
Total	$4,711,882	$5,378,404	$3,311,831
e expenses, salaries, etc.	69,897	109,413	60,462
rnment royalties, taxes, etc.	267,847	264,317	233,162
lends and bonuses	1,348,791	1,556,297	570,624
Total	$1,686,535	$1,930,027	$864,249
ce to balance sheet	$3,025,357	$3,448,377	$2,447,582

Dividends: in 1916, 25% and 2½% bonus; in 1917, 18¾%; in 1918, %; in 1919, 37½%. The total is $4,876,756.

Property: the City, Cobalt Lake, Little Nipissing, and Townsite Silver s at Cobalt, Ont. The second named was exhausted and closed at of 1918. The Townsite at the end of 1918, had but 205,000 oz. silver ; ore reserves; exploration work has been finished on this property.

Geology: ores occur in narrow calcite veins in Huronian conglomerate and Keewatin formation. The high-grade ore in 1918 assayed 1953 oz. silver per ton, the milling ore, 35 oz. silver per ton, and average of total ore treated was 41 oz. per ton.

Development: vein 32 of the City mine yielded most of 1918 production; reserves have been increased by the discovery that in some stopes the silver content extends out into the wall rock. There is little virgin ground left on the property, but exploration is vigorous; that of 1918 totalled 6,540', at cost of $16.52 per foot. Total openings are over 22 miles. Mining costs were $7.30 per ton in 1918; $4.74 in 1917, and $3.87 in 1916. Exploration of new areas in the other mines should reveal orebodies, but the Townsite is near exhaustion.

Ore reserves: at end of 1918 were 314 tons of rich ore, containing 391,450 oz. of silver, and 29,257 tons mill ore containing 849,111 oz., a total of 29,571 tons with 1,240,550 oz. silver, compared with 31,364 tons and 1,545,370 oz. in 1917; and 64,751 tons and 3,235,000 oz. in 1916. Tailings contain 1,000,000 oz. additional, which will be retreated.

Company examined 164 properties in North America during 1918, 90 in 1917, and 65 in 1916. Two are now being developed in British Columbia, which see under company's name. Exploration was also started at Butte, Ontario, searching for radium ore.

In the Casey district, Ontario, the company is developing the Nelson and other claims. A separate company controlled by the Corporation operates a fluorspar property near Madoc, in eastern Ontario. In 1917 an option was closed on a quartz gold property in the Yenesei district of Siberia, after considerable development had been done, but due to the political condition of the country the mine was closed temporarily. The company also plans to develop a large coal field at tidewater in the Far East, and is negotiating for a lead-zinc silver mine there. Properties in China, Mexico and South America have also been examined.

Production: ore is treated at the Cobalt Reduction Co.'s plant.

Year	Tons ore treated	Oz. Silver per ton	Extraction per cent	Total Oz. silver Rec.	Total costs per ton	Total costs per Oz.
1918(a)	42,482	41.01	95.71	1,667,344	$24.51	60.9¢
1917	84,085	56.49	94.43	4,485,541	19.26	36.1
1916	114,392	42.29	92.14	4,457,440	13 43	34.4
1915	132,879	37.86	90.72	4,563,957	10.15	29.5

(a) does not include 17,632 tons tailing treated with a total silver recovery of 40,908 oz., or 57.04%.

Total production, to 1919, totals 29,204,217 oz.. The company is one of the largest silver producers in Canada. Its 3 Cobalt properties are nearing exhaustion, but under present management there seems little doubt that other good properties will be acquired and the company continue paying dividends. Reported in November, 1919, that company had purchased control (70%) of the Buffalo Mines, Ltd.

NIPISSING EXTENSION MINES, LTD. ONTARIO

Officers: A. J. Young, pres.; W. E. Stevenson, v. p.; with Albert Loring; J. W. Pickup, and Abbott Kimball, directors. E. H. Birkett, mgr.

Inc. 1919, in Ontario. **Cap.,** $3,000,000, issued $2,000,000.

Company has purchased property formerly owned by **Nipissing Ex. Mng. Co.,** 40 acres in Peterson Lake area of Coleman Twp., also property once owned by **Farah Mng. Co.;** this has been unwatered and development resumed.

NIPISSING MINES CO. ONTARIO

Company's assets and business acquired in September, 1917, by the Nipissing Mines Co., Ltd., of Ontario. Nipissing Mines Co., described in Vol. XIII.

IPISSING MINES CO., LTD. **ONTARIO**

Company took over assets and business of the Nipissing Mines Co., Maine, which controlled the Nipissing Mining Co., Ltd., which see.

Head office: Excelsior Life Bldg., Toronto, **New York office:** 165 oadway.

Officers: E. P. Earle, pres.; Alex. Fasken, sec.; P. C. Pfeiffer, treas. **rectors:** E. P. Earle, W. H. Brouse, R. T. Greene, David Fasken, August :ckscher, John H. Block and R. B. Watson.

Inc. September, 1917, in Ontario. **Cap.,** $6,000,000; par $5; all issued. ansfer agents; Bankers Trust Co., New York, Old Colony Trust Co., ston; and Toronto General Trusts Corp., Toronto. Registrars: Liberty tional Bank, N. Y., State Street Trust Co., Boston, and Toronto General usts Corp., Toronto. Listed on Boston Stock Exchange, New York rb and on Toronto Stock Exchange.

Nipissing Mines Co., Ltd. is a holding company, owning the entire ck of the Nipissing Mining Co., Ltd.

Annual report, December 31, 1919, shows total receipts $1,845,100, in- ding $1.845.000 dividends on stock of Nipissing Mining Co., Ltd.; total dis- sements were $1.838,405, including $1,800,000, paid in 4 quarterly dividends)%). Assets, January 1, 1920, were $6,609,973, including capital stock of The)issing Mining Co., Ltd., $6,000.000; dividend receivable from The Nipissing ning Co., Ltd., $600,000; cash $9,973.

Dividends: 46 paid by Nipissing Mines Co. (Maine Corp.) 1906-1917, was %, or $16,140,000. Ten paid by Nipissing Mines Co., Ltd. (Ontario Corp.), 7-'19, 80%, on $4,800,000, making a total of 349%, equal to $17.45 per share, $20,940,000. Distributions in 1920, to April 20, 15%, or $900.000.

Nipissing Mining Co., Ltd.

Head office: Excelsior Life Bldg., Toronto. **New York office:** 165 adway. **Mine office:** Cobalt, Ont., Canada.

Entire stock issued owned by Nipissing Mines Co., Ltd.

Officers: David Fasken, pres.; E. P. Earle, v. p.; with John H. Black, T. Greene and R. B. Watson, gen. mgr., directors; Alex. Fasken, sec.; . Pfeiffer, treas.; Hugh Park, mgr.; J. Johnston, mill mgr.; J. J. Denny, allurgist.

Inc. 1904, in Ontario. **Cap.,** $250,000; shares $100 par; all issued.

Comparative General Balance Sheet:

Assets.

r	Property and Equip.	Investm's.	Ore and Bullion	Other Current	Total
.....	$364,226	$178,755	$1,093,111	$3,975,227(f)	$5,611,321
.....	629,203	380,000	1,496,784	2,237,006(e)	4,742,994
.....	662,741	529,123	1,320,839	1,368,866(d)	3,881,569
.....	652,605	279,123	1,198,473	962,072(c)	3,092,273
.....	689,974	33,430	944,932	784,892(a)	2,453,228
.....	746,887	69,520	1,129,539	416,350(b)	2,362,296

Cash, (a) $776.854. (b) $391,292. (c) $952,082. (d) $1,364,458. (e) 3,526. (f) $2,036,563.

Liabilities.

	Capital Stock	Accounts Payable	Accrued Expenses	Dividends Payable	Surplus	Total
.....	$250,000	$365,834	$22,535	$600,000	$4,372,952	$5,611,321
.....	250,000	398,954	52,337	600,000	3,441,702	4,742,994
.....	250,000	271,157	28,814	600,000	2,731,599	3,881,569
.....	250,000	195,515	36,632	610,000	1,980,126	3,092,273
.....	250,000	103,909	13,058	300,000	1,786,261	2,453,228
.....	250,000	190,522	18,998	300,000	1,602,776	2,362,296

Comparative Income Account:

Year	From Ore	Total	Cost Production	Net Profit	Dividends	S
1919.....	$3,752,084	$3,856,458	$1,080,208	$2,776,250	$1,845,000	$
1918.....	4,040,446	4,119,568	1,475,832	2,525.104	1,815,000	
1917.....	3,756,890	3,828,311	1,129,408	2,686.472	1,935,000	
1916.....	3,027,669	3,076,228	1,024,745	2,028.866	1,835.000	
1915.....	2,222,256	2,256,432	815,005	1,441.427	1,220,000	
1914.....	2,516,065	2,558,733	971,112	1,587.621	1,235,000	

Dividends: paid to April 20, 1920, a total of $21[illegible],000, equal

Property: 8 claims, 846 acres at Cobalt, Ontario, Canada, has fissure veins, from ½" to 12' in width, occurring in Huronian conglomerate or Keewatin formation. The ore carries silver, with cobalt, arsenic and mercury.

Development: total work in 1919 amounted to [illegible], compared with 7,815' in 1918. There are 10 working shafts on the property. The No. 64 shaft is 1,003' deep; work there in 1919 gave no [illegible]. At the beginning of 1919, several orebodies have been found, all of which have proved up well. Shaft 73 produced most of the ore mined in 1918. Shaft 63 was pumped out in 1918 and work resumed on the Silver veins. In 1919, tunnel 96 opened No. 99 and 109 veins, which are small but very rich.

Ore reserves: January 1, 1920, were 116,061 tons, assaying 54 oz. silver per ton, or 6,354,656 oz. in all, compared with 6,095,[illegible] on January 1, 1918.

Early in 1919, the company acquired an interest in [illegible] acres 20 miles S. E. of the Burkburnett oil pool, in Clay [illegible], Texas. Drilling was started in May, and by March, 1920, a depth of [illegible]' had been reached.

Equipment: includes a mill for high-grade ore, [illegible], down in 1918, on account of the high price of mercury; a [illegible] mill for ore, cyanide plant, air compressors, power house, [illegible] and new flotation plant of 10 Callow cells treats tailings.

Year	Production: Ore, tons	Silver per ton, oz.	Total silver, oz.	[illegible]
1919.....	66,354	49.9	2,905.474	[illegible]
1918.....	81,257	44.2	3,701.416	[illegible]
1917.....	74,187	61.6	4,212,248	[illegible]
1916.....	77,915	53.9	4,044,668	[illegible]
1904-1919....	.....	....	56,023,955	[illegible]

Nipissing is the largest company and has [illegible] than any company in the Cobalt district.

NORTHERN CUSTOMS CONCENTRATOR [illegible]

Office: 702 Excelsior Life Bldg., Toronto, Ont.

Officers: A. J. Young, pres.; C. J. Booth, [illegible], treas.; C. J. B. Armstrong, supt.; F. J. Bourne, [illegible].

Cap., $250,000; 248,008 shares issued.

Company operates a 200-ton, 80-stamp concentrating mill at Rose mine, at Cobalt, Ont.; also has a lease on part of Silver [illegible] in December, 1919, acquired 25 acres from the Chambers Fer[illegible]. Work is to be started on 425' level between Nipissing and [illegible]. 1918 the plant treated 457,719 tons containing [illegible] oz. of silver.

The South Easter Mining Co., British Columbia, is a subsidiary company.

O'BRIEN MINE, THE

Owned and operated by M. J. O'Brien, Ltd., Cobalt, Ont.

Staff: J. C. Dickenson, mgr.; D. W. McLeod, [illegible]; O'Shaughnessy, mill supt.; A. D. Campbell, engineer; A. [illegible], treas.

Property: 15 claims, patented, 560 acres, privately owned at Cobalt and ganda, Ont. The O'Brien mine has been a steady silver producer for y years and is reported to have 5 years ore reserves in sight in 1919. In a dispute with La Rose Consolidated the court dismissed the action.
Ore: occurs in conglomerate, Keewatin and diabase and contains silver, lt, arsenic, nickel and copper.
Development: by 6 shafts to depth of 800', with 10 miles of crosscutting, ng, drifting and winzing.
Equipment: includes 200-ton concentrator and cyanide mill.
Production: 1,237,345 oz. of silver shipped from 51,892 tons of ore in ; and 1,137,000 oz. from 65,000 tons in 1918.
Company is also operating the **Miller Lake O'Brien** mine and **Millerette r Mining Co., Ltd.**, at Gowganda, Ontario; the **Scheelite Mines, Ltd.**, at se River, and the **Renfrew Gold Mines, Ltd.**, at Renfrew, Nova Scotia; **Storm Cloud** mine near Senator, Hassayampa district, Arizona; also rty in Missouri and Mexico. All of these will be found described in ction devoted to the state named.

ORD COBALT SILVER MINES, LTD. **ONTARIO**
ddress: Woodstock, Ont.
fficers: A. H. Wilson, pres.; J. R. Shaw, v. p.; Geo. F. Mohon, sec.; . W. Russell, and A. T. McNeil, directors. E. A. Rea, treas.; J. W. l, mgr., Woodstock, Ont.
c. 1919, in Ontario. **Cap.**, $1,000,000; par $1; outstanding 300,000 ; non-assessable.
operty: 2 claims, 41 acres, in Temiskaming mining district, Ont., fissure veins containing silver, cobalt, and nickel. Assessment work d been done to July, 1919. Company said to plan further develop-

ER-PAINE MINING CO. **ONTARIO**
ress: Gowganda, Ont. N. R. Morrison, supt.
anized, 1919, to operate the T. C. 177 claim near the Miller Lake- mine, which was formerly operated by the T. C. 177 Mining Co. veins are said to have been opened to a depth of 200' and low-grade e found, though but little ore of commercial grade has been found.

CANADIAN MINES, LTD. **ONTARIO**
e: 1011 Chestnut St., Philadelphia, Pa. P. G. Grant, 52 Broadway, rk; and Cobalt, Ont.
ers: Wm. J. Haines, pres.; R. B. Haines, sec.-treas.; with J. D. E. C. R. Laidlaw, S. D. Wright, A. S. Elliott, directors; B. Neilly, ast accounts.
April 24, 1912, in Ontario. **Cap.**, $1,500,000; $1 par; 1,349,705 issued.
unds: $175,461 to end of 1917.
erty: the Cobalt Central Silver mine at Glen Lake, in Cobalt dis-

opment: by 22,152' of drifts, crosscuts, raises and winzes. About mond-drilling was done to May, 1916.
ment: includes mill with 6 Wilfley tables, ball mills, and a 75-h. p. he mill treated 24,510 tons of ore during fiscal year ending April nd shipments to American and Canadian smelters amounted to The output in 1918 was 29,910 tons of ore. Company is a close n which does not make production figures public.

ON LAKE SILVER COBALT MINING CO., LTD. **ONTARIO**
s: 909 Excelsior Life Bldg., Toronto and Cobalt, Ont.
s: W. A. Lamport, pres.; with D. E. Kennedy, C. B. Powell, M. , W. G. H. Browne, J. E. Carter, Max B. Borg, I. L. Ernst, and el, directors. P. M. Goff, sec.-treas.; C. E. Filteau, mgr.
6, in Ontario. **Cap.**, $3,000,000; issued 2,426,282, shares $1 par. arantee Company, Ltd., Toronto, transfer agent. Listed in on New York Curb. Annual meeting 3rd Monday in May.

Comparative General Balance Sheet: (year ending April 30)

Assets.

	Property	Dev. Expl.	Plant Supplies	Current	Total
1919.....	$2,309,323	$136,666	$43,654	$ 5,159	$2,494,802
1918.....	.....	.....	.....	.....	.....
1917.....	2,309,323	136,666	15,382	49,934	2,510,78[illegible]
1916.....	2,309,323	136,666	16,897	223,920	2,686,80[illegible]
1915.....	2,463,507	136,666	19,701	177,033	2,642,72[illegible]

Liabilities.

	Capital Stock	Current	Surplus	Total
1919.....	$2,401,820	$13,395	$79,587	$2,494,8[illegible]
1918.....	2,401,802	....	.....	.....
1917.....	2,401,820	1,234	107,726(a)	2,509,54[illegible]
1916.....	2,401,820	7,610	277,377	2,686,80[illegible]
1915.....	2,401,820	8,690	232,213	2,642,72[illegible]

(a) Profit and loss.

Comparative Income Statement:

	Royalties on Ore	Misc. Inc.	T'l Expend.	Total
1919.....	$15,877	$4,996	$16,913	$3,959
1918.....	.....	....	.....	.....
1917.....	9,940	5,210	58,705	43,55[illegible]
1916.....	296,498	6,685	89,892	213,29[illegible]
1915.....	191,156	9,826	60,557	140,42[illegible]

*Net loss.

Dividends: fiscal year ending April 30, 1915, No. 1 to 4 inc., $168,[illegible] April 30, 1916, No. 5 to 8 inc., $168,127, No. 9 to 11 inc., $126,096. L[illegible] one, Jan. 2, 1917. Total is $462,063.

Property: 224 acres underlying Peterson Lake at Cobalt, almost s[illegible] rounded by holdings of the Nipissing Co. The most important lease w[illegible] that of Seneca-Superior, now exhausted. Company operated the Merc[illegible] Reliance and Peterson Lake mines, the last named in the Nova Scotia s[illegible] tion. All leases given by company have now expired.

Development: the Peterson Lake area has been prospected thro[illegible] shafts No. 2 and 3 and the Nova Scotia territory opened up; several ve[illegible] have been found here, but to date commercial ore has not been found [illegible] paying quantities. During the year new work totaled 3,556'.

Production: in 1913, 1,230,732 oz. silver; in 1914, 1,608,550; in 1915, 22[illegible] 295; in 1916, 11,204 oz.

The company's property has been well prospected in Nova Scotia ter[illegible] tory, but the Little Nipissing & Susquehanna tracts are promising and [illegible] large part of the company's ground under Cart Lake is still unexplored.

Mine was practically closed down from February to April, 1917, wh[illegible] entire management changed.

Two years' litigation between the company and the Dominion Red[illegible] tion Co., resulted in a recent judgment by the Supreme Court of Can[illegible] awarding to the company the 250,000 tons of slime in Peterson Lake, deriv[illegible] from the company's ore, and valued at $1,473,186. In December, 1919, No[illegible] shaft was being unwatered and exploratory work started.

PITTSBURG AND LORRAIN SYNDICATE ONTARI[illegible]

J. A. Rice, mgr. **Property:** the Currie Mine, adjoining the Wettlaufe[illegible] in South Lorrain, Ontario, Canada, said to show rich silver ore in pocke[illegible]

Development: is by shaft, to 300' level. Diamond-drilling to 900' dept[illegible] 1917. Leases the Wettlaufer 25-ton mill, increased daily capacity to 40 t[illegible] in 1919. Mill at present is retreating old tailings.

RIGHT OF WAY MINES, LTD. ONTARI[illegible]

Office: Central [illegible]ber, 46 Elgin St., Ottawa, Ont.

[illegible] C. [illegible]outh, v. p.; E. A. Larmouth, sec.-treas.; direc[illegible]

A. [illegible]

Inc. September 11, 1909, in Ontario. **Cap.**, $2,000,000; shares $1 par; standing $1,685,500. **Transfer office** 46 Elgin St., Ottawa, Ont. Annual ting in February.

Shares selling around 5c per share, 1916, sold in the boom days as high 10.50. The company has paid 66⅔% on the old capital of 500,000 shares the new capital of 2,000,000 shares.

Annual report for 1918 shows gross receipts $48,089; operating expenses 835, leaving a net profit of $2,254. Adding the previous balance, etc., e was available $5,873. Depreciation and general expenses reduced this 515.

Dividends: $252,825 to March, 1917.

Property: 3½ acres adjoining La Rose mine at Cobalt, and mining its 3½ miles of the right-of-way of the T. & N. O. Railway. The mine duced a large amount of silver for a few years, though for the past four rs but little rich ore has been found.

Development: to a depth of 465'.

Production: in 1918 was 162 tons of high-grade ore, concentrates, and allics returning $50,384. In 1917, 186 tons ore were produced with a ie of $54,441.

NECA SUPERIOR SILVER MINES, LTD. **ONTARIO**

Dead; described in Vols. XII and XIII.

AMROCK CONSOLIDATED MINES, LTD. **ONTARIO**

Dead. See Vol. XIII. Formerly operated Shamrock mine.

VER LEAF MINING CO., LTD. **ONTARIO**

Inc. 1906, in Ontario. **Cap.**, $5,000,000; shares $1 par. Owns the Sil- Leaf mine, adjoining the Crown Reserve property at Cobalt. Mine is rated by Crown-Reserve Mining Co., Ltd., which see.

MISKAMING & HUDSON BAY MINING CO., LTD. **ONTARIO**

Company dissolved 1919, former address New Liskeard, Ont., Can.

Officers: F. L. Bapst, pres.; A. A. McKelvie, v. p., with T. McCamus, . Ritchie, W. H. Kinch, Chas. L. Sherrill, F. L. Hutchinson, sec.-treas., ve are directors. D. A. Mutch, mgr.

Inc. July 29, 1903, in Ontario. **Cap.**, $25,000; shares $1 par; outstanding 51 Annual meeting, last Tuesday in October. Company is a holding oration, whose operating company is the Hudson Bay Mines, Ltd., ch in turn controls Dome Lake Mining & Milling Co., Ltd.

Balance sheet for year ending Aug. 31, 1918, shows: assets $2,812,001, ch includes stock of Hudson Bay Mines, Ltd., 546,000 shares, $2,730,000; , $1,166; Hudson Bay Mines, Ltd., accounts receivable, $76,075; Gow- ia claims, $4,500; furniture, $260. Liabilities include: outstanding capital k, $7,761; balance, loss and gain account, $2,804,240.

Dividends: during 1915-'16 one 300% dividend was paid, bringing total lends paid since incorporation to 1915 to 25,000%, or $1,940,250. Opera- s are described under titles of the subsidiary companies.

Assets of T. & H. B. distributed and charter surrendered in 1919, shares of . M. Co. held by T. & H. B., distributed pro rata to shareholders.

MISKAMING MINING CO., LTD. **ONTARIO**

Office: Standard Bank Bldg., Toronto. **Mine office:** Cobalt, Ont., Can.

Officers: J. P. Bickell, pres.; W. J. Sheppard, v. p.; with Geo. E. Drum- d, W. Linton, Geo. N. Miller, H. D. Symmes, J. B. Tudhope, directors. . Van der Voort, sec.; P. W. Cashman, treas.; L. J. Pashler, asst. treas.; . Cooper, mgr.

Criticism of the mine management and dissension among the share- ers culminated when H. B. Wills, a broker, and M. Morgenstern, a eholder accused the management of distorting facts in reports to share- ers. As a result of these charges an examination of the mine was e by Balmer Neilly of the Penn-Canadian mines, who estimated 11,572 of positive ore broken, or 4,000 tons less than official reserves. As ius shareholders still doubted the correctness of these estimates, Doug- Mutch of the Hudson Bay mine was employed to sample the mine. He

estimated reserves of 10,816 tons of ore, containing 393,800 oz. silver. Exploration of the lower contact at 1,600' in depth was unsatisfactory and results generally do not warrant further expenditure.

Inc. 1906, in Ontario. Cap., $2,500,000; shares $1 par; non-assessable, all issued. Union Trust Co., Toronto, transfer agent; Chartered Trust & Executive Co., Toronto, registrar. Annual meeting first Monday in February. Listed on Standard Stock Exchange, Toronto. Shares 34c low, 35½c high in 1918; 30c low and 52½c high, 1919.

On December 28, 1917, a shareholders' meeting authorized the purchase from **Beaver Consolidated Mines**, of 871,525 shares of **Kirkland Lake Gold Mining Co.**, at 40c a share. This is half the Beaver Company's interest. Money for development work at Kirkland to be advanced equally by the companies. This deal is said to have been blocked by two shareholders.

Company controls the Wright-Hargraves Mines, Ltd., at Kirkland Lake, developed by 425' shaft. A 110-ton mill to be erected.

Dividends: 15% in 1908; 6% in 1909; 11% in 1910; 9% in 1911; 12% in 1912; 3% in 1913; none in 1914; 3% in 1915; 9% in 1916; and 12% in 1917; 3% in 1918; nil in 1919; 2½% in 1920; a total of $2,175,000. Earnings were $295,252 in 1919; and surplus on mining account was $70,448, compared with $135,394 the previous year. The total surplus at end of 1919 was $864,[illegible]. Earnings in 1919 were small, as mill ran but 44% of the time.

For 1918 the following figures have been reported: current assets, $[illegible]114, which includes $700,000 in Victory bonds; profit, $135,395; earnings $425,014, of which $368,724 came from ore sales; operating expenses, $[illegible]801; total assets, $3,893,463, of which $2,427,802 is in properties.

Comparative General Balance Sheets:

	Assets.				
	Current	Property	Const'n	North Dome	Hospital	Total
1917...	$835,342	$2,427,802	$104,183	$321,684	$2,120	$3,[illegible]
1916...	579,599	2,427,802	259,168	320,408	2,120	3,[illegible]
1915...	462,488	2,581,884	105,192	320,408	2,120	3,[illegible]
1914...	83,501	2,560,658	104,616	317,908	2,120	3,[illegible]

	Liabilities.				
	Cap. Stock	Depreciation	Profit & Loss	Current	Total
1917....	$2,500,000	$101,377	$814,557	$36,655	$3,[illegible]
1916....	2,500,000	75,591	671,000	19,978	3,[illegible]
1915....	2,500,000	49,674	896,860	25,556	3,[illegible]
1914....	2,500,000	23,747	527,996	17,059	3,[illegible]

* Includes $322,528 contingent a/c re North Dome property and Gold mines hospital shares.

Comparative operating account:

	Receipts	Expenses	Profits	Cash Assets
1917.....	$875,782	$331,440	$544,342	$507,[illegible]
1916.....	708,877	355,987	352,870	570,[illegible]
1915.....	732,263	262,471	469,731	462,[illegible]
1914.....	146,649	228,071	*81,422	85,[illegible]
1913.....	438,455	320,881	117,574	196,[illegible]

* Deficit.

Property: in which the company is directly or indirectly interested—Daile claims, 20 acres; Gans property; McDonald claims, 40 acres in North Cobalt; Peterson claims, 40 acres; Osland claim, 40 acres each in McCool, Cook, and Barnet townships; the Morrison claims, commonly called the Red Jacket, and the North Dome property, in the Porcupine mining division. The Red Jacket was leased in 1916 to a syndicate which unwatered it.

Ore: high-grade silver, containing arsenic and smaltite. Ores occur in veins where they cut contact of the Keewatin formation with a diabase sill. Pay ore is found in shoots.

Diamond-drilling has proved that another contact occurs below the base sill at a depth of about 2,000′

Ore reserves: estimated February 7, 1918, at but 829 tons containing 41 oz. silver. The report of the manager at that date stated future possities of the property depend on finding ore in the Gans lot above the sill, on the Temiskaming and Gans lots below the sills.

Development: by 1,600′ vertical shaft and 4,000′ of workings.

Equipment: includes a compressor for 20 drills, a Nordberg hoist with lrums and capacity of 2,500′. Electric power is hydraulically generated. e 40-stamp mill is equipped with concentrating machinery and handled tons of low-grade ore a day until compelled to close, 1918, owing to ɔility of mine to furnish over 40 tons ore daily. Reported that an important body had been opened on the 500′ level in 1919.

Production: 11,300,000 oz. of silver from 246,000 tons to end of 1918. e yield in 1918 was 420,076 oz.; in 1919, 243,037 oz. silver.

ETHEWEY SILVER-COBALT MINE, LTD. **ONTARIO**

The Trethewey mine was acquired January, 1920, by the Coniagas comy for $100,000.

Office: 1601 Royal Bank Bldg., Toronto. **Mine office:** Cobalt, Ont.

Officers at last accounts: S. R. Wickett, pres.; J. B. Tudhope, v. p.; with don Taylor, J. B. Bickell, W. J. Sheppard and T. E. Leather, directors; J. Pashler, sec.-treas.; I. S. McReavy, mgr.

Inc. 1906, in Ontario. **Cap.,** $2,000,000; $1 par; non-assessable; outɪding, $1,000,000. No bond issues. Annual meeting, February. Toronto ɪeral Trust Corporation, transfer office. C. E. Robin, registrar. Listed New York Curb. Shares 30c. low, 52½ high, 1919.

Reported that 1918 net value of year's production was $250,534; operating . $147,166; operating profit, $103,368. Current assets, $171,600, and current ilities. $20,000. Company bought 370,000 shares of Castle Mining Co. stock, $78,230 was spent on property in 1918.

Dividends: total 133% to January, 1919.

Property: one patented claim, 40 acres, Coleman township, Cobalt. dist; also owns control in Rochester Mines, Ltd., of Cobalt. Ore deposits d silver and cobalt and occur between conglomerate and diabase. Pay occurs in shoots. At Gowganda company is opening the Castle mine, and spent $80,000 to end of 1919.

Development: by vertical shaft, greatest depth 250′, and total linear ɛnt of workings 25,650′. The limited productive area of the property, about ɛres, to a depth of 250′, is practically worked out. In 1918, production came n walls of old stopes, was very low grade, and only made profitable by high e of silver. Estimated ore reserves at end of 1918, contained 159,172 oz. ɪpared with 264,044 oz. the previous year, a decrease of almost 40%.

Equipment: compressors, hoists and other necessary mining machinery, des a 30-stamp concentrating mill with a capacity of 100 tons daily. A 100-flotation plant has recently been erected to treat slime dumps which con-65,000 tons of 4.7 oz. material. Several months' operation said to have wn a profit of $1.50 per ton.

Production: in 1918, the mill treated 24,514 tons ore at a cost of $2.21 ton.

The Castle property at Gowganda, acquired in 1918, is next to the Millerɛ-O'Brien, and a level at bottom of the 380 ft. shaft is said to have as good ɪes as the vein cut on the level above. The Major property at Gowganda optioned in 1919, and a lease also taken on 112 acres under Miller lake.

IVERSITY MINES, LTD. **ONTARIO**

Is a subsidiary of the La Rose Consolidated Mines Co., which see.

ETTLAUFER-LORRAIN SILVER MINES, LTD. **ONTARIO**

Office: 61 Broadway, N. Y. **Mine office:** South Lorrain, Ont.

Officers: H. Lockhart, Jr., pres.; D. M. Steindler, v. p.; E. H. Westlake, treas.; the foregoing, and T. L. Herrmann, J. H. Sussmann, W. J. Ma-

gavern, Wm. J. McWhiney, J. L. Mitchell and Herman Cook, directors. H. A. Kee, mgr.

Inc. November, 1908, in Ontario. **Cap.**, $1,500,000; $1 par; non-assessable; outstanding, 1,416,590 shares. Annual meeting, fourth Monday in January. Bankers' Trust Co., New York, and Trust & Guarantee Co., Ltd. Toronto, transfer offices; Security Transfer & Registrar Co., New York, registrar. Listed on New York Curb.

Balance sheet, Dec. 31, 1918, showed total assets, $1,520,180, which include mine property, $1,383,112; U. S. Liberty bonds, $60,390; cash, $22,719.

Operations ceased in 1913, owing to exhaustion of ore, and efforts to find other bodies in the property practically abandoned.

During recent years the company's properties were operated under a lease to the Comfort Mining & Leasing Co., Ltd. In Sept., 1917, the Pittsburg Lorrain Company leased the mine, paying $2,210 in royalties in 1918.

WRIGHT-HARGRAVES MINING CO. ONTARIO

Property owned by Temiskaming Co., which see.

KIRKLAND LAKE DISTRICT

BALDWIN GOLD MINING CO., LTD. ONTARIO

Address: 301 Dominion Bank Bldg., Toronto. W Wilson, mgr., Mile 167, T. & N. O. Ry. Kenogami Lake, Ont.

Officers: F. W. Tanner, pres.; F. W. Gates, v. p.; J. A. Cherry, sec.-treas.; with H. J. Dudley and Jas. Gorrie, directors.

Inc. January, 1917, in Ontario. **Cap.**, $2,500,000; par $1; outstanding 1,805,000 shares. Listed on Toronto Exchange, but no quotations given in published lists for 1919.

Property: 160 acres, in Eby Twp., Kirkland Lake mining district. Gold was discovered on tract in 1910 and property bought in 1917 from Mr. Jas. Gorrie for 1,500,000 shares. Ore occurs in quartz veins.

Development: on one vein includes a 200′ shaft, with 500′ of workings; said to expose ore of "large amount but not estimated."

Equipment: includes a hoist and compressor. Property is a prospect undergoing development; Tanner, Gates & Co., of Toronto, are helping finance the company.

BOURKES MINES, LTD. ONTARIO

Address: J. J. Byrne, mgr., Bourkes, Kirkland Lake, Ont.

Cap., $2,500,000; $1 par.

Property: the south half of Lot 9 in second concession of Benoit Tp., at Bourke's siding, N. W. of Kirkland Lake, developed by 200′ shaft and 1,500′ of workings. A 28″ gold quartz vein exposed at 200′ depth.

Equipment: 80-h. p. steam boiler, 210 cu. ft. compressor, 2 Jenckes hoists; a mill being planned and buildings for 50 men.

BURNSIDE GOLD MINES, LTD. ONTARIO

Address: Charles Richardson, mgr., Kirkland Lake, Ont.

Inc. July, 1913, in Ontario. **Cap.**, $3,000,000.

Is a subsidiary of the Kirkland-Lake Proprietary, Ltd. Owns 3 claims joining the Tough-Oakes gold mine at Kirkland Lake.

Mine was operated in 1918 by the Aladdin Cobalt M. Co.

In 1918, development was resumed and shaft No. 2 was sunk to 420′ on vein No. 3; high values were found on the 120′ level. A 30-ton mill was operating in Feb., 1919. A consolidation with Kirkland Lake Proprietary Ltd. and Tough Oakes was planned.

CANADIAN-KIRKLAND GOLD MINES ONTARIO

Address: George Tough, sec., Haileybury, Ont.

Property: 4 claims at Kirkland Lake shows a number of promising veins on which development work was started in 1917. Crown Reserve Mining Co. acquired control and [illegible] in May, 1919.

ELLIOTT-KIRKLAND [illegible] INES, LTD. ONTARIO

[illegible]; Kirkland

Officers: S. H. Worth, pres.-treas.; R. H. Lyman, v. p. and mgr.; W. A. ordon, sec.; with John M. Wood and E. W. Kearney, directors.

Inc. December, 1916, in Ontario. **Cap.,** $2,000,000; par $1. Traded on oronto Stock Exchange.

Property: 2 gold-bearing claims, 85 acres, at Kirkland Lake, developed y a 520′ shaft and extensive diamond drilling. As commercial ore was not ound on the lower levels, work was stopped temporarily in 1919.

Equipment 60-h. p. boiler, hoist, compressor, and quarters for 18 men.

RANBY-KIRKLAND GOLD MINES, LTD. **ONTARIO**

Head office: Toronto, Ont. E. Croteau, supt.

Cap., $2,000,000; par $1.

Property: 2 claims, 85 acres, in twp. of Lebel, 1 mile N. E. of Tough-akes mines, on which trenching has disclosed 3 promising veins. Company ans sinking shaft.

UNTOON-KIRKLAND CO. **ONTARIO**

Cap., $1,500,000. Traded in on Toronto Exchange.

Reported, Oct., 1919, that company had given an option on 500,000 treas-ry shares at 20c. each—the money to be used for further development. The roperty was idle during the war.

IRKLAND LAKE EXPLORATION, LTD. **ONTARIO**

Office: Pinners Hall, Austin Friars, London, Eng.

Officers: C. H. Villiers, pres.; H. J. Hollingsworth, and R. D. La Bere, irectors. E. C. Wheater, sec.

Inc. January, 1914, in England, to acquire mining properties in Ontario, anada. **Cap.,** £150,000; shares £1 par; 26,000 issued. On June 30, 1916, ssets included stocks and bonds at cost, £10,320; interest in the Kirkland ake district, £1,650. Organization expenses, £5,498; exploration, etc., £12,-1; cash, £116.

Property: in Swastika district, near Porcupine, Ontario, Can., and an terest in claims adjacent to the Tough Oakes mine. Is a holding company, active during the war.

IRKLAND LAKE GOLD MINING CO., LTD. **ONTARIO.**

Is a subsidiary of Beaver Cons. Mines, Ltd.

Address: 810 Lumsden Bldg., Toronto, Ont. **Mine office:** Kirkland ake, Ont.

Officers: F. L. Culver, pres.; J. H. Black, v. p.; R. Graham, sec.-treas.; . E. Tremain, asst. sec.; with Wm. T. Mason, directors.

Cap., $2,000,000; $1 par; 1,743,050 shares are owned by Beaver Cons. ines, Ltd. Shares 91c. low, $1.26 high, in 1918; 92c. low, $1.08 high, 1919, on oronto Curb.

Property: 362 acres in the Kirkland Lake district. Development work .s been confined to one claim on a vein which has been traced 1,400′ on rface and proved on 7 levels underground.

Development: by a 700′ shaft (No. 2), with levels 100′ apart. The third vel shows from 5 to 12′ of ore, assaying $7 to $12.80 per ton. The ore oot is 160′ long on the third and 220′ on the fourth level, and the high lues continue down to the 700′ level. The 3-compartment main shaft near nter of property connects with No. 2 shaft. Workings total 5,210′, but stoping has as yet been done.

Equipment: includes steam plant, electric motors, double-drum hoist, 12-drill and smaller compressors and a 150-ton mill, completed in 1918, with 8′ Hardinge mill, Dorr classifier, tube mill and 15 solution tanks. Mill was erated until labor troubles caused a 4 months' shutdown in 1919. Operation umed Dec., 1919.

Production: in 19[illegible], 11,324 tons of ore yielding 2,675.05 oz. gold and [illegible] oz. silver, of a total value of $56,262, representing a recovery of $4.97 per n. t.

IRKLAND LAKE PROPRIETARY, LTD. **ONTARIO**

Office: J. J. Sneddon, sec., Finsbury Pavement House, London, E. C. Eng.

Directors: H. G. Latilla, chairman; A. Burt, J. D. G. Simpson and G. F. Wyatt.

Inc. November 27, 1913, in England. **Cap.,** £200,000; shares £1 par; 100,000 issued and fully paid. Last annual meeting was held Oct. 17, 1918.

Company's assets are share holdings in the following companies: Tough Oakes Mines, Ltd.; Burnside Gold Mines, Ltd.; Sylvanite Gold Mines, Ltd.; Teck-Hughes Gold Mines, Ltd., and Sudbury Syndicate, Ltd.

Balance sheet Aug. 31, 1918, shows general expenses, £22,696; cash, £86; debtors, £35,566; loans and interest, £34,202; shares and interests in properties at cost, £111,492.

A merger with Aladdin Cobalt, Ltd., and through it with A. C. Co., Ltd. and Chambers Ferland Mining company, was made in 1920; see Aladdin Cobalt, Ltd.

KIRKLAND-PORPHYRY GOLD MINES, LTD. **ONTARIO**

Address: Kirkland Lake, Ont.

Officers: Henry Cecil, pres.; M. P. Vandevoort, sec.-treas.; with A. R. Porter, B. P. McAvoy and Wm. Linton, directors; J. C. Houston, mgr.

Inc. in Ontario. **Cap.,** $3,000,000; par $1; 1,623,005 shares issued. Bonds: $540,000 outstanding of an authorized issue of $800,000.

Property: 9 claims, 3 patented, approximately 360 acres, at Kirkland Lake, formerly operated by Orr Gold Mines, Ltd. The tract is said to show porphyry cut by quartz veins with N. 60° E. strike and dip of 75° S. E. Ore occurs in shoots up to 12′ in width, assaying about $13 gold per ton.

Development: by 400′ vertical shaft, with 800′ of workings. Management claimed ore reserves of 65,000 tons, valued at $800,000, and to have spent $120,000 on the property in 1918.

Equipment: includes hoist, compressor, and electric power. Plant building a cyanide mill. Company in liquidation, Nov., 1919.

KITCHIGAMI GOLD DEV. CO. **ONTARIO**

Officers: John Daniell, pres., Calumet, Mich.; John MacRae, v. p.; Chas. Chynoweth, sec.; Jas. T. Fisher, treas.

Inc. 1915, in Arizona. **Cap.,** $300,000; shares $2 par; 100,000 shares subscribed at 25c.

Property: 160 acres, Gordon McGuire claims, on Goldfish lake, Macassette township, Ont., Kirkland district, adjoining the Goldfish Lake Gold Mines Co. Ground acquired on advice of Chas. W. Botsford, E. M.

Some diamond-drilling was done in 1916, without important results.

LA BELLE KIRKLAND MINES, LTD. **ONTARIO**

Property: the Gibson group of claims at Goldfish Lake, Kirkland Lake district, Ont., said to show molybdenite and gold ore in Keewatin formation. Developed to depth of 350′ by shafts and crosscuts, showing several 2′ strings of high-grade ore. Diamond drilling totaling 5,000′ is said to indicate ore to 700′ depth.

Equipment: includes compressor and hoist good for depth of 1,000′.

Suspended operations, July, 1917, pending financing. Plans were on foot, 1919, to sell treasury stock and resume operations.

LAKE SHORE MINES, LTD. **ONTARIO**

Address: Kirkland Lake, Ont.

Officers: Harry Oakes, pres. and man. dir.; A. G. Slaght, v. p.; C. Wettlaufer, 2nd v. p.; Dr. W. P. St. Charles, treas.; with Louis Oakes, W. Wright, and A. E. Wende, directors. Kirkland Securities, Ltd., sec.; R. Coffey, mgr.

Inc. February 25, 1914, in Ontario. **Cap.,** $2,000,000; par $1. Trust and Guarantee Co., Ltd., Toronto, transfer agent and registrar. Traded on Toronto Exchange. Price record, 91c. low, $1.26 high in 1918; 92c. low, $1.08 high in 1919.

Balance sheet, Nov. 30, 1918, shows assets of $1,462,023, which include cash, $49,417; other current, $137,579; buildings and equipment, $160,564; property, development and organization expenses, after charging off $90,000 as provision against exhaustion, $1,112,632; exploration, $1,831. Current liabilities were $84,841; capital stock, $1,332,203; surplus for year, $44,978.

At end of 1919 current assets were $112,620; current liabilities, $41,947; ɔme, $307,531; operating expenses, $209,258. The profit of $98,273 was re-ed to $38,273 by deductions for ore exhaustion.

Dividends: 4 quarterly dividends of 2½% paid to October 25, 1919, a ıl of $200,000.

Property: the Lake Shore gold mine, on Kirkland Lake, adjoins the k-Hughes on the east.

Development: 400′ shaft and several thousand feet of workings. In year ending Nov. 30, 1918, new work totaled 2961′, of which 1141 was on No. ein, and 1920′ on No. 2 vein; 80% of all drifting was on ore of milling de. The ore contains gold telluride, and the shoots persist in both size and ıe to the 400′ level. New work in 1919 amounted to 1,864′, with 6,035 tons of 60 broken ore in reserve.

Equipment: includes 7-drill electrically-driven compressor, fully ipped shaft-house, heating plant, continuous decantation cyanide plant, with ıpacity of 60 tons daily.

Production: the mill started operating March 8, 1918, and during the ıainder of the year treated 14,948 tons of ore, recovering $24.76 per ton. ı a total bulion production of $370,128. Expenses were $139,096, leaving a fit of $234,978, before making the $90,000 provision for exhaustion. In y, 1919, production amounted to $42,136 from the treatment of 1,750 tons ɔre, a recovery of $24.08 per ton. In the following month, the mine closed ;n, and the pumps were pulled, allowing it to fill with water, as a result of ıbor strike which lasted several months. Production resumed November,), and shaft deepened to 600′. The output in 1919 was $294,514 from 11,907 ; of $24.67 ore.

NAKER KIRKLAND GOLD MINES, LTD. **ONTARIO**

Address: G. A. Bagshaw, Haileybury; and T. J. Flynn, mgr., Kirkland ;e.

Inc. in Ontario. **Cap.,** $1,500,000; $1 par.

Officers: G. A. Bagshaw, pres; Frank L. Mapes, v. p.; F. Haak, sec.-ıs., both of Rochester, N. Y.; with Edward Moir, Marcelles, N. Y., and n Kavanagh, Rochester, directors.

Property: four claims, adjoining the Lake Shore on the S., is said ıhow a number of gold bearing veins, on one of which a shaft has been k to depth of 175′, with drifting in progress on 150′ level.

TARIO-KIRKLAND GOLD MINES, LTD. **ONTARIO**

Address: Haileybury, Ont.

Officers: Frank Huth, pres.; Walter E. Hurd, v. p.; with Ralph Hurd, A. Dalton, Henry Haertel, Wm. H. Meyer and H. S. Sonder, directors. W. A. ·don, sec.; M. A. Riley, treas.. Ralph Hurd, mgr., Haileybury, Ont.

Inc. 1918, in Ontario. **Cap.,** $1,500,000; par $1; outstanding 965,006 res. By Dec., 1919, 400,000 treasury shares had been sold to provide cash development work.

Property: 2 patented claims, 88½ acres, S. E. of Lake Shore mine, kland Lake, Ont. Ground shows gold bearing quartz veins in porphyry and glomerate.

Development: by 300′ vertical shaft, and two levels. **Equipment:** in-ies a 50-h. p. electric hoist. Reported that a 100-ton mill would soon be ed.

R GOLD MINES, LTD. **ONTARIO**

Address: Kirkland Lake, Ontario, Canada.

Inc. 1917. **Cap.,** $3,000,000.

Owns or did own the Orr group under option to Kirkland-Porphyry Gold ıes Ltd., 1917-1919. Conflicting reports regarding ownership were current

[illegible] GOLD MINES, LTD. **ONTARIO**

[illegible] of Kirkland Lake Proprietary.

[illegible] 1913, in Ontario. **Cap.,** $2,000,000.

Owns the Wright and Robbins claims adjoining the Tough-Oakes gold mine, Kirkland Lake. Work to date has been chiefly surface exploration.

TECK-HUGHES GOLD MINES, LTD. **ONTARIO**

Office: 14 Wall St., New York. **Mine office:** Kirkland Lake, Ont.

Officers: C. L. Denison, pres.; R. W. Pomeroy, v. p.; Geo. C. Miller, with A. W. Johnston and J. F. Thompson, directors. Wm. C. Himrod, treas; D. L. H. Forbes, gen supt.

Inc. in Ontario. **Cap.**, $2,500,000; $1 par; 2,134,000 issued. **Bonds:** $250,000. Traded on Toronto Stock Exchange.

Statement for year ended Aug. 31, 1918, showed an expenditure of $259,694. Income was $107,280, leaving a deficit of $152,415. Current assets were $59,885 and current liabilities $18,957.

Property: 4 miles from Swastika, in Kirkland Lake district, Ont. **Development:** by 600′ shaft, with five levels showing the vein to be 5′ to 30′ wide.

Equipment: hoist, 10-drill compressor, and milling plant, including ball and tube mills, cyanidation by counter current decantation, and Oliver filter. Electric power is supplied by the Northern Ontario Light & Power Co. of Cobalt, whose power plant is 65 miles distant.

Production: commenced in March, 1917, was continued until July, 1918, when property was closed on account of war conditions; reopened late in 1918. From Aug. 31, 1917, to July 2, 1918, the mill treated 15,879 tons ore of an average value of $7.87 per ton. In 1919, property produced 18,387 tons of ore, yielding $169,590.

TOUGH-OAKES GOLD MINES, LTD. **ONTARIO**

(Subsidiary of Kirkland Lake Proprietary, Ltd.) **Office:** 119 Finsbury Pavement, London, E. C. 2, Eng. **Mine office:** Kirkland Lake, Ont.

Officers: G. R. Bonnard, chairman; R. Simpson, E. H. R. Trenow, directors. C. O. Connell, mine mgr.; H. J. Almond, sec.

Inc. in England, Jan., 1914. **Cap.**, £500,000; shares £1; 230,007 outstanding. Organized to acquire 426,388 fully paid shares of the Tough-Oakes Mining Co., registered in Canada, with a capital of $3,000,000 (£600,000), in $5 shares, together with an option on a further 85,555 shares at 15s. each and 85,555 at 20s. On Feb. 28, 1919, company had 426,843 shares of Canadian company.

During 1915, two dividends of 2½% each were paid by the Canadian company and during 1916 four dividends of 2½% each.

For details of property see Tough-Oakes Mining Co., Ltd.

TOUGH-OAKES MINING CO., LTD. **ONTARIO**

Head office: Toronto, Ont. **Mine office:** Kirkland Lake, Ont.

Officers: Harry Oakes, pres., with Dr. R. J. Robins, J. B. Holden, J. Y. Murdoch and A. Burt, directors. Col. H. H. Johnson, gen. mgr. C. L. Richardson, mgr.

Inc. 1913, in Ontario. **Cap.**, $3,000,000; par $5; 531,500 issued; 426,843 shares owned by Tough-Oakes Gold Mines, Ltd. Operations for 1919 gave a net loss of $105,934.

On account of litigation the mine was closed down in 1918, but reopened March, 1919.

Dividends: to July, 1917, totaled $391,125.

Property: 185 acres in the Kirkland Lake district, Ont. **Development:** by shafts to 500′ depth, with extensive underground work. Ore is largely a hard mineralized feldspar-porphryry, with a net work of quartz stringers. The lode traverses conglomerate and graywacke.

Equipment: includes a 120-ton milling plant, using ball and tube-mills and the counter current decantation system of cyanidation.

Production: in 1918 was 22,000 tons yielding gold and silver worth $139,683.

Recent production figures are not obtainable. In April, 1919, seven drills and 98 men were employed and new work totaled 1,000′. A vein of $20 ore is said to have been found.

ITED KIRKLAND GOLD MINES, LTD. **ONTARIO**
Address: Kirkland, Ont.
Officers: R. T. Shillington, pres.; W. G. Ellis, v. p.; H. A. Day, sec.-
., with Levi Dodge and Ed. Kert, directors.
Inc. in Ontario. **Cap.,** $2,000,000; shares $1 par; 1,000,000 issued.
Property: 135 acres near the Teck-Hughes mine, Kirkland Lake dis-
Ont. Geologic conditions are said to be similar to adjacent producers.
Development: by surface prospecting; No. 1 shaft being sunk in Sep-
er, 1917.
Company may have fair prospects, but has received considerable over-
nistic advertising by brokers. No recent information.

ST KIRKLAND GOLD MINES, LTD. **ONTARIO**
Office: care Black & Martin, mining brokers, 147 Bay St., Toronto.
Officers: Edward Martin, pres. and gen. mgr.; Jas. Rogers, v. p.; T. R.
k, sec.-treas.; with S. Hurd and R. Hurd, directors.
Inc. June, 1919, in Ontario. **Cap.,** $500,000.
Property: 80 acres, in Kirkland Lake mining district, is said to show
al gold bearing quartz veins on which but little work has been done.

OD-KIRKLAND CO. **ONTARIO**
Inc. February, 1920. **Cap.,** $2,000,000. Will explore and develop 300
in Kirkland district.

PORCUPINE DISTRICT

This section includes only the mining companies of the Porcupine District,
of Kirkland Lake being given under that heading, while the Swastika and
on Creek companies are in the general section of Ontario mines.

E GOLD MINES, LTD. **ONTARIO**
See Hollinger Cons. Mines, Ltd.

X PORCUPINE MINES, LTD. **ONTARIO**
Address: J. A. Jacobs, Traders Bank Bldg., Toronto, Can.
Inc. 1911. **Cap.,** $2,000,000; **shares** $1 par.
Owns 80 acres in southern Tisdale Twp., Porcupine district, Ont., showing
and free gold. Shaft 108'. Shut down since 1912.

ADIAN MINING & FINANCE CO., LTD. **ONTARIO**
Office: 85 Bay St., Toronto, Can.
Company is not engaged in any mining operations, simply owning a few
s. The several properties that it formerly managed are now owned by
Hollinger Consolidated Gold Mines, Ltd., which see.

TON PORCUPINE MINES, LTD. **ONTARIO**
Office: 703 Bank of Hamilton Bldg., Toronto. **Mine address:** Wm. C.
, supt.; Box 120, South Porcupine, Ont.
Officers: F. C. Preston, pres.; H. L. Gibson, v. p., with W. E. Pres-
as. Cowan and Wm. C. Offer, directors.
Inc. April 5, 1919, in Ontario. **Cap.,** $2,000,000; par $1; 1,200,000 shares
anding.
Property: one claim, 50 acres, in Porcupine district, ¼ mile S. of Dome
, Ltd., said to show several quartz veins in quartz-porphyry. When present
any acquired the property there were two 90' vertical shafts, and a 50'
e shaft; 82 tons of ore shipped from the latter said to have realized $13,170.
output to date reported as $14,511.
Power and machinery installed, and considerable ore developed above 200'
in 1919. Electric power installed 1920, and 800' crosscut on 200' level started
eleven parallel veins.

IDSON CONS. GOLD MINES, LTD. **ONTARIO**
Address: Porcupine, Ontario.
Officers: G. C. Crean, pres.; H. B. Sutherland, v. p.; H. H. Sutherland,
director, with W. C. Lacey, directors. L. C. Platt, sec.-treas.; N. J. Evered,
F. D. Henderson, mine supt.
Inc. 1919, as a reorganization of the Davidson Gold Mines, Ltd. **Cap.,**

$5,000,000; $1 par. Shareholders were to receive a bonus of one share of new stock for every share in original company. After issuing sufficient stock to pay for additional acreage, new company will have 1,000,000 shares in treasury, in addition to $125,000 cash. Half a million treasury shares were, it is said, underwritten at 75c. net, to provide funds for operations.

Property: 5 claims, in Porcupine area, showing a 5½' vein of gold-bearing quartz, developed by 500' shaft. A winze put down 300' below the 500' level is said to show ore. A second shaft was sunk to open an orebody disclosed by diamond drilling between the 550 and 650' levels. This ore is reported to be 25' wide and to average over $24 per ton.

The adjacent ground acquired in the reorganization has increased the holdings to a total of 420 acres.

Over 2,115' of diamond drilling, and several thousand feet of underground development work has been done. The ore is treated in a 10-stamp mill and mill heads are reported to have run as high as $20 per ton. Electric power is purchased.

It is claimed that over $83,000 was spent on development work in the 3 months ended January 1, 1918.

Production: in 1919, mill treated 3,831 tons, yielding $27,089.

DAVIDSON GOLD MINES, LTD. ONTARIO

Reorganized, 1919, as Davidson Cons. Gold Mines, Ltd., which see.

DOBIE MINES, LTD. ONTARIO

Office: 201 Inspector St., Montreal. H. E. Carmichael, mgr., Porcupine, Ont.

Officers: Frank C. Armstrong, pres., 25 Broad St., New York; S. J. Le Huray, sec.-treas., 260 St. James St., Montreal. Directors: F. C. Armstrong, Geo. C. Loveys, Donald D. Fish, B. Osler, and W. A. J. Chase.

Inc. March 27, 1911, in Ontario. **Cap.**, $1,500,000; outstanding, $1,200,000. Of the issued stock, 1,100,000 was given to the owners in payment of the property and $100,000 stock was purchased by the Tisdale Gold Mng. Co., to provide funds for development purposes. Transfer agents: Toronto General Trusts Corp., Toronto; Investment Trust Co., Montreal. Listed on Toronto Standard & Mining Exchange, and traded in on the unlisted department of the Toronto Stock Exchange, and on the New York and Boston Curbs.

Property: 17 claims, crown patented, in Tisdale Twp., Ont., taken over from the Tisdale Gold Mng. Co., Ltd. Idle several years.

DOME EXTENSION MINING CO. ONTARIO

Head office: 36 Toronto St., Toronto, Ont., Can. H. C. Anchor, mgr., South Porcupine, Ont.

Officers: W. S. Edwards, pres.; J. S. Tomenson, v. p.; Alex Parker, sec.-treas., with J. S. Wilson, A. S. Wigmore, directors.

Inc. Jan., 1911, in Ontario. **Cap.**, $3,000,000; par $1; 2,300,000 shares issued. Annual meeting in May. Listed in Toronto and on New York Curb.

Property: 198¼ acres adjoining Dome Mines, Ltd., on the east, in the Porcupine district. An option to the Dome Mines, Ltd., given in 1919, provided that the latter company should spend $3,000 a month on exploration and development, and had until March 15, 1920, to purchase the property for 75,000 shares of Dome Mines, Ltd. stock. By December, work at 600' depth had revealed considerable ore, and crosscutting at 1,150' was started.

Development: 3 shafts and over 10,000' of underground workings, said to have opened a considerable tonnage of low grade ore.

DOME LAKE MINING & MILLING CO., LTD. ONTARIO

Offices: New Liskeard, Ont., and South Porcupine, Ont.

Officers: F. L. Bapst, pres.; A. A. McKelvie, v. p.; F. L. Hutchison, sec.-treas., with Thos. McCamus, W. H. Kinch, S. J. Dark and Chas. L. Sise, directors. Carl Frank, supt.

Inc. Aug. 26, 1912. **Cap.**, $3,000,000; $1 par; 2,750,000 shares outstanding. Controlled by Hudson Bay Mines, Ltd., which owns 894,045 of the outstanding shares. Trusts & Guarantee Co., Ltd., Toronto, transfer agent.

eting, second Monday in February. Listed in Toronto and on New York b.

Statement for 1918, showed revenue of $97,416; and expenditures, $115,487.

Property: 3 claims, patented, 120 acres, in Tisdale township, Porcupine, wing gold ore in quartz veins, regarded as replacement deposits. The veins N. 10° E. and have a dip of 70°. The mineralized zone traverses a basaltic k, and runs through the entire group.

Development: to depth of 600' by vertical shaft and 16,853' of work- s. Work in 1918 was confined to drifts on the 3d, 4th, 5th and 6th levels on 3 vein, west of shaft. Two ore-shoots were found on the 5th level; one long, the other but 25'; the ore in these shoots varied from $9 to $13.40 per ton. ken ore in stopes at end of 1919 was 2,422 tons, assaying $9.70 per ton.

Equipment: includes Vulcan hoist, compressor and 200-ton mill. A ton cyanide plant was completed in 1918.

Production: r	Tons Milled	Gross Value	Value per ton	Extraction %	Costs per ton
).....	4,433	$23,832	$6.50	78.85	.....
).....	11,929	115,202	9.65	84.5	8.73
'.....	16,388	68,214	4.16	66.1	8.14
).....	6,540	25,629	3.92	....	....

In September, 1919, shareholders authorized a $100,000 bond issue to raise ds for further development. Work was resumed early in 1920.

ME MINES, LTD. **ONTARIO**

Head office: 36 Toronto St., Toronto, Ont. **Executive and financial:** Exchange Place, New York. **Mine address:** South Porcupine, Ont.

Officers: J. S. Bache, pres.-treas.; W. S. Edwards, 1st v. p.; C. D. ding, 2nd v. p.-gen. mgr.; H. P. De Pencier, 3rd v. p.; Alex. Fasken, sec.; H. Curtis, J. S. Bache, treas. and asst. sec., preceding, except H. P. De Pencier, G. C. Miller, Colgate Hoyt and T. R. Finucane, directors. Sol Wexler, treas. C. W. Dowsett, mill supt.

Inc. March 23, 1910, in Ontario. **Cap.**, authorized $5,000,000; oustanding 00,000; shares $10 par. Guaranty Trust Co., New York, and Trusts & Guar- e Co., Ltd., Toronto, transfer agents. Bankers Trust Co., New York, and onto Genl. Trusts Corp'n, Toronto, registrars. Annual meeting, second sday in June. On June 23, 1915, the New York Stock Exchange listed 00,000 of the capital stock with authority to add $500,000 on official notice of ance and payment in full.

Dividends: on Sept. 1, 1915, initial quarterly of 50c per share was paid; inued until reduced in June, 1917, to 25c. quarterly. The total was $1,400,000. ursements suspended until January 15, 1920, when 25c., equal to $100,000, paid; 25c. paid April 20.

Comparative General Balance Sheet, years ending March 31:

Assets.

	Property and Equipment	Current	Deferred Charges	Suspense	Total
....	$4,430,996	$495,454	$41,647	$34,530	$5,002,626
....	4,449,986	717,921	42,857	31,369	5,242,733
....	4,457,192	677,357	56,825	.....	5,191,375

Liabilities.

		Reserves	Surplus	Total
		$31,603	$56,891	$5,002,626
		[illegible]	524,798	5,242,733
		[illegible]	627,051	5,191,375

Profit and Loss Statement, years ending March 31:

Year	Gross Earnings	Expenses	Net Earnings	Dev., Deprec., and Improv.	Surplus
1919.....	.....	$812,852	.....	$234,373	$455,49
1918.....	$1,041,784	237,279	$236,459	282,329	45,8
1917.....	2,194,311	1,241,862	952,448	221,369	731,0
1916.....	1,778,959	.....	912,380	370,518	541,8
1915.....	1,055,497	.....	488,498	309,920	178,5
1914.....	1,204,597	.....	753,328	295,631	457,6

* Deficit.

Property: 6 claims, 240 acres, in Tisdale township, Ont. The ... shows the veins of milky quartz usual in the district, the ore carrying free gold and auriferous pyrite. They form a stockwork whose net ... of interlacing stringers cut schists and intrusives of pre-Cambrian age. The ... body is over 100' across in places, and has been proved by diamond drill work ... a depth of 1,200' or more. The original outcrop, a dome-shaped hillock ... 30' high, showed so much free gold at one place that it was called the Golden Stairway. The gold occurs irregularly in the quartz, as large irregular ... entirely without walls and extremely uneven in value. It is mainly found ... near the contact of an intrusive porphyry with sedimentaries, and is capped ... slate. Development has proven the existence of quite as good ore at 700' ... in diamond drill holes at 1,150' vertically below the surface, as that mined ... the surface and in the upper levels.

Company has an option until March, 1920, on the 5 adjoining claims of the Dome Extension Mining Co., and spent $22,669 in 1917, and $3,000 a month ... 1919, diamond drilling and doing 2,730' of new underground work.

Development: the Dome mine has 3 working shafts, the main shaft being 1,200' deep. Considerable exploration and diamond-drill work has been done on the orebody, especially during the period December, 1917 to June, 1919, when the mill was idle on account of war conditions.

Reserves above the 700' level are estimated as 3,499,832 tons, averaging $... per ton, while the underlying block of ground down to a depth of 1,150' has a large tonnage of potential ore. An official estimate of reserves made April, 1917, was 2,250,000 tons averaging $5.32 per ton. In 1918, the average ... value of the ore reserves was $5.10 per ton.

Up to 1918, over 750,000 tons had been mined and milled and 321,000 ... remained in stopes. Stoping costs in that period were 47c. per ton. New methods of mining and ore handling installed in 1919, will, it is said, make a notable saving in costs. A square-type shaft was sunk on the footwall side of the ore-bearing zone, to a depth of 1,000', with stations at 100' intervals, ... loading pockets for ore and waste on several levels. The eighth level at a vertical depth of 850', is the main haulage way, all ore going to a 36 by 54 ... jaw crusher just below the station. Ore passes are so arranged that all the ... mined above this level, estimated at 2,000,000 tons, will be moved mechanically after it is loaded into cars. Shaft No. 2 is utilized as a main chute or pass from the upper workings to No. 8 level. Electric locomotives are used for haulage. Ore is hoisted by skips working in balance, taking 4 tons per trip at a speed of 1,100' per minute.

Equipment: is modern, extensive, and all electrically driven, by power obtained from Wawaitin Falls, 13 miles from the property. Three-phase current is supplied over the company's own transmission line at 12,000 volts, stepped down to 550 volts by 600 k. w. transformers.

The cyanide mill is of 1,500 tons daily capacity. It contains ball-mills (instead of the stamps formerly used), tube-mills, thickeners, agitators, and filter-presses. The mill was idle from December, 1917, until June, 1919.

Production:

Ore Milled, Tons	Value per ton	Recovery %	Cost per Ton Mining	Reduction	General	Total
187,580	$7.04	.....	....	....	....	....
247,000	$4.27	97.67	$1.42	$1.05	$0.32	$2.79
459,530	4.73	92.98	1.44	1.05	0.30	2.70
347,640	5.50	92.88	1.22	1.01	.32	2.56
248,550	4.68	90.6	1.38	1.12	.46	2.97
145,305	8.77	94.51	1.86	1.69	.64	4.19
101,812	10.72	95.63	1.31	2.35	1.29	4.95

The Dome is a big low-grade mine in which some extraordinarily rich ore ound. The mine and mill are well equipped to handle 1,500 tons daily, and r normal conditions will earn a handsome surplus. From 1914 to 1917, isive, the cost of producing 300,000 oz. of gold was $11.80 per oz., but $11 is considered ample to cover all expenses.

LD CENTRE MINES, LTD. **ONTARIO**

Head office: Dominion Bank Bldg., Toronto. **Mine office:** Timmins, ario.

Officers: T. G. Marquis, pres.; Geo. S. Bingham, v. p.; M. P. Van der rt, sec., with A. H. Jucksceh, Wm. R. Kirk, and W. Melrose, directors.

Inc. in Ontario. **Cap.**, $3,000,000; par $1; issued 1,500,000 shares. isfer agents and registrars, Trust and Guarantee Co., Toronto.

Property: 160 acres, in Porcupine district, formerly owned by the e Syndicate, located about one mile E. of the productive area of the Hol- r Cons. in a section where only a limited amount of work has been done. orted November, 1919, that company would do about 5,000' of new diamond ng.

CHA MINES OF PORCUPINE, LTD. **ONTARIO**

Head office: Toronto, Ont. Is a private company with capital of $40,000.

LLINGER CONSOLIDATED GOLD MINES, LTD. **ONTARIO**

Offices: 85 Bay St., Toronto, and Timmins, Ontario.

Officers: Noah A. Timmins, pres.; D. A. Dunlap, v. p.-treas.; J. B. en, sec., with L. H. Timmins, W. R. McDougold, and J. R. Timmins, direc- A. F. Brigham, general manager; C. G. Williams, general supt.; E. L. more, mill supt.; R. W. Robbins, mech. supt.; A. W. Young, prod. supt.; . Regnell, develop. supt.; Benjamin Richards, mine inspector.

Inc. 1916, in Ontario. **Cap.**, $25,000,000; shares $5 par; 4,920,000 issued. nto Genl. Trusts Corp. and Montreal Trust Co., transfer agents. Guardian t Co. and Montreal Safe Deposit Co., registrars.

Company is a consolidation of the Hollinger Gold Mines, Ltd., Acme Gold s, Ltd., Millerton Gold Mines, Ltd., and Claim 13,147 of the Canadian Mng. inance Co., Ltd.

Stock was issued as follows: 200,000 shares in treasury; 2,400,000 to Hollinger holders; 2,100,000 to Acme shareholders; 100,000 to Canadian M. & F. Co. holders. Shareholders in Acme, Millerton and Canadian M. & F. coms. were to receive full dividends from January 1, 1916, on Hollinger Con- stock issued to them; amounting to $720,000 in June, 1916. Owing to [illegible] costs and scarcity of labor, operations resulted in a deficit and [illegible] 120,000 shares to shareholders at $6.50, proceeds being used to [illegible] indebtedness.

Jupiter Mines, Ltd. See Vol. XII for description of property and of organization.

McINTYRE-PORCUPINE MINES, LTD. ONTARIO

Offices: Standard Bank Bldg., Toronto, and Schumacher, Ontario.

Officers: J. P. Bickell, pres.; H. M. Pellatt, v. p.; with W. J. Sheppard, J. B. Tudhope, and N. S. Dunlop, directors. M. P. Van der Voort, sec.-treas.; L. J. Pashler, asst. sec.; R. J. Ennis, gen. mgr.

Inc. March 16, 1911, in Ontario. **Cap.,** $4,000,000; shares $1 par; increased from $3,000,000, shares $1 par, in 1917, when company purchased properties and assets of McIntyre Extension Mines, Ltd., and McIntyre Jupiter Mines Ltd. Payment amounted to 610,298 shares for both mines. McIntyre-Porcupine shares issued total 3,640,283. The capital of the three amalgamated companies was $7,500,000, $7,398,878 issued. Outstanding bonds were retired at maturity August 15, 1918.

Toronto General Trusts Corp. and Security Transfer & Registrar Co., New York, transfer agents and registrars. Annual meeting, first Monday in February. Traded in on New York Curb and Standard Exchange, Toronto.

Dividends: initial of 5% paid Feb. 15, 1917; 10c. cash in 1918 and 1919. Total to August, 1919, $1,448,612.

Comparative General Balance Sheet, years ending June 30:

Assets.

Year	Plant and Equip.	Capital Devel.	Investments	Disc. on Sec. Sold	Current	Total
1919	$4,688,682	.....	$197,163	.....	$728,992	$5,614,837
1918	4,616,811	.....	104,117	.....	393,679	5,125,561
1917(b)	4,432,250	.....	100,000	.....	319,530	4,851,780
1916	2,921,991	209,508	175,036	211,992	151,963	3,670,490
1915(a)	2,799,035	209,508	.....	214,492	104,670	3,327,705

(a) 15 months, ending March 31. (b) 15 months, ended.

Liabilities.

	Capital Stock	Bonds	Current	Reserves	Profit and Loss	Total
1919	$3,640,283	.....	$122,377	$688,445	$1,163,732	$5,614,837
1918	3,610,283	$4,500	106,181	532,207	872,173	5,125,561
1917	3,610,283	11,000	87,597	400,996	741,903	4,851,780
1916	2,999,985	31,000	111,989	144,466	383,050	3,670,490
1915	2,986,985	54,500	114,704	4,989	166,527	3,327,705

Comparative Operating Account, years ending June 30:

		Disbursements			Profit and
	Receipts	Mine	Mill	Miscel.	Loss Account
1919	$2,745,990	$510,727	$182,530	$369,381	$683,351
1918	1,729,842	607,208	161,201	281,071(c)	680,361
1917(b)	1,693,040	526,200	159,005	285,185(c)	725,700
1916	775,821	265,622	102,389	80,286	327,524
1915(a)	749,234	319,203	101,354	95,923	232,753

(a) 15 months, ending March 31. (b) 15 months ended June 30. (c) Includes depreciation.

Property: located on the south, west and north sides of Pearl Lake, Tisdale Twp., comprises 347 acres, of which 113 acres are under Pearl Lake, Gillies Lake. The area added by acquiring the Extension and Jupiter mines is 127 and 79 acres, respectively. The immediate object of amalgamation was to secure the right to use the Extension main shaft for deeper exploration of McIntyre property on N. side of Pearl Lake, as development work had opened large orebodies at 1,000' depth in both mines.

In 1918, a long term option was obtained on controlling interest in Newray property adjoining the [illegible] on the [illegible] under option in 1918, [illegible]

vember, 1919, company took an option on property of Martin Gold Mining . Hurricanaw River district near Amos, Quebec.

Geology: the tract shows a broad band of schistose quartz porphyry, ween two areas of altered volcanic schist, basalt and associated lavas.

Exploration has shown that the best gold ore occurs in the altered volcanic ist, at or near the quartz porphyry contact; development in the quartz porphyry ay from the contact has not shown much gold. Orebodies are lenticular in m and very irregular, the shoots consisting of quartz more or less interbanded h mineralized schist. The discovery of orebodies has been rendered difficult the presence of compression faults which have displaced portions of the ore much as 130'. Eighty per cent. of ore milled is heavily mineralized schist.

Development: to depth of 1,500' by shafts, with stations at 1,125', 1,250', 1,375', the latter being the new main haulage-level. Total work, 57,965' at of June, 1919, not including 26,907' of diamond drilling. The McIntyre-iter veins are from 24' to 50' wide, with rich stringers running out along the it-planes in the walls.

Ore reserves:

	Tons	Average Value	Total Value
e 30, 1919	433,057	$11.00	$4,777,324
e 30, 1918	459,276	9.80	4,490,432
e 30, 1917	443,617	11.14	4,943,034
rch 31, 1916	201,920	11.12	2,247,128
rch 31, 1915	109,693	7.79	854,436

Equipment: property is well equipped with hoisting and milling plants, luding a 525-ton cyanide mill, in which a 95% recovery is obtained by grind- the ore in cyanide solution and giving a short period of agitation. (See Dorfman, in August, 1917, Bulletin of Canadian Mining Institute.)

Production:

	Tons Milled	Value per ton	Rec %	Costs per ton Mine	Mill	Total	Profit per ton
9(d).	179,874	$9.76	95.2	$2.89	$1.01	$5.08	$4.21
8(d).	178,327	10.05	95.6	3.26	0.90	5.15	4.90
7(c).	195,307	10.00	95.4	2.99	0.89	4.78	5.22
6(a).	105,758	7.71	95.6	2.51	0.96	4.28	3.09
5(b).	85,654	8.87	94.4	3.72	1.18	6.02	2.85
3.....	31,979	7.85	89.8	....	....	....	....
2.....	14,500	7.00	75.0	....	....	....	....

(a) Year ending March 2. (b) 15 months, ending March 31. (c) 15 months led June 30, 1917. (d) Year ending June 30.

For calendar year 1919, company milled 185,018 tons yielding $1,978,013.

Mine development during the past few years has been very satisfactory as veins on the lower levels show as much commercial ore as the upper work- and lateral development on the upper levels has opened up entirely new These results and the acquistion of adjoining properties, assures productive life to the company, which is now the second largest gold Canada.

W PORCUPINE IMPERIAL MINES, LTD. ONTARIO

Successor of Porcupine Imperial Mines, Ltd. H. L. Taylor, pres.

Cap., $3,000,000; $1 par. Holders of Porcupine Imperial stock received share of new stock for two shares of old company's stock.

Property: ¼ mile S. W. of Dome Lake, mine in Porcupine district is to show several veins of gold ore, under development for several years by shaft with about 500' of workings. Some diamond drilling has also been

WRAY MINES, LTD. ONTARIO

Office: 55 Yonge St., Toronto, Ont., Canada.

Officers: B. J. Bixby, [illegible] N. Y.; H. L. Pudor, v. p.; C. P. [illegible]

Inc. in Ontario. **Cap.**, $1,500,000; shares $1 par; 1,200,000 issued. Imperial Trust Co., Toronto, transfer agent. Traded in on Toronto Stock Exchange.

Is a reorganization of the Rea Consolidated Gold Mines, Ltd.; stock being exchanged at the rate of 1½ shares new stock for each share of Rea Consolidated stock.

Property: North ½ of lots 6 and 7, Concession III, about 320 acres, comprise the Rea mine, at Porcupine, Ont, 1½ miles from Schumacher, the nearest railroad station. The veins are well-defined quartz fissures, strike N. E. and dip N. W.; ore-shoots occur as lenses in and along shear zones.

Development: 2-compartment vertical shaft, sunk 420' on vein, with levels at 200, 300 and 400'. The oreshoot is cut and displaced by a fault at depth of 240'; below the fault the vein is not of the same character. The ore-body above the fault was stoped for about 300' in length, 4½' wide, and 200' in depth and is said to have produced 19,500 tons of ore, averaging $11 per ton. Diamond drilling is said to have cut 12' of quartz showing free gold at 630' vertical.

Equipment: includes 10-stamp mill, hoist, 6-drill compressor, pump and boiler.

Production: mill treated 11,607 tons of ore yielding $125,000 in bullion in 1915. It resumed treatment in May, 1917. Output in 1918 was 401 tons of $3.78 ore.

In November, 1917, property was taken under control by the Crown Reserve company of Cobalt, but option was relinquished in 1918 and McIntyre-Porcupine Mines, Ltd. then took a 2-year option on 1,500,000 shares at 45c. per share.

An immense quantity of literature has been published about this mine, mostly in the interest of speculators. Evidently, the management is trying hard to make it a large producer.

NORTH DAVIDSON ONTARIO

Address: L. G. Harris, managing director, Royal Bank Bldg., Ont. T. Jeffrey, pres.

Property: Lot 3, Con. 6, Tisdale Twp., Porcupine.

Development: by diamond drill work, 1919.

NORTH DOME MINING CO. ONTARIO

Owned by Temiskaming Mining Co., Ltd., which see.

NORTH THOMPSON (ASSOCIATED) GOLD MINES, LTD. ONT.

Merged, 1917, into Porcupine V. N. T. Gold Mines, Ltd., which see.

NORTH WOODS MINING CO. ONTARIO

Office: 115 Broadway, New York.

Officers: John C. Hicks, pres.; Ernest Sharp, v. p.; A. J. Dunkle, sec.; Charles S. Rees, treas.

Inc. 1914, in Ontario. **Cap.**, $2,000,000; $1 par; all issued. Shares closely held.

Property: 127 claims, 1,080 acres, in Tisdale and Whitney townships, heart of the Porcupine district, close to the principal mines.

Development: only nominal exploration has been done owing to abnormal conditions. In the fall of 1919 some drilling was done, and work is to be resumed in the summer of 1920.

PEARL LAKE GOLD MINES ONTARIO

Bankrupt. Property acquired, 1915, by McIntyre Extension Mines, Ltd., subsidiary of the McIntyre-Porcupine Mines, Ltd.

PORCUPINE CROWN GOLD MINING CO. ONTARIO

Offices: Dominion Exp. Bldg., St. James St., Montreal, Quebec; Toronto St., Toronto.; and Timmins, Ontario.

Officers: J. W. Carson, pres. and managing dir.; W. J. Gear, 1st v. p.; J. G. Ross, 2nd v. p.; with C. A. Smart, J. W. Rost, A. G. Gardiner, R. S. Lay, ford, F. S. Meighen, Ziba Gallagher, Chas. C. Dickson, directors; [illegible] sec.-treas.; John Reid, asst. sec.-treas.; Samuel W. Colver, Consulting engr.

Inc. in October, 1915. Cap. $2,000,000; shares $1 par. Canada Co., Montreal and Toronto, [illegible]

ital stock owned by Crown Reserve Mining Co., Ltd. Traded on New York rb, and on Toronto Stock Exchange.

Balance sheet of December 31, 1918, showed net profit for the year $4,814, npared with $109,421 in the previous year, making a total with balance brought ward of $282,130. Expenses absorbed $10,174, leaving surplus of $271,956. sh at end of 1919 was $174,576, and total surplus, $224,611.

Dividends: 3% quarterly was paid from 1914 to August, 1917. Total that date was 42%, or $840,000.

Property: one patented claim, 40 acres, at Porcupine, shows quartz ore h free gold and sulphides in veins in schist. Orebody is 5' wide and 1,100' g. Vein strikes N. and has dip of 70° S.

Development: to depth of 1,100' by vertical shaft. New work to July, 8, totalled 700', until property was shut down. Work was resumed early in 9. Ore is mined by shrinkage stoping.

Equipment: includes 150-ton cyanide mill. Total cost per ton ore was 7 in 1916, and $7.07 in 1917.

Production:	Tons Treated	Value per Ton	Extraction	Net Value Bullion
8	10,907	$9.64	97.09%	$124,474
7	37,722	10.97	97.09%	.....
6	51,273	12.11	97.14%	571,652
5	41,326(a)	14.46	97.70%	613,565
4	40,857	17.18	97.26%	689,151

(a) Not including 5,093 tons tailing, assaying $3.15 per ton, treated with an raction of 85%.

The company's prospect of finding new veins is not generally regarded as orable since the quartz-porphyry throughout the western portion of the prop- y has been proved non-productive. At the beginning of 1919 mine reserves re of estimated value of $500,000. In December, 1919, the company was gotiating for the Moneta property which lies west of the Hollinger.

RCUPINE EXCELSIOR MINING CO., LTD. ONTARIO

Mail returned 1919, from former address at Porcupine, Ont., Canada.

Officers: P. Cameron, pres.; Wm. Duncan, sec.; G. L. Wheeler, asst.

Property: claims, Nos. 13890, 13891 and 900 P. in Shaw Twp., Nipissing trict, Ont., formerly owned by the Tommy Burns Mining Co.

RCUPINE KEORA MINING CO., LTD. ONTARIO

Address: W. B. Gunton (who is in control), Toronto, Ontario.

Inc. 1912, in Ontario. **Cap.**, $2,000,000; $1 par; over 1,500,000 outstand- Listed on Standard Stock Exchange of Toronto, and to be traded on New k Curb.

Property: 5 claims, 200 acres in Whitney Twp., Porcupine district, 5 [illegible] E. of the Hollinger and 3 miles N. E. of the Dome.

Development: by incline shafts and extensive drifts to depth of 200' ein No. 1. Diamond drill work and underground development is said to w 40' of $6 ore, but over $70,000 has been spent since February, 1919, in lling the other veins of the tract. Three drill holes indicate the existence two comparatively long and wide shoots of high-grade ore in No. 5 and 6 s at incline depths of from 250 to 480'. Results are considered to be orable for development of a tonnage of ore in No. 5 vein, estimated to exist block 100' by 100' by 20' of a total value of $1,500,000. This ore will be proven by the summer of 1920. Company started shaft sinking late in and will erect machinery. Is regarded as a property of merit, with prom- prospects.

RCUPINE MINES SYNDICATE ONTARIO

Care Mark Harris, Mutual Life Bldg., Buffalo, N. Y. Was a new scheme the above named promoter and his associates.

Presumably organized to acquire the Cross Veteran location, 160 acres, in [illegible] Not regarded favorably.

PORCUPINE PREMIER GOLD MINING CO., LTD. **ONTARIO**

Office: G. W. Fields, treas.-gen. mgr., 53 State St., Boston, Mass. B. M Walton, supt.

Inc. in Massachusetts. **Cap.**, $1,000,000; shares $1 par. Traded on Boston Curb.

Property: 40 acres in Whitney Twp., 110 acres in Deloro Twp., Porcupine district, Ont., Can. Also said to own Standard group of about 110 acres south of Dome Lake property, and the Virtue mine near Baker, Oregon.

Development: on the Porcupine property consists of two shafts, one 200′ deep, with drifts and crosscuts. Mines are in the prospect stage and are outside of the proven belt, but are regarded as worthy of prospecting. Company's promoter is also treasurer and general manager. No recent information, probably idle.

PORCUPINE VIPOND MINES, LTD. **ONTARIO**

Merged, 1916, into Porcupine V. N. T. Gold Mines, Ltd., which see.

PORCUPINE V. N. T. GOLD MINES, LTD. **ONTARIO**

Office: 50 East 42nd St., New York. **Mine office:** Schumacher, Ontario, Canada.

Officers: Henry H. Ward, pres.; H. A. Poillon, v. p.; Chas. C. Dickson v. p.-treas.; H. F. Karst, sec.; C. H. Poirier, mgr., with L. A. Sorenson, and J. A. Carey, directors.

Is a merger of the Porcupine Vipond and North Thompson Mine companies. **Inc.** 1917. Stock traded in on Toronto Exchange.

Property: about 160 acres, adjoining the Hollinger on the west, in the Porcupine mining district, Ontario, Canada. Claims show several quartz veins, one cut on 600′ level reported to average 20′ in width.

Ore: gold quartz, occurs in fissure veins, said to be 3′-10′ wide, which run N. E.-S. W. and are vertical. Pay ore occurs in a shoot 900′ long. Formation is an amygdaloidal basalt.

Ore reserves: in the Vipond, April 1, 1916, estimated at 68,145 tons in place, valued at $8 per ton, and 22,850 tons already broken, but not hoisted, averaging $6.25 per ton, a total of 91,000 tons, valued at $688,600.

Development: by 600′ shaft.

Equipment: includes hoist, 2 compressors, hydro-electric and steam power, and 140-ton mill, which employs the continuous decantation process and is equipped with crusher, 6′ Hardinge ball mill, classifiers, Dorr agitators and Dorr thickeners. The mill was treating 100 tons daily, August, 1917.

Production: 15,134 tons of ore yielding 3,977 oz. gold in 1918. In 1919 explored Krist mine under contract.

In 1918, mine was closed down and lower workings allowed to fill with water. Company was to re-open mine in December, 1919, sink shaft to 800 or 1,000′ level, and enlarge the mill to handle 300 tons. Management claims ore has improved with depth, and that ore reserves will assay about $10 per ton.

PORCUPINE WHELPDALE MINES, LTD. **ONTARIO**

Address: B. J. Simons, sec., 911 Royal Bank Bldg., Toronto.

Cap., $2,500,000; $1 par.

Property: north half of Lot 11 in Tisdale Twp., Porcupine, opened by a 114′ shaft and equipped with steam boilers, hoist, compressor, etc.

PRESTON EAST DOME MINES, LTD. **ONTARIO**

Office: 7 Melinda St., Toronto, Ont., Canada.

Officers: Lt. Col. D. M. Robertson, pres.; Gordon Taylor, sec.-treas. with C. L. Sherrill, R. T. Shillington and D. L. White, Jr., directors.

Inc. 1911, in Ontario. **Cap.**, $3,000,000; shares $1 par; 2,500,000 shares outstanding. Stock listed on New York Curb. Toronto General Trusts Corporation, Toronto, transfer agents.

Property: 3 claims, patented, in Tisdale Twp., Porcupine, Ont., adjoining the Dome Mines, Ltd.

Ore: which occurs in narrow veins in quartz-porphyry, carries coarse gold, associated with pyrite and zinc-blende. Company is idle, pending outcome of further development on the Dome Mines property.

:HUMACHER GOLD MINES, LTD. **ONTARIO**

Head office: 85 Bay St., Toronto, Ont. **Mine office:** Schumacher, Porpine district, Ont.

Officers: F. W. Schumacher, pres.; F. L. Culver, v. p.; J. Y. Murdoch, :.-treas.; H. E. Tremain and C. A. Covert, directors; T. J. Harwood, mgr.

Inc. July 16, 1914, in Ontario. **Cap.,** $2,000,000; shares $1 par; 1,850,000 ued. Traded on Toronto Stock Exchange.

Balance sheet for year ended July 15, 1918, showed assets totalling $1,968,582, luding property, $1,393,970; plant and equipment, $198,239; development, 5,606; current assets, $38,267, and discount on shares, $202,500. Liabilities luded current, $24,707; and surplus, $81,902.

Revenue from bullion, etc., was $242,061, of which $8,888 was profit, com-ed with a loss of $7,696 in the previous year.

Property the Schumacher mine, at Porcupine, Ont., adjoining the Mcyre on the W. for ⅛ mile, and the Acme mine of the Hollinger Consolidated ⅜-mile. Vein outcrops are numerous and extensive, occurring in an E.-W. zone 1,000′ wide. The No. 1 vein is traceable for 1,150′, and is from 50 to 60′ le.

Development: to depth of 600′, with about 12,000′ of work at main or rking shaft. Two orebodies cut on the 600′ level by diamond drilling have yet been mined. The main shaft was to be sunk to 1,000′ in 1919. A second ft, 400′ deep in December, 1919, is also used.

Reserves: 99,425 tons, averaging $6.78 per ton.

Equipment: includes 180-ton mill containing Hardinge and tube mills, l 300-ton continuous decantation cyanide plant.

Production: March 31, 1917, to March 31, 1918, 45,373 tons of ore yield-$259,365. Output in the calendar year 1918 was 4,463 oz. gold from 19,098 s of ore.

)MMY BURNS GOLD MINING CO. **ONTARIO**

Address: H. B. Hatch, Porcupine, Ont.; and Phil. Moore, Brookfield, va Scotia.

Officers: W. E. Beattie, pres.; L. M. Myers, v. p.; with V. Marone and Fairbrother, directors. A. W. Young, sec.-treas., at last accounts.

Inc. in Delaware. **Cap.,** $3,600,000; shares $1 par; Registrar & Transfer , 32 Nassau St., New York, registrar and transfer office.

Owns all but 5 shares of stock of the Tommy Burns Gold Mines, Ltd. ance sheet of January 31, 1916, shows no other assets besides this stock and 00 cash. Balance sheet of the same date for the Tommy Burns Gold Mines, l, gives this stock a value of $99,995 and shows $4,000 cash and total develop-nt expense of $5,645.

Not favorably regarded. No recent information.

ST DOME CONSOLIDATED MINES **ONTARIO**

Head office: Traders Bank Bldg., Toronto. **Mine office:** Porcupine, tario.

Officers: Sir Henry M. Pellatt, pres.; Hugh Blain, v. p.; C. H. Mana-, sec.-treas., with J. A. Murry, R. L. Baker & Co., and G. A. Stimson, directors.

Inc. 1915, in Ontario, to take over property and assets of the West me Mines Co. **Cap.,** $3,000,000; $1 par; 2,000,000 shares offered in exnge for 3,000,000 shares in the old company, leaving 1,000,000 in the treasury provide funds for development. Annual meeting in April. Listed on New k Curb and in Toronto.

Balance sheet of December 31, 1917, showed total assets of $3,009,935, with h on hand $52,718; property and equipment, $2,000,000; discount on treasury k, $749,965; deferred development, $166,250. Accounts payable were $9,935.

Property: 176 acres, in Tisdale Twp., Porcupine, Ont., adjoins Dome e on W. Idle from 1912 to 1915, after fire destroyed many lives besides face equipment worth $75,000. Property shows a quartz vein proven to th of 1,800′. There are also 8 other veins as yet undeveloped.

Development: by 70° incline shaft, 365′ deep, sunk on a quartz vein averages 5′ in width and in some places 8′. Workings total about 4,600′

Reserves in September, 1917, were estimated to be worth $2,000,000, the ore assaying $6.17 to $8 per ton. In 1918, a test run of 300 tons ore was made at the Dome Lake mill. This ore assayed $9.55, and an 86% recovery, or $8.21 was saved. Milling and transportation cost $6.05, and indirect charges were $1.21, so that the net profit was only 93c. per ton. Under normal conditions costs would not exceed $6, and mine could be operated with a profit of $3.55 per ton, but 93c. being too low for safety, mine was closed down.

Equipment: includes 12-drill compressor, electric motors and transformers, 4 boilers, drills, etc.

QUEBEC

ALBERT COPPER CO. QUEBEC

Office: 25 Broad St., New York. **Mine office:** Capelton, Sherbrooke county, Quebec. Was organized to take over the mining interests of the Nichols Copper Co. in Quebec.

ASCOT MINING CO. QUEBEC

A close corporation owning an old copper mine near the Eustis mine, in Ascot township, Sherbrooke county, Quebec. See Vol. XII.

BRITISH MINERALS CORPORATION, LTD. QUEBEC

Owns the Siscoe mine, located on an island in Lake De Montigny, 40 miles by river from Amos, on the National Transcontinental Ry. Mine shows quartz veins and stringers in diorite and greenstones. Veins are from 22" to 10' in width. Developed by shallow shafts, deepest 100'. An 8-ton sample assayed $39.64 gold per ton. Property is considered worthy of exploration.

CANADIAN WOOD MOLYBDENITE CO. QUEBEC

Described in Vol. XIII. Property taken over, 1917, by Dominion Molybdenite Co., which see.

DOMINION MOLYBDENITE CO. QUEBEC

Absorbed the Canadian-Wood Molybdenite Co.

Inc. 1917. **Cap.,** $500,000.

Property: the Moss mine, near Quyon, Pontiac county.

Development: by opencuts, exposing molybdenite in reddish gneissoid granite. A 200' shaft has stopes connecting with the open cuts. The ore is principally finely disseminated in flakes of ½" or less, and is hand sorted. Present company did 12,000' of diamond drilling, which is said to have blocked out considerable ore.

Equipment: includes 150-ton mill, using crushers, dryers, ball mills and Callow flotation machines. Ore containing as low as 1% MoS_2 gives 95% recovery.

Production: from March, 1917, to January, 1919, over 43,000 tons of 1% ore had been mined and milled. Mine was closed down in July, 1918, on account of the poor market for molybdenum.

EASTERN MINING & MILLING CO. QUEBEC

Fred. M. Connell, pres.

Property: the Huntingdon copper mine, 409 acres, near Eastman, Que. The ore deposit is a well mineralized mass of greenstone between serpentine and schist. The mineral is chalcopyrite.

Development: by tunnels. Company has a 250-ton flotation plant built to treat the 50,000 tons of ore on the dumps. Up to first week in February, 1918, the mill had treated 6,000 tons assaying about 2% copper. Concentrates were shipped to Nichols Copper Co. The plant was closed down for several months in 1919, but has been reopened. See Canadian Mining Journal, August 6, 1918, "The Huntington Copper Mine, Quebec."

EUSTIS MINING CO. QUEBEC

Office: Eustis, Sherbrooke county, Quebec, Can. W. E. C. Eustis, 131 State St., Boston, Mass., pres., sec.-treas.; F. M. Passow, supt.

Inc. 1878, in Quebec, and operated as a close corporation.

Property: near Sherbrooke, carries 4 parallel interbedded lenses of

cupriferous pyrite, in talcose schist crossed by dioxite dikes, the cupriferous belt being traceable for 2 miles. The orebody is worked through an inclined shaft to a depth of about 3,450' on the incline, with an average dip of 45°. Lenses are 3 to 60' in width, averaging about 2.5% copper, up to 60 cts. per ton in combined gold and silver values, and 40% sulphur, but with considerable variations, are occasionally carrying up to 50% sulphur. Footwall vein, or lens 4 to 20' thick, 50 to 100' long. Main vein 20 to 60' thick, 100 to 120' long. Shaft vein, 3 to 15' thick, 50 to 100' long. No. 1 vein 2 to 25' thick, 20 to 120' long. Footwall and shaft lenses richest in copper, averaging 4 to 8% while others carry 2½% copper with 42 to 48% sulphur. Property is primarily a producer of pyrite, for the sulphuric acid trade.

Development: the mine, opened 1870, and producing for 80 years, has a 7x7' crosscut tunnel, 1,000' long and a 3,000' shaft, sunk at 20 to 45°, with double skip tracks. The mine is dry, most of the water coming from surface and the upper stopes, but the limited quantity of mine water is very acid, and contains copper in solution, which is precipitated as cement copper on scrap iron as it leaves the tunnel, through which it is conducted by a launder. Mine is served by the Boston & Maine railway. About 150 men are employed in the mine and mill.

Equipment: includes a 150-h. p. electric hoist, good for 3,500' depth, and two 8-drill, 2-stage air compressors, 1 run by steam and 1 by electricity.

The 300-ton mill, three-fourths mile from the mine, is connected therewith by an electric tram, equipped with three 3-ton cars. The mill has a 150-h. p. electric equipment. Ore is dumped onto grizzlies, coarse ore falling to the sorting floors and conveyor belts, where hand-picked and cobbed. Ore sufficiently rich for shipping is reduced to 2½" size, and concentrated ore is reduced to ⅛" size, by crushers and ball mills, going thence to an 8-compartment classifier with spigots discharging to 8 Wilfley tables. Middlings from coarsest tables are returned to ball mills and from finer tables, to the re-crushing department.

Selected ore and concentrates are shipped to various acid works, and there burned for sulphur, the cupriferous cinder remaining then being shipped to the Norfolk smelter, where it is treated for copper. Production is about 30,000 tons of cupriferous pyrite yearly.

FEDERAL LEAD & ZINC CO. **QUEBEC**

Address: J. C. Beidelman, 315 Transportation Bldg., Montreal, Quebec.

Property: claims at Blende, 45 miles back of Cascapedia, Gaspé peninsula, Quebec. Examined in 1918 by Walter Harvey Weed.

Well mineralized fissure veins lie in slates cut by quartz-porphyry and later basic rocks. Ore consists of sphalerite and galena in quartz and spar.

Development: by 1,400' of drift and crosscut work with tunnel entrance and connection with shaft at depth of 92'. Ore opened above the tunnel is estimated at 60,000 tons, worth $860,000 gross and $479,000 net. Possibilities are considered good.

INDIAN-PENINSULA MINING CO., LTD. **QUEBEC**

Office: W. E. Simpson, Cobalt, Ont., and 52 Broadway, New York.

Officers: W. J. Haines, pres.; P. G. Grant, v. p.; with S. D. Wright, W. H. Storey, A. W. Porter, Frank Groch, and W. E. Simpson, directors.

Inc. July, 1918, in Ontario. **Cap.**, $1,000,000; $1 par; all issued; non-assessable. Annual meeting, Friday before first Monday in September.

Company controls the St. Maurice Mines Co., Ltd., which see.

MARTIN GOLD MINING CO., LTD. **QUEBEC**

Property: in the Hurricanaw district, 40 miles by river from Amos, on the National Transcontinental Ry., consists of parts of lots A and 37, ranges VIII and IX, Dubuisson Twp. Shows a quartz vein in greenstone, 2 to 10' wide, exposed for over 700' by stripping and trenching.

Development: 125' vertical shaft with 75' of drifting on vein at bottom level. In 1918, company built and operated a small experimental 10-stamp mill. Ore is said to have yielded good gold value, but work was discontinued in July, 1919, on account of financial difficulties. Reported in November, that the McIntyre-Porcupine company of Ontario had taken an option on the property.

MUTUAL CHEMICAL CO. OF CANADA, LTD. QUEBEC

Address: Hugh B. Lee, supt., Black Lake, Quebec.

Property: the Belanger mine, 250 acres in Coleraine Twp., Megantic county, Quebec. Ore is chromite occurring in serpentine.

Development: by shafts, deepest 200', with workings on 90' and 190' levels exposing ore for 500' in length with crosscuts each 50'.

Equipment: includes an electric hoist, compressor, and 100-ton mill, making an 80% extraction. Concentrate assays 50% chromic oxide.

NORTH AMERICAN MAGNESITE CO., LTD. QUEBEC

Address: 36 Board of Trade Bldg., Montreal, Quebec.

Officers: E. Liersch, pres.; C. L. Higgins, v. p.; W. J. Phelps, sec.-treas.; with C. O. Clark, L. N. Benjamin, A. W. Gifford, A. Letang, and Jas. N. Laing, directors, all of Montreal. W. P. Boshart, supt., Calumet, Que.

Cap., $200,000; par $100; issued $186,000.

Property: 300 acres, in Greenville Twp., Argenteuil county, Quebec, said to have 1,000,000 tons of magnesite. Mining is by open-cut methods.

NORTON, A. O. QUEBEC

Office: Coaticook, Quebec. A. O. Norton, owner and mgr.; W. Jenkin, mine supt.

Property: 600 acres, freehold, except 150 acres, title covering only mining rights, includes the Suffield, King, Silver Star, and Marrington mines, in Ascot township, 7 miles from Sherbrooke, with railroads within 2 miles on either side.

The mines show 3 lenses, of 3 to 20' width, 1 proven to depth of 400', estimated by owner to average 4 to 5% copper, from a trace to 10% zinc, 5 to 25 oz. silver, and $1.50 gold per ton. The King mine has a 165' incline shaft with about 500' of workings. The Suffield mine has a 350' shaft with about 1,200' of workings, showing ore assaying 3% to 4%, and combined gold and silver values of $2 to $12 per ton, with about 25% sulphur. The Marrington mine, 100 acres, 1½ miles from Suffield, and about 1 mile from Capelton, is opened by a 260' shaft with about 400' of drifts, developing a lens about 75' wide at surface, said to carry at depth 5 to 7' of good ore. Little development work has been done since August, 1914, and no shipments have been made from the property.

Equipment: includes a steam plant, 100-h. p. boiler, a 50-h. p. double cylinder steam hoist and a straight-line air compressor. In 1918, electric power was installed, also compressor and 100 h. p. motor. A 100-ton flotation mill was built in 1919. Property considered promising.

ST. MAURICE MINES CO., LTD. QUEBEC

Office: W. E. Simpson, Cobalt, Ont., and 52 Broadway, New York.

Officers: W. J. Haines, pres.; A. E. Doucet, v. p.; W. H. Storey, sec.-treas., with W. E. Simpson, S. D. Wright, A. W. Porter, and P. G. Gram, directors.

Inc. June, 1916, in Quebec. **Cap., $750,000; $100 par; all issued:** non-assessable. Annual meeting, first Monday in September.

Property: 5 claims, 683 acres, at Indian Peninsula on Lake Keewagama, 20 miles S. of Amos, Quebec, on the National Trans. Ry. Ore carries molybdenite, treated in a 100-ton mill, employing the Groch flotation system.

WEEDON MINING CO., LTD. QUEBEC

Office: 263 St. James St., Montreal. **Shipping office:** Room 560, 11 Broadway, New York. L. D. Adams, gen. mgr.

In 1915 acquired the property of the East Canada Smelting Co., at Weedon from the Precious Metals Corporation of New York. Controls the Zinc Co., Ltd., which operates a lead and zinc mine at Notre Dame des Anges, Portneuf county, Quebec; also the Canadian Zinc Products Co., Ltd., which operates a zinc oxide plant at Notre Dame des Anges.

Property: 375 acres in Wolff county, Province of Quebec. Has produced 260,000 tons of cupriferous pyrite ore, mined for sulphur as well as copper in the last 6 years. Average assay is 3.3% copper, 40.8% sulphur, trace of lead, 0.77% zinc, 0.5 oz. silver, and 20c. gold per ton.

Geology: ore occurs in two lenses in schist. Main orebody is 570' long nd from 15 to 45' wide, with dip of 45° N. E., and course N. 37° E.

Development: by two shafts 700 and 900' deep, and 9 levels driven to ıe limits of the ore. **Reserves:** on January 1, 1917, were about 200,000 tons.

Equipment: 2 air hoists (60-h. p.), one 150-h. p. electric hoist, 2 comressors (one electrically driven, 1,600 cu. ft. capacity), and all necessary buildıgs, shops, etc.

The zinc mine is developed by one 300' shaft. It is equipped with a 150-ton ɔncentrating mill using tables, flotation unit, and magnetic separation. Proıces zinc concentrates containing 42% zinc and lead concentrates averaging)% lead, 65 oz. silver, and $13 gold per ton.

Transportation: at copper mine 3½ miles of aerial tram to railroad, costing :. per ton.

At zinc mine there is 4 miles of teaming. Mining costs at copper mine in)16, including development and all overhead charges were $2 per ton. Comete cost at zinc mine for concentrates, f. o. b. cars, was $6 per ton of crude ore.

Production of copper in 1916, 5,640,000 lb. Mine output in 1919 about 80 to)0 tons daily, or 25% of that in 1917-18. Company does not give out any inɔrmation.

SASKATCHEWAN

EAVER LAKE GOLD MNG. CO. **SASKATCHEWAN**

Mail returned, 1919, from Prince Albert, Saskatchewan, Canada.

Property: 32 claims acquired in 1914, from the Prince Albert Epl'n Co., ı the north shore of Beaver Lake, 118 miles from Le Pas, the nearest R. R. ɔint, on the Can. Northern Ry., out of Winnipeg.

On the Prince Albert claim, at the contact of the Huronian schist and ıurentin diorite, a 48" quartz outcrop can be traced for a considerable disnce. A 70' incline shaft, sunk on the vein, is said to show a 4 to 5' vein avering $16 in gold and 2 oz. silver per ton. Probably idle.

YUKON TERRITORY

ΓLAS MINING CO. **YUKON**

Dead: In February, 1916, holdings were taken over by the Yukon Copper ., Ltd., which see.

ANADIAN KLONDYKE MINING CO., LTD. **YUKON**

Is a subsidiary of the Consolidated Gold Fields of South Africa, Ltd. On ɔvember, 22, 1917, the Granville Mining Co (which see), the bondholding comıy, applied for a receiver for the Canadian Klondyke Mining and Canadian ondyke Power companies.

Address: Dawson, Yukon Territory. H. G. Blankman, receiver-manɛr.

Inc. March 5, 1913, in Canada. **Cap.,** $8,000,000 shares $5 par; $6,000,000 ued. When the receiver took over the property on January 5, 1918, total liabili; (excluding claims of litigants) were $662,038, which included $158,570 in ges. Balance sheet of December 31, 1918, showed current assets of $506,900, current liabilities of $30,569; total assets, $4,156,837. The profit and loss tement for the year showed a gross profit on operation of $216,963. Gold ırns were $452,648, and total income was $487,120; operating charges absorbed 0,157. Net profit to surplus was $44,570.

Property: 15½ placer claims and hydraulic lease No. 18, about 26,000 es, in the Klondyke valley, with total production to date of nearly $12,000,000.

In 1918, company operated 3 dredges which handled 4,300,910 cu. yds. at a ıl cost of 10.28 c., and yield of 11.19c. per cu. yd., compared with a cost of 6c. and yield of 14.76c. in 1917, and cost of 14.22c. and yield of 14.21c. in 1916.

Development: by open-cut, with a 120′ shaft in ore.

Equipment: includes 800-h. p. steam plant, hoist, with a tram line and 2,000-ton ore bins on the sea. Has 1,500-ton coarse crushing plant and 150-ton concentrator.

Company expected to start regular operations in 1919.

HYDRO-ELECTRIC SMELTING CO. NEWFOUNDLAND

Developing an old copper property on Little Bay, Newfoundland, operated by a British company, 1878-1890, at last account.

REID-NEWFOUNDLAND CO. NEWFOUNDLAND

Address: St. Johns, N. F.

Property: a copper mine at New Bay, N. F., was under development in 1907, but has never been a producer. Company owns the railroad and steamship lines of Newfoundland.

TERRA NOVA PROPERTIES, LTD. NEWFOUNDLAND

Secretary and office: E. A. Sursham, Fleetway House, Farrington St., London, Eng. **Mine office:** Millertown, Newfoundland. Mayson M. Beeton, chairman; William Scott, gen. mgr. at Grand Falls, Newfoundland. Is a subsidiary of the Anglo-Newfoundland Development Co., Ltd.

Company owns rights over about 2,500 sq. miles, held by 99-year lease, in the central part of Newfoundland, surrounding Red Indian lake. The principal property is Buchan's River mine, about 5 miles W. of the lakes on the N. shore. Ore occurs in sericitic schists formed of volcanic grits, the vein having strike of N. 51° E. and dipping about 30°.

Development: consists of a 370′ shaft with several levels, having long drifts on the vein. The one orebody thus far found varies from 5 to 10′ in thickness, is 350′ long, horizontally, and 370′ in downward extension. The ore is a complex sulphide carrying 2.36% copper, 8.14% lead, 20.38% zinc, 6.70 oz. silver and $2.72 gold per ton.

Examined and reported on by W. H. Weed.

YORK HARBOUR MINE NEWFOUNDLAND

Idle. **Former address:** York Harbour, Birchy Cove, Bay of Islands, N. F. The mine, 4,000′ from the bay, at elevation of 1,000, carries cupriferous pyrite. The ore is compact and close-grained with 2% to 4.5% copper and 35 to 41% sulphur, the sulphur being valuable for the manufacture of acid.

Development: by 360′ main shaft sunk at an angle of 72° to the S. E., practically the same as the dip of the ore lenses. Levels are opened at 60′ intervals, with drifts driven S. W. along the strike of the orebodies.

Equipment: included a 250-h. p. steam plant, with a 50-h. p. Flory hoist and an 8-drill Norwalk high-altitude air compressor. Company supposedly bankrupt and property has been closed down for years.

MEXICO

Owing to the unsettled political condition of this country, and to the numerous massacres of American men in the revolutionary States of the nation, the mining industry of Mexico has been greatly depressed for six years past, and many companies formerly prosperous, have stopped work, while others have maintained merely nominal operations.

As an instance of the burdens under which mining companies operate, in addition to a 25% increase in rail freight and supplies, and the frequency with which bullion was stolen by so-called bandits, the Batopilas Mining Co. of Chihuahua pays 10% of its gross output for taxes. Another example is the Guanajuato Reduction & Mines Co. of Guanajuato; owing to the prohibition on gold exports from the United States in 1918-'19, the company had to pay a premium of $53,558 to obtain Mexican currency with which to meet payrolls, taxes, and supplies purchased in Mexico.

AMERICAN SMELTING & REFINING CO. **MEXICO**

See same title under United States mines.

EXPLORATION CO. OF ENGLAND & MEXICO, LTD. **MEXICO**

In liquidation, 1917.

EXPLORATION CO., LTD. **MEXICO**

Office: H. F. Wreford, sec., 24 Lombard St., E. C., London; P. L. Foster, 61 Broadway, New York.

Directors: R. T. Bayliss, chairman and mng. director; J. H. M. Shaw, mng. director; J. R. Maguire, J. E. D. Ryder, G. D. Smith, and O. E. Warburg.

Inc. March 21, 1904, in Great Britain, to acquire the assets and undertakings of a company of same name, registered June, 1896, except certain assets and liabilities which had been acquired by the Exploration Assets Co., Ltd. The company carries on a general financial business and holds interests in the Tomboy, El Oro, Santa Rosa, Buena Tierra, Greene-Cananea Copper, Chile Copper, Natomas Co., South African Real Estate Trust Ltd., and other concerns, and floated the Mexico Mines of El Oro, Ltd.

Cap., £750,000; shares £1 par; reduced Nov., 1916, to £375,000; shares 10s. par. For every 5 old shares, holders received 3 fully paid shares and £2 of the Assets Company's debenture stock.

Dividends: declared by former company: 1896, 2s; 1897, 2s 6d; 1898, 3s. 6d.; 1899, 3s.; 1902, 1s. Dividends paid by present company: 1905, 1s.; 1906, 1s.; 1907, nil; 1908, 1s.; 1909, 1s. 6d.; 1910, 1s.; 1911, 1s. 6d.; nil in 1913, 1914 and 1915; 1s. in 1916; 6d. in 1917; 9d. in 1918.

For year ending December 31, 1916, there was a net profit of £3,251, making with balance forward, £97,457. Investments were valued at £617,863. For 1917, the profit was £21,024, plus £60,210 from 1916. The dividend absorbed £18,750, and £62,484 was carried forward. Investments were £262,530 plus £183,757 of British Treasury Bills. In 1918 the profit was £31,742, plus £62,484 from 1917. Investments were £305,779 plus £173,692 cash and War Bonds.

INTERNATIONAL CO-OPERATIVE HOLDING CO. **MEXICO**

Dead. Former office was at Las Cruces, New Mexico. See Vol. XIII.

MEXICANA; COMPANIA METALURGICA **MEXICO**

Offices: 82 Beaver St., New York; 26 Ave. 16 de Septiembre, Mexico City, D. F.

Officers: Geo. Foster Peabody, 2nd v.-p.; R. E. Safford, sec.; Peabody & Mason Smith and Isaac

Inc. 1890, in New Jersey. Cap., $4,000,000; shares $100 par; fully issued: in $1,000,000 cumulative 8% preferred stock, $1,250,000 guaranteed 6% second preferred stock, and $1,750,000 common stock

Bonded debt $2,774,700 first gold 5s. dated July 1, 1901, due July 1, 1931; interest payable at the company's New York office. Coupon (principal may be registered) $1,000, and registered in multiples of $100. Guaranty Trust Co., New York, trustee. Authorized $3,000,000, of which $732,700 held alive in sinking fund. Subject to call at 110 and interest. Sinking fund, 2% per annum of amount outstanding; bonds so purchased being kept alive and the interest thereon added to the fund. Interest paid without deduction for normal income-tax. Guaranty Trust Co., New York, registrar.

Property: interests are extensive, including control of numerous subsidiary mining, transportation, and land companies, among the more important being the **Sombrerete Mining Co.**, and the **Mexican Lead Co.**, at Sombrerete, Zacatecas, Mex., the **Montezuma Lead Co., Alvarez Lead & Timber Co., Mexican Mineral Railway Co.**, and **Potosi & Rio Verde Railway Co.**

The **Veta Rica** mine, owned outright, is at Sierra Mojada, and is an important silver-lead producer. Development is by a 600' shaft.

Other important producers are the silver-copper mines at **Concepcion del Oro,** State of Zacatecas. The **San Pedro** and **San Pablo** mines at Diente in Coahuila, 12 miles from Monterrey, are also important producers of lead, and the mines of the San Pedro district at San Luis Potosi are heavy producers of silver, gold, and lead ores, constituting the main supply of ore for the company's custom smelter at San Luis Potosi. Smelter has been operating since February, 1918.

At the **Diente** group, including the San Pedro, San Pablo, and Zaragoza mines, J. S. Carnaham, mgr, silver ore was originally discovered in caves in cliffs of hard blue limestone. It is found in so-called chimneys or pipes, the largest one being beneath a cave 150 meters wide and of same height. The ore bodies extend from near the crest of the cliffs or 3,266' above the valleys down to the deepest workings. The ore chimneys are connected by thin seams and stringers which are a guide in exploration work. The silver occurs in cerussite changing to galena in depth. Mining is by panel slicing under mats of timber. (See Brinsmade, "Min. & Sci. Press," November 22, 1919.) Monthly production averaged 1,000 tons, but in December, 1919, ore extraction was suspended though development continued.

Equipment at Diente: steam boilers, Frazer and Chalmers engine-driven Bullock generators, motor-driven compressor, Lidgerwood hoist, ventilating fans, machine-drills, 3-rail gravity surface tram 1,000 meters long, Hallidie single-rope aerial tram, and 2,200-meter aerial tram to loading-bins at rail.

The **San Luis Potosi** smelter, blown in February, 1918, treating 1,000 tons daily, includes 12 furnaces for the reduction of gold, silver and lead ores and a special copper department of 100 tons daily capacity. The works have steam and electric power, and employ about 1,000 men. In addition, there has lately been completed the Carmen 250-ton cyanide plant for cyanidation of lower grade ores from the San Pedro mines.

The company is a large producer of lead and silver, with copper and gold secured mainly as by-products, and is active and enterprising in the rejuvenation of old properties and the development of new mines.

MEXICAN CORPORATION, LIMITED (THE) MEXICO

Offices: A. A. Kelsey, 1 London Wall Bldgs., London, E. C. 2, England; 61 Broadway, New York; and Edificio La Mutua, 522, Mexico City.

Directors: F. W. Baker, R. T. Bayliss, Walter McDermott, F. A. Govett, A. S. Elmore, Herbert Guedalla, J. A. Agnew, and Lord Brabourne. Consulting engineers: J. A. Agnew, L. Chevrillon, and Hugh Rose.

Inc. August, 1919, in Great Britain. **Cap., £1,000,000;** £1 par; £962,75 allotted, of which £850,000 is held by Consolidated Gold Fields of South Africa, Consolidated Mines Selection Co., Central Mining Corporation, Imperial &

'oreign Corporation, Lena Goldfields Co., Lake View & Oroya Exploration, and ıe Exploration Co., Limited.

When the company was formed 25% of the capital stock was underwritten y the Camp Bird Co., 25% by Santa Gertrudis, and 15% of the capital, or 50,000 shares reserved for subscription by Santa Gertrudis shareholders. Additional shares accrued to Camp Bird, through the shareholding in Santa Gertudis.

Seventy-six thousand shares were offered at par in September, 1919, to amp Bird shareholders at the rate of one share in the Mexican Corporation for very 23 shares held in Camp Bird.

By November 28, 1919, £108,040 had been paid in and preliminary expenses of 1,583 incurred.

Company was organized to acquire three promising properties in Mexico.

(1). A 25-year lease on the holding of the **Teziutlan Copper Co.**, at a Aurora, State of Puebla, on the railway line, consisting of 2,500 acres of ineral land, together with a 3,000-h. p. hydro-electric plant, a 500-ton mill and nelter.

The mine has 600,000 tons of sulphide ore blocked out that will assay 2.4% ›pper, $1.75 gold and silver, and 5.5% zinc, and diamond-drilling has revealed ldditional ore. This ore needs concentration by flotation, followed by smelting. he plant requires improvements that will cost $500,000, to be repaid at the rate 20% from the annual profit. The Mexican operating company gets 37½%, ıd the Teziutlan Copper Co., 62½% of the remaining profit. A yearly profit $230,000 is estimated, aside from probable profits from custom ores treated zinc recovered. See Teziutlan Copper in Volume XIII of this Handbook.

(2). The holdings of the **Fresnillo Mining Co.**, at Fresnillo, Zacatecas, mprising the Proaño mine and a total of 733 acres mineral land. The Proaño as worked from 1550 to 1873, when pumping expenses and low silver prices used its shut-down. In 1919 there was 600,000 tons of tailing left, assaying 0.05 . gold and 3.2 oz. silver per ton, besides 3.5 oz. of mercury.

Development: to depth of 1,500' with workings on 50 veins. Equipment cludes a 1,000-h. p. gas engine power plant and 500-ton cyanide mill.

Reserves are estimated as follows:

		Average assay		Total contents	
		Gold,	Silver,	Gold,	Silver,
ıtcrop ore	Tons	dwt.	oz.	oz.	oz.
›sitive	2,000,000	0.12	5.25	12,000	10,500,000
›bable	2,000,000	0.12	5.25	12,000	10,500,000
Totals	4,000,000	0.12	5.25	24,000	21,000,000
Dump ore:					
ıide	60,000	0.09	4.9	270	294,000
lphide	365,000	0.12	6.5	2,190	2,372,500
Total	425,000	0.11	6.3	2,460	2,666,500

It is estimated by company that with silver at $1 an ounce, the net profit will $2.10 per ton and the profit from the tails $1 a ton.

The power-plant is to be enlarged to 3,000-h. p. and the mill to 2,000 tons ›acity at a cost of $2,000,000.

The company engineers estimate an annual return of 33% on the investnt in the Teziutlan and Fresnillo properties.

(3) a 22% interest in the **Esperanza Company's** new mine in Jalisco.

The rejuvenation of these mines is not an easy matter, nor are the ores ;h grade. Moreover, $2,500,000 must be spent to enable the Teziutlan and Fresılo mines to make 33% annual return. The undertaking is a large one, but the hands of people who are accustomed to handling enterprises of this kind, that success is confidently expected.

MINERALES Y METALES, COMPANIA DE **MEXICO**

Subsidiary of American Metal Co., Ltd. **Office:** 61 Broadway, New York.

Cap., $2,500,000: $100 par; of which A. M. Co. owns 24,423 shares. Increased from $1,250,000 in 1917.

Company owns the following properties:

Guadalupe—Mines and smelter	Nuevo Leon
Cerralvo—Mines and smelter	Nuevo Leon
Providencia Mines	Zacatecas
Santa Eulalia Mines, under lease and bond	Chihuahua
Guanacevi—Mines	Durango
Oil leases	Vera Cruz

Company manages or controls the following properties:

Agujita Coal Mines	Coahuila
The Torreon Smelter	Coahuila
Paloma Mines	Coahuila
Parrena Mining Co.	Coahuila
Penoles Mines	Durango
Monterrey Smelter and Refinery	Durango

1. The mines near Guadalupe, owned outright, cover 2,270 acres, and yield lead and zinc ores shipped over an 18-mile narrow-gauge railway to the treatment plant at Guadalupe. This smelter has a blast-furnace with capacity of 75,000 tons lead ores annually, making 7,000 to 8,000 tons of bullion. There is also a calcining plant for zinc-carbonate ores, capable of handling 7,000 tons per month from the mines near Guadalupe, and the company's other mines and custom ores. At Guadalupe there is also a modern power-plant, offices, workmen's houses, schools, hospitals, and other miscellaneous equipment.

2. *Cerralvo.*—This unit of 750 acres, includes a mine and smelter. The concentrate is either shipped out or treated at the smelter at Cerralvo. The mine produces 1,200 tons of 40% lead ore and can furnish 300 tons of zinc carbonate ores monthly. The Cerralvo smelter treats 35,000 tons of lead ore per annum. Transportation between the mine and smelter and the railroad junction at Herreras is by means of automobile-trucks.

3. *Providencia Mines*—These mines are capable of producing 4,500 tons of lead-silver ores per month, averaging 18% lead and 13 oz. of silver; also 1,500 tons of oxidized zinc ores running about 35% zinc. The ore goes by aerial tramway and narrow-gauge railway to the National Railway at Saltillo. The lead ores are sold in the United States and the lead-silver ores treated at the various smelting-plants controlled by the company. A first-class power-plant is under construction at these mines.

4. *Guanacevi*—In Guanacevi the company, in 1919, acquired valuable silver properties covering 415 acres. As Guanacevi is remote from a railway and in an unsettled district, the company has not yet begun operations there. Work already done on the properties is said to show that they are worth more than the amounts invested.

5. *Santa Eulalia*—These properties cover 2,935 acres, operated under lease and bond. The leases run from 10 to 15 years and require the payment of royalty. The properties are still in the development stage. Ores will be transported by aerial tram from Santa Eulalia to the main line of the National Railway.

6. *Vera Cruz Oil-lands*—Early in 1917, before the enactment of the new oil-land laws in Mexico, company acquired 6,710 acres of oil-land under lease in the State of Vera Cruz, adjacent to producing properties. No development work has been undertaken owing to high cost of [illegible] and unsettled conditions.

7. *Railway equipment*—The company owns [illegible] locomotives and 900 cars, which it was compelled to [illegible] product over the National lines.

8. *Real estate*—The company owns office [illegible] and Saltillo; also a recreation park in Monterrey.

9. *Compania de Combustibles Agujita, S. A.*—Incorporated in 1917 with a ital stock of 45,000 shares of P100 each. Of these shares the Minerales Co. ıs approximately 55,000, the rest being owned by Mexican citizens. The com- y owns coal-lands aggregating 2,700 acres at Agujita and 1,525 acres at npacitos. The developed tonnage is estimated at 18,000,000 tons, and the ıes are capable of maintaining a production of 45,000 tons per month. A dern washery, recently completed, serves a coking-plant with a capacity of 00 tons at Agujita and 500 at Lampacitos. The largest proportion of the put of the Agujita Co., both coal and coke, goes to the Minerales Co. and the ional railway lines. The excess is sold to domestic consumers through a fuel- ing company, which the Minerales Co. also controls.

10. *Fuel Sales Co.* (*Cia. de Combustible Nacional y Transportes, S. A.*)— s company was incorporated with 1,250 shares of P100 each, of which the ıerales owns 750, for the purpose of disposing of the excess production of l and coke not required by Minerales and its subsidiaries or by the National lway companies. This company has its own transportation equipment, con- ing of three 90-ton locomotives and 60 standard-gauge cars, and maintains etail-sales agency in Sabinas and Mexico City.

11. *Compania Metallurgica de Torreon*—This company has a capital stock 50,000 shares of P80 par value, of which the Minerales Co. owns approxi- ely 83%. The company owns 503 acres, including mines and a large smelting- lt near Torreon. The plant consists of nine lead blast-furnaces and one per blast-furnace, with an annual capacity of 400,000 tons. There is a copper verter to treat copper matte, and two Dwight-Lloyd roasting-machines, and the necessary auxiliaries, such as power-plant, etc. This plant has been rated as a custom smelter for the past 15 years. The normal production is 00 tons of silver-lead bullion per annum and 2,500 tons of blister copper. company has an extensive townsite, with dwellings suitable both for laborers officials, offices, hospitals, schools, etc.

12. *Parrena Mining Co.*—The capital stock of this company is P500,000, of ch the Minerales Co. owns 50%. The company owns mining properties in Sierra Mojada district, covering 475 acres, from which are produced lead- er, copper, and zinc ores. The Parrena Co. also owns a 50% interest in the Salvador mine in the same district, which has been producing for over 30 s. The Parrena Co.'s own properties are still in the development stage, ough the value of the production up to date covers development expenses.

13. *Cia Minera Paloma y Cabrillas, S. A.*—This company has a capital k of 72,000 shares of P50, which is distributed throughout the United States, ico, and foreign countries. The company owns 278 acres of mining prop- s near Higueras, in the State of Coahuila, and is connected with the National way lines at that point by an aerial tramway. The mine is equipped with nate power-plant facilities as well as offices, workmen's houses, hospitals, ols, etc., and is capable of producing 5,000 tons monthly of iron-lead ores aining 15% lead and 3 oz. of silver, and 800 tons of zinc carbonate ores aining 32% zinc.

14. *Compania Minera de Penoles, Durango*—This company has a capital k of 120,000 shares of P30 each. Its property, which is one of the best and est known in Mexico, covers 7,123 acres, from which 15,000 tons of lead- ores are being produced monthly, containing 14% of lead and 13 oz. of and 1 oz. of gold.

The Mapimi smelter also owned and operated by this company has five blast- and a roasting-plant for the treat 400,000 tons of charge per there is also an arsenic plant arsenic as a by-product ing operations. smelter, as well n. A 25-mile narrow mine and smelter National Railway production of 25,000 tons white arsenic. ated a leasing ; S. A., plant

16,074-meter pipe-line, having pumps at Santa Agueda and Santa Rita. The mines and works are connected by a 30-kilometer private railway, equipped with 9 locomotives and 250 cars.

Compañia del Boleo treats 1,000 metric tons daily, the ores averaging from 4 to 5% copper. There are 7 blast-furnaces in operation, with a capacity of 200 tons each per 24 hours. The ores are mainly oxidized and contain a large amount of moisture as delivered to the smelter. The products shipped are black copper assaying 93% in that metal and matte containing 63% copper.

In 1918 the company employed 3,500 men. Almost all hand labor is Mexican with some Yaqui Indians. Europeans are only employed as foreman and for special work.

Production: in 1918-'19 averaged 1,673,776 lb. of copper per month from ore that averaged 3.49% copper; 29,120,000 lbs. in 1910; 27,686,400 lbs. in 1911, and 28,336,000 lbs. in 1912. The production of ore mined for 1911 was 355,[illegible] tons of 3.47% ore; 364,850 tons of 3.51% ore in 1912; 371,300 tons in 1913; 324,[illegible] tons in 1914; 316,800 tons in 1915. The smelter handled 356,700 tons of ore in 1911; 360,000 tons of ore, yielding 12,650 tons of copper in 1912; 374,350 tons yielding 3.47% or 13,000 tons copper in 1913; 324,000 tons, yielding 3.53% or 11,480 tons of copper in 1914; 317,000 tons, yielding 3.62%, or 11,500 tons of copper in 1915; 290,000 tons of 3.79% ore for 11,000 tons of copper in 1916; and 258,[illegible] tons of 3.56% ore for 9,225 tons metal in 1917. Reserves of ore amount to [illegible] year's supply.

The company's policy of secretiveness concerning mine operations, together with its refusal to permit inspection by visiting engineers and geologists, has made it impossible to give detailed information concerning a unique ore deposit and its exploitation. The property is one of exceptional merit and has been ably managed for many years. Company has been able to continue operations despite revolutionary disturbances in Mexico.

Producing at rate of 1,600,000 lb. of 3% copper ore monthly in 1917, about 1,800,000 lb. in 1918; and 1,300,000 lb. monthly in 1919.

ESMERALDA COPPER MINING & SMELTING CO.

Idle. Mine near Santa Catarina del Norte, Baja California, Mex., known as La Esmeralda, is opened by shaft, with considerable development.

ESPERANZA MINING CO. **BAJA CALIFORNIA**

Secretary and office: E. W. Nicholson, 801 Land Title Bldg., Philadelphia, Pa. **Operating office:** P. O. Box CCC, San Diego, Cal. Mine at Ensenada, Baja California, Mex. Geo. P. Brown, gen. mgr.

Property: 83 hectares, and 40 acres miscellaneous lands, on Coche island, on the Pacific coast, shows diorite cut by veins having 3 lenticular shoots, carrying carbonate and sulphide ores, estimated by company to average 40' width, 300' depth and 1,100' length, and to contain an average of 2% copper, 3% zinc, 2 oz. silver and $3.50 gold per ton.

Development: about 8,500' of workings, showing 150,000 tons of [illegible] grade ore, with about 100,000 tons blocked out for stoping. Has received $450,000 from shipments to the Denver, Pueblo, San Francisco and Tacoma smelters.

Unsettled conditions in Mexico since 1914 have prevented [illegible] property.

GULF COPPER CO. **BAJA CALIFORNIA**

Head office: Phoenix, Ariz. Mine at Angeles Bay, Gulf of California, Mexico.

Cap., $1,000,000; shares $1 par. J. H. Baker, pres. and gen. mgr.; Anthony, mgr. engr.; J. H. Louden, directors.

Property: 40 hectares, about 100 acres, at north end of Angeles bay, [illegible] miles N. W. from Guaymas and about 90 miles S. W. from Pilares. Claims show silicious schists cut by porphyry dikes and a vein running [illegible] dipping at 45° [illegible] ranging from 5 to 42' in width.

Ore: bla[illegible]ud sulphide of copper said to average 4% [illegible] trace of gold [illegible]

Develop[illegible] with 1,363' workings, including [illegible]

ein 175'. Has shipped 300 tons, 25% picked ore, and has several thousand tons f low-grade ore on dump. Property considered promising if properly financed nd handled. Presumably idle; no recent returns received.

AN JUAN REDUCTION CO. **BAJA CALIFORNIA**

Address: San Antonio, Baja California, Mexico. Paul Knapp, gen. ıgr.; J. C. Puttner, mine mgr.; David Lawrence, mill supt. Operates a mine ielding gold-bearing arsenopyrite ore, 5 miles E. of Triunfo.

The reduction plant has dry rolls, Hardinge mills, roasting furnaces, and yanide department. No recent information is available.

/EST MEXICO MINES CO. **BAJA CALIFORNIA**

Office: Krape Inv. Co., Gas & Electric Bldg., Denver, Colorado. **Mine ffice:** San Antonio, Baja California, Mexico.

Officers: W. G. Krape, pres.-mgr.; D. H. Lawrence, v. p.-supt.; H. C. an Norman, sec.; T. Williams, treas.

Inc. January, 1912, in Arizona. **Cap.**, $3,000,000; shares $1 par; non-sessable; outstanding 1,985,000 shares. Annual meeting, first Wednesday in nuary.

Property: 3 claims, about 30 acres, in the San Antonio district, 38 miles of La Paz, Lower California, Mexico. Veins are both fissure and contact, ntaining gold and silver. Pay ore occurs in shoots and streaks, the main ebody varying from 3' to 14' wide. Sulphides appear at 275' depth.

Development: by inclined shaft, greatest depth being 340' and extent of eral workings 5,000'. Company claims to have 15,000 tons in reserve with a)ss value of $400,000.

Equipment: includes a 3-stamp concentrating mill.

Production: total production said to be $20,000 from 6 shipments of assaying $192 to $326 per ton.

In 1914 the Wm. G. Krape Inv. Co. was selling this stock at "12½c. per re. fully paid and forever nonassessable" on the installment plan, a statement : is itself a warning.

STATE OF CHIHUAHUA

MOLOYA MINING CO. **CHIHUAHUA**

Office: 203 Broadway, New York. **Mine office:** Baca, Chihuahua, ico.

Officers: Nils O. Bagge, pres.; W. H. Schlofield, v. p.; C. I. Morey, sec.-; preceding officers and W. M. Jermyn, directors; Victor C. Joslyn, mine

nc. 1903, in Arizona. **Cap.**, $2,000,000; shares $1, in $800,000 partici- non-cumulative 10% preferred stock, and $1,200,000 common stock, all ding. New York Trust Co., registrar. Holds title to lands through de Almoloya, S. A., a Mexican corporation.

operty: 177 hectares, including the San Enrique group adjoining the rero mine, and 4 other groups, about 4 miles from Baca, in the Allende ct, with rail transportation over a standard-gauge line to the Cigarrero

eology: the Sierra de Almoloya is an isolated mountain range, about s long and 2 wide, carrying limestone beds of the Comanche series of the Cretaceous, extensively fractured by several systems of faulting, with zones of 50 to 90 metres width, principal zones being the northeast system, cene age, of which the most prominent is the San Pedro fault zone, and 40° W. system of Miocene age, which are the sources of large and rich ambers, the most important orebodies occurring at the intersection of faults. Lands adjoin the Cigarrero mine on the northeast, and carry the ion of the San Pedro fault, proven by diamond-drilling to occur between ' and 9 e so fa ockets, in leached shear zones, carrying low

station on the Kansas City, Mexico & Orient railroad. These properties were purchased from Don Francisco Diaz in 1908, by the late Ernesto Madero.

Owing to conditions in Mexico it is impossible to get recent information.

BATOPILAS MINING CO. **CHIHUAHUA**

Address: 49 Cedar St., New York City. **Mine office:** Batopilas, Chihuahua, Mexico. John R. Harbottle, gen. mgr. in Mexico.

Officers: F. D. Merchant, pres.; N. F. Palmer, v. p.; W. M. Brodie, v. p.; S. Elliott, v. p., with Jas. Marwick, Geo. W. Field, Gates W. McGarrah, Geo. Rowland, E. L. Stevens, all of New York; F. A. Drury, Worcester, Mass.; Robt. M. Currier, Boston; A. B. Parker, Edward L. Stevens, L. H. Scott and Geo. Rowland, trustees; E. W. A. Jorgensen, sec. and asst. treas.; L. H. Scott, treas.

Trustees: foregoing with Alton B. Parker and eight others.

Inc. 1887, in New York. **Cap.**, $9,000,000; shares $20 par; 446,599 issued. **Bonds:** authorized $1,000,000, 1st mtge. 6's, dated Dec. 1, 1887, for 15 years, outstanding $366,500. Bonds were extended to December 1, 1927. Shares listed on the New York and Boston Stock Exchanges. Annual meeting, third Tuesday in April. Union Trust Co., New York, and State St. Trust Co., Boston, transfer offices. Farmer's Loan & Trust Co., New York and Old Colony Trust Co., Boston, registrars. Shares, old, $1 low, $1¼ high in 1918; $1⅛ low, $2 high in 1919.

Dividend: one of 12½c a share was paid December 31, 1907.

Balance sheet as of December 31, 1914, the last issued, shows assets $12,794,479, of which amount $12,485,435 represents mines, real estate, buildings, equipment, etc., and $207,322 current assets; current liabilities, $37,258, accrued liabilities, $24,950. Total surplus December 31, 1914, $3,365,771. On April 1 1917, cash in Mexican silver, etc., totaled 6,187 pesos; cash in New York funds $29,000. The 98,555 (pesos) Chihuahua currency, which company was forced to purchase, is worthless. Company has filed claims for $390,000 against the Mexican Government, and $150,000 more will be filed.

Property: concessions to 61 square miles of richly mineralized lands near Batopilas, in the Andres del Rio mining district, in the extreme southwestern part of the State of Chilhuahua, Mexico. When 1913 began the company had titles in the silver zone for 2,137 acres, and in the auriferous zone 3 miles up the river, for 140 acres. On account of the revolution it has been impossible to comply with the provisions of the contract covering what is known as the concession and time allowances have been granted. In addition, the company owns 130,000 acres of ranch and timber lands.

Ore: native silver occurring with calcite in veins in diabase. The San Miguel property contains many veins, some of which have been worked for more than 100 years. The main veins are the San Antonio, Cancio, Cinco de Mayo, Diablo, Carmen, and Veta Grande now worked out. During 6 months in 1913 the average assay for low grade ore from the San Miguel mine, which produced ¾ of the silver output, was 9.27 oz. per ton, while the ore from the Porfirio Diaz Tunnel group averaged 6.55 oz. per ton. High-grade ore produced during 4 months, 609 tons, averaged 411 oz. per ton.

Development: over 10 miles of adit levels and 77 miles of workings. The principal mines are the Porfirio Diaz Tunnel on the Todos Santos Group, the San Miguel mine, El Escritorio, and El Camuchin. Work at El Escritorio and El Camuchin was unsatisfactory in 1913 and they were closed down.

Equipment: the Hacienda San Antonio contains a 125-stamp mill with a daily capacity of 400 tons, electric light plant and air-compressor, all run by Pelton wheels capable of furnishing 550-h. p. The San Miguel Hacienda contains a 25-stamp mill for high-grade ores, cyanide plant, amalgamating pans, reverberatory plant, a roasting and lixiviation plant for concentrates, with a daily capacity of 8 tons, machine-shop, foundry, office buildings, dormitories, boarding houses, etc.

Power obtained from the Batopilas River by means of a dam 764' long and an aqueduct 9,900' long. The water after being used in the San Antonio plant is siphoned under the river and runs to the San Miguel Hacienda, where 2,5[illegible] is developed by turbines.

Production and profits have been as follows:

Year	Ore Treated, Tons	Silver, Oz.	Operating Profits
1915	.....	156,862	.....
1914	6,630	188,087	$10,556
1913	20,887	374,174	60,068
1912	34,032	564,398	80,046
1911	33,073	516,688	17,409*
1910	43,612	730,697	106,258*

* Deficit.

At a special meeting called in August, 1916, company's charter was amended, uthorizing the management to conduct mining operations in the United States. ompany did some exploration work near Joplin, Mo., in 1918, but results were nsatisfactory. It also has options on coal lands in Missouri.

Since 1910, only about one year's work has been done by the company (in 913) and since 1915, operations have been conducted on a share basis by loyal lexicans. About 40,000 oz. silver ore was produced from May to October, 1919. he management is not particularly optimistic for the near future, because of nsettled and unsafe political conditions. In December, 1919, the manager re- irned to the mine to prepare for resumption of full scale operations.

UENA TIERRA MINING CO., LTD. **CHIHUAHUA**

Office: T. D. Pillans, sec., 24 Lombard St., London, E. C. 3, England.

Directors: R. T. Bayliss, chairman; Lord Arthur Butler, W. McDer- ott, J. H. M. Shaw; R. M. Raymond, cons. engr.; A. C. Brinker, gen. mgr., 09 Mills Bldg., El Paso, Texas.

Inc. Feb. 10, 1912, in England. **Cap.**, 330,000 shares, £1 par; all is- ed and fully paid.

Property: acquired from the Exploration Co. of England and Mexico, td., the Buena Tierra mine, 89 acres, in the Santa Eulalia district, Chihuahua, miles S. E. of Chihuahua. Purchase price was £300,000, payable £178,201 sh, £121,799 in fully-paid shares. Property reported on by R. T. Bayliss and . M. Raymond.

Dividends: 5% each in 1912 and 1914; nothing since.

Ore: principally lead and zinc carbonates assaying 10 oz. silver, 15% ad and 25-50% zinc. There is also a low-grade mixed sulphide. Ore-bodies cur in limestone lying almost flat, but instead of following the fissures, spread t into flat beds near them, their average width is 30', average thickness, 40'. e Chorro orebody has a depth of over 1,000'. Developed orebodies are most merous at 450' depth, but most of the mines have ore down to a depth of 1,300'. e reserves estimated in 1917 as 281,500 tons.

Development: by shafts; Buena Tierra shaft is 1,400' deep. Raises are t up from the levels at intervals of 75-200' and the ore is mined in small nches, little powder being required and practically no timber.

Operations were resumed in May, 1918, but Mexican troubles have interfered th production during the past few years and property has not been steadily erated. Lead ore is shipped to the A. S. & R. Co.'s smelters at Chihuahua or Paso, and the zinc ore to the United States.

JENA VISTA GOLD MINING CO. **CHIHUAHUA**

Owned by El Rayo Mines Co., which see.

NDELARIA MINING CO. **CHIHUAHUA**

Office: 111 East 34th St., New York.

Officers: A. S. Dwight, pres.; D. E. Moran, v. p.; C. I. Reeves, sec.- as.; and H. J. Stehli, directors.

Property: in the State of Chihuahua, but details not obtainable.

IHUAHUA-ESPERANZA GOLD MINING CO. **CHIHUAHUA**

Subsidiary of the Dolores Esperanza, which see.

IHUAHUA MINING CO. **CHIHUAHUA**

Controlled through stock ownership by El Potosi Mng. Co., a subsidiary of Howe Sound Co.

Offices: 734 Fifth Ave., New York City, and Chihuahua, Mexico.

Officers: G. B. Schley, pres.; E. B. Schley, v. p.; W. J. Walworth, sec.-treas.; C. G. Raynor, asst. sec.-treas.; W. J. Quigly, mgr., Chihuahua.

Inc. Jan. 8, 1890, in New York. **Cap.,** $600,000; $1 par; outstanding, 587,806 shares. Stock transferred at company's New York office. Annual meeting, second Monday in January. Stock is closely held.

Property: in the Santa Eulalia district, Chihuahua, Mexico.

Ore: lead, silver, and zinc occurring as replacement deposits in limestone.

Development: by vertical shafts to a depth of 1,800'. Operations have been hampered by the revolution, though shipments of zinc ore were made in 1915 and 1916. No work was done in 1919. See El Potosi Mining Co.

CUSI MINING CO. **CHIHUAHUA**

Office: 144 South Wabash Ave., Chicago, Ill.

Officers: Potter Palmer, Jr., pres.-treas.; Honore Palmer, v. p.; A. M. Murphy, sec.; all of 721 Peoples Gas Bldg., Chicago.

Property: the Promontorio mine and other claims at Cusihuiriachic, Chihuahua, Mexico, showing veins of silver-lead ore.

Equipment: includes a 250-ton mill.

Company reported to have given a lease on the mine, on a royalty basis.

DESCUBRIDORA MINING & DEVELOPMENT CO. **CHIHUAHUA**

Owned by El Rayo Mines Co. See Dolores-Esperanza of America.

DOLORES ESPERANZA CORPORATION **CHIHUAHUA**

Succeeds Mines Company of America.

Office: Room 226, 111 Broadway, New York City.

Officers: H. S. Black, pres.; W. E. Reis and A. T. Black, v. p.'s; with W. T. Graham, Frank Ray, E. N. Skinner, and E. L. Gruver, directors. J. D. Gruver, sec.-treas.

Inc. Jan. 18, 1919, in Maine. **Cap.,** $2,000,000; shares $2 par; 864,8[illegible] outstanding. Bankers Trust Co., New York, transfer agent. Equitable Trust Co., New York, registrar. Listed on New York Curb.

On February 11, 1919, directors of the Mines Company of America were authorized to sell all the company's property to the Dolores Esperanza Corporation for $600,000 cash, this money to be used to pay off all debts and to meet expenses. Old stockholders could buy new stock at $2 per share up to number of shares held.

Balance sheet, June 30, 1919, showed assets totaling $1,733,351, including cash and U. S. Government certificates, $130,824; second installment on capital stock due July 7, $824,595; investments in subsidiary companies, $771,906; and sundries, $6,025. Liabilities included capital stock, $1,729,634, and sundries $3,717.

Ownership in companies is as follows:

Per cent. of subsidiary owned by Dolores Esperanza.	Par value of shares	Number of shares owned
99—Dolores Mines Co.	$5.00	396,[illegible]
100—Chihuahua Esperanza G. M. Co.	1.00	2,411,[illegible]
75—Consuelo M. M. & Power Co.	1.00	1,826,[illegible]
99—El Rayo Mines Co.	2.00	355,[illegible]
100—Creston Colorada Co.	100.00	1,[illegible]
33⅓—La Dura Mill & Mine Co.	10.00	33,[illegible]
33⅓—Compania Minera Gloria Fortuna	1.00	8,[illegible]

Dolores Mines and El Rayo Mines each own ⅓ of La Dura and For[illegible] capitalization.

Dividends: (by Mines Co. of America) total paid to Dec. 31, [illegible] amounted to $4,958,600, including a dividend in 1906 in stock of the Dolores Mines Co.

Chihuahua-Esperanza Gold Mining Co.

Property: adjoining that of the Dolores Mines Co., Chihuahua, on the west, consists of 3 claims, 304 acres. Company also owns 10,000 acres of [illegible] miles north of Dolores.

Geology: formation is similar to that of the Dolores. Fissure veins ur in rhyolite dikes cutting andesite; 3 vein-systems exist. Development ounts to 502'. Ore reserves said to total 2,500 tons worth $15 per ton. La eranza mine has great possibilities.

Consuelo Mining, Milling & Power Co., Mexico.

Property: adjoins that of the Dolores Mines Co., west of Madera, in huahua, on the south and east, and consists of 77 pertenencias, 190 acres, a half interest in 9 pertenencias, 22 acres, also a water-right on the Tutuaca r. The formation is similar to that of Dolores. No systematic development been done; the value of the ground is prospective.

Creston Colorada Co., Mexico

Mine office: Torres, Sonora, Mexico.
Inc. February, 1902, in Ohio. **Cap.**, authorized and outstanding, $100,- par $100. Annual meeting, first Saturday in November.
Property: 27 claims, 828 acres, commonly known as "Minas Prietas" ck mines), in Sonora, at La Colorada, a station on the narrow-gauge Mexico on Ry., 12 miles east of Torres, on the Southern Pacific R. R. of Mexico, 200 miles south of Nogales, Ariz. The mines have been worked for 100 s and have produced regularly during the last 33 years, but are now con- ed depleted. Gross production estimated at over $112,000,000.
The property is divided into 4 different mines: the Creston Colorada, Ama- s, Grand Central, and Verde. The claims contain a number of producing s, and cover the latter for 8,000' along their strike. Company also owns ace rights to 7,000 acres land, including the mining claims. It also owns a r-right on the Matape river.
Ore: veins have a general E.-W. strike, dip N. 55° to 90°, and vary in h from 3' to 40'. Larger orebodies occur principally in diorite, metamorphic s and quartz porphyry. The Creston ore, or east end ore, is a highly frac- l quartz. The Colorada is a harder quartz. Sulphides of silver, iron, lead zinc occur from the surface down. Streaks of high-grade sulphide shipping are occasionally found. The Verde ore is a hard quartz, at times very ctory. The Amarillas-Grand Central ore is a highly oxidized quartz, con- ng free gold in places. Average values in ores, as milled, are said to be gold and 40% silver.
Development: in 1916 totaled 2,075', compared with 2,578' in 1915. k was divided as follows: Creston mine, 1,473'; Colorada mine, 226'; Ama- -Grand Central mine, 376'.
Ore reserves: estimated Jan. 1, 1917, as 190,350 tons, average assay per ton, or a gross value of $937,591, as compared with 200,300 tons, average $4.89 per ton, the previous year; gold figured at $20 per oz., silver at 75c. The Amarillas-Grand Ceneral mine has one dump of tailing containing tons which will be retreated.
Equipment: at the Creston mine includes steam hoist and compressor foundry, etc. The Colorada cyanide plant receives Creston ore over a erial tramway, and the Colorada ore over an 800' incline tramway. The Grand Central mine includes steam operated hoisting and compressor electrically-driven crushing plant; also a 450-ton cyanide plant, which re from the Creston, Amarillas and Colorada over aerial tramways. plant, 18 miles from the mines, on the Matape river, supplies water es through a 5" pipe.
cyanide plants: in 1916 extensive shut-downs were in order, disturbances. The Amarillas-Grand Central unit was oper- treated 14,550 tons of ore. Extraction amounted to 73.8%, and 53.3% by cyanidation.

Production:

Year	Creston mine, tons	Colorado mine, tons	Am.-G. C. mine, tons	Old tailing, tons	Total tons	Value per ton
1916	12,400	2,150	.....	.....	14,550	$5.65
1915	98,662	18,854	10,365	3,469	131,350	4.80
1914	94,655	18,090	10,887	3,243	126,875	4.67

The Creston-Colorada mines were badly damaged by Mexicans (bandits) in 1919, who looted pillars of good ore, fired the shaft sets, burned buildings and cyanide tanks, and stole the metal from all machinery. It will require a large amount of time and money to put the property in shape for operating.

Dolores Mines Co., Mexico.

Inc. Nov., 1903, in Mexico. **Cap.**, authorized and issued, $2,000,000; full paid and non-assessable; par $5. No bonded debt. U. S. Mortgage & Trust Co., New York, transfer agent. Guaranty Trust Co., New York, registrar. Annual meeting, first Tuesday in December. Listed on New York Curb.

Entire capital stock of this company was formerly owned by an English company called Dolores, Ltd.; dissolved February 25, 1908, by exchange of stock, share for share, of Dolores Mines, Ltd. The company owns 33⅓% of the La Dura Mill & Mining Co.

Property: 17 contiguous claims, 250 acres, in Chihuahua, west of Madera, a station on the Mexico Northwestern Ry., about 250 miles S. W. of El Paso, Texas, and 200 miles N. W. of the city of Chihuahua. Mines are reached over a 45-mile trail, requiring 7 days' time for pack trains. Company also owns 3 detached mineral claims, 126 acres, near Dolores, and all surface rights to 12,500 acres, also a water right on the Tutuaca river. The main group, as shown by developments to date, contains 4 main vein systems, known as the Alma, San Francisco, West San Francisco, Washington and Arco Iris dikes, covered for 8,000′ on the strike of the Alma vein system, 4,000′ on the San Francisco vein system, 3,800′ on the West San Francisco, 1,000′ on the Washington, and 2,600′ on the Arco Iris vein system.

Geology: vein systems consist of rhyolite dikes in andesite; the veins are fissures in these rhyolite dikes, strike north and dip 55° to 90°. Ore-bodies occur at or near intersections of side fractures and within the boundaries of the dike. Dolores ore is a very hard quartz, containing about 2% sulphides of iron, silver and occasionally lead and traces of zinc. Values in ore are approximately 40% gold and 60% silver.

Development: in 1916 totaled 1,795′ as compared with 2,833′ in 1915, all done by hand and above the 500′ level. The 600′ and 700′ levels are under water.

Ore reserves: were estimated Jan. 1, 1917, as follows:

	Tons	Value per ton	Gross value
Ore in place	135,628	$13.80	$1,872
Broken ore	13,595	14.10	19
Total	149,223	$13.83	$2

Compared with 125,663 tons of $14 ore with gross value of $1,768,[illegible] January 1, 1916. Value is based on $20 per oz. for gold and 50c. per oz. for silver.

Equipment: includes steam-operated crushing, concentrating and cyaniding plants, also compressor and hoisting plants, machine shops, etc. A power-driven Reidler pump, 2½ miles east of the mine on the Tutuaca river, supplies all necessary water. Electrical equipment to supplant steam power is in place. Transmission line connects Dolores with Madera; line is designed for 60-cycle current of 33,000 volts. Power will be furnished from a plant built near Madera, to consist of three 320-k. w. generators driven by type oil engines of the "Snow" make.

In the re-modeled mill a 15x24" Blake crusher replaces 3 small machines; belt conveyors and steel ball mills replace stamps and Bryan mills. Extraction is about 87%, 18% by concentration and 69% by cyanidation. Bullion is sent to Maurer, N. J. Concentrates are shipped to the El Paso smelter.

Company employs about 365 men under normal conditions, only 17 being Americans. The small amount of development work done in recent years gave good results.

The orebody found in 1915 is over 265' long, with indications of greater length. New company expects to reduce power costs to one-third when the plant is run by electricity.

El Rayo Mines Co., Mexico.

Mine office: Santa Barbara, Chihuahua, Mexico.

Inc. Feb. 13, 1906, in Maine. **Cap.,** $1,000,000; outstanding $714,000; shares $2 par. No bonded debt. Annual meeting, second Tuesday in February. Listed on New York Curb. Company is the American holding company for the El Rayo Mining & Development Co., S. A., a Mexican corporation. Owns the Descubridora Mining & Development Co. and Buena Vista Gold Mining Co.

Property: 21 claims, 766 acres, in the State of Chihuahua, S. W. of Santa Barbara, the terminal of a branch line of the Mexican Central Railway. Mines can be reached from Santa Barbara over an 8-mile trail. Company also has a 14-year lease on about 12 square miles of timberland, adjoining the mining property. El Rayo is at an elevation of 7,200' above sea level. The mining claims cover the N. S. strike of the producing veins for over 2 miles.

Ore: gold-silver in fissure veins in rhyolite, which dip from 50° to 90°. The gangue varies from a friable and oxidized quartz at the north end to a harder sulphide-bearing quartz at the center and south end of the property. The north end contains about 4% sulphides, chiefly iron, with traces of lead and zinc. Copper sulphides are found occasionally. The metal content is about 74% gold and 26% silver. The ore shoots are irregularly shaped lenses which occur at vein junctions or intersections with main fracture.

Development: underground workings extend to depth of 1,400' and total 19,000'. The Adela mine covers 4,700' of the vein system at the north end. The El Rayo mine covers 2,300' of the vein system and adjoins the Adela. The Descubridora mine covers 5,000' of the vein system on the extreme south end of the property.

Ore reserves: were estimated Jan. 1, 1917, as:

	Tons	Value per ton	Gross value
Ore in place	65,210	$11.58	$755,283
Broken ore	13,328	10.77	143,542
Total	78,538	$11.44	$898,825

Compared with 75,038 tons of $10.48 ore with gross value of $786,825 on January 1, 1916. Value is based on $20 per oz. for gold and 50c. per oz. for silver.

Equipment: includes a 1,950 cu. ft. steam operated compressor plant. A 2-mile aerial tram furnishes the necessary fuel, lumber and mining timbers.

Mill: includes 160-ton crushing, concentrating and cyaniding plants. From the storage bin at the portal of the 1,100' level of the Adela mine the ore is trammed 1,300' in 6-ton cars to the mill storage bin. Course of ore through plant is as follows: from bin through 9"x15" Blake crusher, set at 1" discharge; [illegible] by conveyor belt to bin, by Challenge feeder over conveyor belt to one set of 16"x36" Traylor rolls, discharge to 2 sets of 14"x30" Traylor rolls, to [illegible]; overflow to tables, oversize in closed circuit returned to 7'x14' tube-[illegible] discharge to classifier, overflow to tables, oxersize in closed circuit returned to [illegible] mill. Pulp treated by cyanide solution. Resulting bullion and concentrates marketed in America.

[illegible] of entire plant was finished in 1917. Electricity is furnished,

MIRASOL; COMPANIA MINERA DEL. CHIHUAHUA

Address: C. B. Clyne, Mills Bldg., El Paso, Tex. E. W. Enriquez, supt., Cusihuiriachic, Chihuahua.

In 1919, it was reported that a 200-ton mill was under construction and the ore was being shipped to smelter at Chihuahua.

PALMAREJO & MEXICAN GOLD FIELDS, LTD. CHIHUAHUA

Office: E. B. Brown, 10 Austin Friars, London, E. C. 2, England.

Directors: Sir W. B. Perceval, chairman; G. Hallett, H. G. Tollemache and E. Turk. W. D. Hole, mgr.; E. T. McCarthy, cons. eng.

Inc. June 25, 1898, in Great Britain. **Cap.,** £565.000, in 200,000 A shares of 6 pence each, 21,000 pfce. shares of £1,, and 1,400,000 of 5s., of which 120,000 pfce. and 835,978 ord. issued.

Bonds: £25,000 of prior lien, due April, 1921; £28,330 of 5% 1st, £18,797 of 7% second, and £93,500 of 6½% third mortgage debentures.

Accrued debenture interest on March 31, 1918, was £43,348. Property was in hands of Receiver from December, 1914, to August, 1918.

Property: 127½ sq. miles of mineral and timber lands in the Hurwaja district of western Chihuahua. Reserves estimated as 319,000 tons proven ore averaging 45 s. ($10.80), and 2,000,000 tons of possible ore of similar value.

Equipment: an old 60-stamp mill and treatment plant, which will be remodelled.

Operations were suspended from 1912 until late in 1918.

PARCIONERA CONSOLIDATED MINING CO. CHIHUAHUA

Address: Jos. S. Qualey, pres., 25 Pine St., New York City. Mine office Santa Eulalia Chihuahua, Mex. Ernest Henderson, sec. Is a close corporation, shares $100 par.

Property: a silver-lead mine, with some copper. Idle on account of Mexican revolution.

RIO PLATA MINING CO. CHIHUAHUA

Office: 654 W. 51st St., New York.

Officers: H. W. Miller, pres.; Archibald Nesbitt, v. p.; J. J. Bonneau, sec.; Lincoln Bonneau, treas., with Geo. F. Parker, John C. Hanson, W. Green, Jos. Coult, R. N. Brundage, A. P. Roth, D. J. Dwyer, and J. H. directors.

Inc. April 7, 1906, in Arizona. **Cap.,** $2,000,000; shares $5 par; outstanding $1,872,590. Stock transferred at company's office, New York Co., New York, registrar. Annual meeting in January, at Phoenix, Ariz. Bolocalization of the company completed October 15, 1910.

Company controls the Trinity Cons. Hydraulic Mining Co. in California.

Dividends: initial dividend, 1½%, paid Dec., 1909; quarterly dividends 2% from March, 1910, to December, 1911, inclusive; none in 1912; February 1913, 1%; none since.

Property: the mines and reduction works of the Cia Minera de la de Plata, S. A., of Mexico; 187 acres mining land, 2,700 acres ranch and lands and water rights, located 6 miles S. of Guazapares, Chihuahua, miles from El Paso. Holdings include the Santo Nino, David, Santa Santa Barbara, Cleopatra, La Ultima and Enrique silver mines. The ore in the Santa Barbara fissure vein, dipping 17°, with average width of 4 to

Development: by tunnels, with about 3,000' of workings.

Equipment: includes hydro-electric plant and an auxiliary steam 25-stamp mill, 60-ton concentrator and an 80-ton cyanide plant.

Operations have been greatly interfered with on account of the revolu but property not molested. A new staff was sent to the mine in May, 1913 withdrew shortly after, as they reported the mine to be worked out, which doubted.

RIO TINTO COPPER CO. CHIHUAHUA

Mine and works office. Terrazas, Chihuahua, Mexico.

Office: James Corrigan, gen. mgr.; H. A. Eye, supt.; Capt. A. Murray, mine supt.; H. L. Schneider, smelter supt.; J. M. Baker, smelter man; F. W. Topken, master mechanic in 1913.

Inc. in Ohio. Is a holding company for Mexican subsidiaries. Operated a close corporation under the control of Corrigan, McKinney & Co.

Property: the Rio Tinto Mexicano mine and works bought 1908 for 87,500, and the property formerly held by the San Rafael Copper Mining Co. he first named is about 25 miles north of Chihuahua City and comprises a main act of 153 hectares, and a smaller tract of 6 hectares, including nearly all the veloped mineral property of the Terrazas camp, except a few lead mines. The act includes the Rio Tinto mine, and properties formerly worked by the Rio into Mexicano Mining Co., Boston & Mexican Mining Co., Dragoon Mining o. and San Rafael Copper Mining Co. The principal properties are the Rio into Mexicano, San Rafael, Promontorio, Verde and Colombia mines, all con-cted underground. The company also owns the Savanarola group, at Savana-la, about 50 miles south of Chihuahua and 35 miles west of Ortiz, carrying lver-copper and lead ores.

The Rio Tinto Mexicano mine opened 1860, closed 1902, reopened 1905, has en owned and operated by a number of different mining companies until pur-ased by this company from Messrs. Enrique and Juan A. Creel.

Geology: the claims cover contact deposits between limestone and al-red andesite, there being 5 known orebodies in a metamorphic zone traced 500 metres. The orebody has a minimum width of 2', maximum of 100', and erages 20' across. Ore also occurs between the limestone bedding planes, ar a large quartz ledge, and the orebodies, while erratic in size and occurrence, e connected and practically continuous. The limestone has an average dip 45° N.-W., and the property has also some silver-lead ore. The gangue is ainly limestone, somewhat garnetiferous. Extensive diamond-drill borings ow large orebodies containing workable copper ore.

Development: by a number of shafts to a depth of 400'; has about 3 iles of workings. The ground is firm, requiring no timbering, pillars having en removed to give chambers up to 100' square.

The San Rafael mine has a 440' two-compartment shaft. The Promontorio ine has 2 shafts, 1,000' apart, the main shaft being 350' deep. The Colombia ine has a 275' shaft, with about one-half mile of workings.

Equipment: includes steam and gas power, air compressors, etc.

Ore is carried from mines to smelter by a mile long narrow-gauge railway, uipped with a 6-ton Porter locomotive and 5-ton iron ore cars.

Smelter at Terrazas, one mile from the mine, connected by ½ mile ur with the main line of the Mexican Central railroad, has two 300-ton x192" blast-furnaces. The converter department has 1 stand and 3 shells, ith a 40-ton electric traveling crane and a relining plant. The power plant has 250-h. p. compound engine, direct-connected to a No. 8 Connersville blower, d a 100-k. w. generator supplies current for the other machinery.

Production: 1906-1910 was 9,150,000 lb. copper; 27,000 metric tons elted averaged 2.5% copper, mining cost being $3.50 per ton, and smelting st $3.50 per ton, or a cost for finished copper of 12.5c. per lb. The ore, though w grade, exists in large quantities, and the mine bids fair to become a producer, pable of making 1,000,000 lb. fine copper monthly.

The mine and smelter operated intermittently throughout the earlier revo-tions, but the intolerable conditions since 1913 have kept them closed.

AN FRANCISCO DEL ORO MINING CO., LTD. CHIHUAHUA

Reorganized as San Francisco Mines of Mexico, Ltd., which see.

AN FRANCISCO MINES OF MEXICO, LTD. CHIHUAHUA

Offices: W. Maclachlan, 65 London Wall, London, E. C. 2, England; d The London Syndicate of Mexico, 20 Avenida del 5 de Mayo, Mexico City.

Directors: Earl of Denbigh, chairman; T. Ford, J. Hatfield, J. Kitchin. . Maclachlan, A. S. Northcote, and A. J. H. Smith. W. S. Harrison, gen. mgr.; nor & Allen, 17 Madison Ave., New York, cons. engr.

Inc. March 27, 1913, in England. **Cap.**, £650,000; outstanding £350,000; ar 6% mar. **Bonds:** £200,000 convertible first mortgage debentures, in nomination of £100 and £ 20 each; int. payable April and October 1, was paid October 1, 1914; payment of the next six half-yearly installments has been

Company was a large producer of silver lead ore prior to the Madero revolution, in 1917, the Santa Eulalia property was leased to Compania de Minerales y Metales for 10 years, on a royalty of 15% on net smelter returns, the minimum to be $300,000, payable monthly in advance in installments of $2,500.

It does not seem likely that San Toy can pay dividends on its present production.

SIERRA CONSOLIDATED MINES CHIHUAHUA

Office: 120 Broadway, New York, N. Y.

Officers: J. B. Cotton, pres.; Robert Linton, v. p.; F. R. Kennedy, sec.-treas.; H. B. Paull, auditor.

Directors: Robert Linton, E. R. Grochau, J. F. Bankerd, T. F. Cole, J. B. Cotton, L. D. Ricketts, C. d'Autremont, Jr., F. R. Kennedy, and H. B. Paull.

Inc. Aug. 18, 1909, in Arizona. **Cap.**, $5,000,000; $10 par; 76,500 shares issued, fully paid 223,500 shares part paid at $7 each, $1,564,500; total outstanding $2,329,500. Stock transferred and registered at the company's office. Annual meeting, first Tuesday after first Monday in May at Warren, Arizona. Stock listed on New York Curb and traded in on Boston Curb.

Property: embraces mines, mineral and timber lands, water-rights, and surface acreage for power plants and reduction works. The mineral properties consist of 1,235 acres, in Ocampo, Pinos Altos, Socorro, and Yepachic, in the district of Rayon, State of Chihuahua, Mexico. The timber lands comprise 80,000 acres all in Chihuahua. The company has water-power rights on Jesus Maria arroyo, a stream that flows through Ocampo, and to the Basaseachic falls 18 miles from Ocampo.

Development: was carried on by the company from 1909 to 1912 on Matulera, Belen, Santa Eduviges, Guadalupe, San Ramon, El Conico, San Estanislao, and La Cumbre mines, and about 13,000′ of work had been done when operations were suspended on account of the revolution. No work has been done on the property since, but the mines can be reopened in short time when conditions permit.

The underground work has developed six ore-shoots blocking out approximately 100,000 tons of ore, averaging $12 per ton in gold and silver, basing the value of silver at 50c per ounce. The silver occurs as argentite, with some associated gold, in a silicious gangue. The ledge matter is an andesite breccia cemented with quartz.

Equipment: the equipment for a mill is at the mine ready for erection as soon as operations can begin, consists of the following: A 20 by 10″ Blake crusher, ten 1,500-lb. stamps, two 4 by 20′ tube-mills, three 15 by 45′ pachuca agitators, two Dorr thickeners, Esperanza classifier, 135-ton Oliver filter, Gaynor centrifugal dumps, all necessary solution tanks, steel zinc-boxes, Johnston precipitate press, tilting furnace for refining precipitates and all other necessary accessories. The electric generating station, 6 miles from Ocampo, on one of the company's timber tracts, consists of 66″ by 16′ Brownell tubular boilers, with feed waterheaters, pumps, etc.; three 100-h. p. Russell high-speed automatic engines belted to 75-k. w. generators; three 75-k. w. oil-cooled transformers; and all necessary lightning arrestors, switch-board apparatus, Tyrell regulators, etc. The current is generated at 2,300 volts and raised to 22,000 volts for transmission to Ocampo.

Sierra Mining Company, S. A.

Principal office: Juarez, Chihuahua. Mines and works at Ocampo, district of Rayon, Chihuahua, Mexico. This company is the Mexican title-holding and operating corporation for the Sierra Consolidated Mines Co.

Officers: J. B. Cotton, pres.; Robert Linton, v. p. and gen. mgr.; [illegible] Flipper, Sec.; F. R. Kennedy, treas.; H. B. Paull, auditor and Enrique N. Soto, commissario.

[illegible]c. Dec. 11, 1908, in Mexico. **Cap.**, 25,000 shares at $20 each (Mexican agency).

[illegible]ned balance sheet Sierra Consolidated Mines Co. and Sierra [illegible] December 31, 1918.

Assets.

›perty	$1,452,602
›h	20,086
counts receivable	24,008
essment No. 2	166,111
estments	45,000
pplies at mines	32,375
spense items	1,891
nstruction and equipment	170,283
velopment, taxes and miscellaneous expenses	469,231
Total	$3,381,590

Liabilities.

pital stock	$2,329,500
llateral trust notes	45,600
counts payable	6,490
Total	$2,381,590

STATE OF COAHUILA

)AHUILA MINING & SMELTING CO., LTD. **COAHUILA**

Office: 614 Penobscot Bldg., Detroit, Mich. **Operating office:** Apartado . Monterrey, N. L., Mexico. **Mine office:** Jimulco, Viesca, Coahuila.

Officers: H. T. Ambrose, pres.; Frank J. Llewellyn, v. p.; Walter E. ırker, sec. and gen. mgr.; Archibald Cattell, treas.; preceding, with J. Kirby, ., Sidney B. Cohn and C. F. Jennings, directors; J. C. Treadwell, supt.; Alex. cCormick, mine supt.; Harry Reed, mill supt.

Inc. January, 1902, in Mexico. **Cap.,** $500,000 gold; shares $1 par; non-sessable, fully issued.

Dividends: 10% in 1902; 6% in 1904; 29% in 1905; 30% in 1907; 10% in 09 and 16% in 1910, a total of 101%, or $505,000. Annual meeting, first Wed-sday in February.

Property: includes holdings in the Mapimi, Viesca and San Juan de ıadalupe districts, containing the (1) Santa Maria, Sultana, and other mines at mulco, carrying auriferous and argentiferous copper and lead ores, opened a 700′ main shaft, and a 1,000′ main tunnel, with steam and electric power; ?) the Alberto mine, in the Mapimi district, was said to have made regular ship-ents of high grade ore to the Mapimi smelter, 1910; (3) a 250-ton smelter, ith steam and electric power, connected with the mines by rail, blown-in early 03, but idle since 1909. The revolution in Mexico has practically stopped all ining in Coahuila and the mines are closed down until peace and safety again evail.

ONTINENTAL MINING CO. **COAHUILA**

Mine office: San Antonio, Texas.

Officers: Otto Wahrmund, pres.; C. T. Priest, San Antonio, v. p.; S. . Newton, sec.

Inc. April, 1905, as a reconstruction of Continental Copper Co., **Cap.,** ,000,000; shares $10 par. Is closely allied in ownership and management with e Jimulco Mining Co.

Property: the Panuco mine with 65 hectares, opened in 1700 and worked intervals since. Property was bought from the Panuco Copper Co.

Ore: deposit is a chimney of breccia, cemented by metallic sulphides, ainly chalcopyrite, but with a little chalcocite, in a quartz gangue, the country ck being granite. The ore is reported to average about 3½% copper.

Company owns a 40-mile railway, from Monclova to Panuco. Old com-ny invested about $1,000,000 in the property and improvements. Largest pro-ction, under former ownership, was 1,466,059 lb. fine copper in 1902, and a

The mine carries silver-bearing copper ores, with considerable development. Mill has 40 stamps, 3 crushers and Frue vanners.

EL ORITO MINING & MILLING CO. DURANGO

Address: care Robt. F. Fitz, gen. mgr., P. O. Box 275, Los Angeles, Calif. **Mine address:** Yerbanis, Durango.

Officers: Wm. Grote, pres., Elgin, Ill.; A. W. Church, v. p.; C. R. Hayson, sec.; J. A. Waterman, treas.; with J. A. Rovelstad, E. S. Eno and F. E. Ackerman, directors.

Inc. May 10, 1910, in Arizona. **Cap.,** $500,000; shares $100 par; outstanding, $432,500. Annual meeting, third Monday in May.

Properties: 233 pertenencias containing free milling gold property, at Peñon Blanco, and a copper property at Velardeña, Durango, Mex.

Development: one vertical and one incline shaft, depth 375' with deeper workings at 475'. Total underground workings 1,500'.

Equipment: includes a 3-stamp mill. Mines closed down owing to revolution, but management states operations will be resumed as soon as possible.

ESPERANZAS MINING CO. DURANGO

Idle for several years. Mine at Estación Symon, San Juan de Guadalupe, Durango, Mexico. Joseph Steel, gen. mgr., at last accounts. **Cap.,** $2...

Property: includes the Montaña de Cobre, Esperanza and other claims.

GUANACEVI TUNNEL CO. DURANGO

Mine at Guanacevi Santiago Papasquiaro, Durango, Mexico.

Inc. 1904, in Arizona. **Cap.,** $5,000,000; shares $5 par. Debts amounted to $150,000 in 1912 and have since increased.

Property: is in hands of trustee until conditions in Mexico permit financing company sufficiently to carry on the extensive development plans. There are 22 properties, including timber rights and original concessions, to possess large bodies of gold and copper ore. The mine has 3 shafts of 300' depth each, with tunnels of 1,250' and 1,400', the main tunnel, 7x9', planned to be driven about 3 kilometers, management estimating that in this distance a large number of veins carrying lead and copper ores should be cut, the cost being estimated as likely to cost about $250,000.

The L. Diamond Co., of Boston, was never a representative of the corporation, but a number of brokers bought stock and combined to unload on the public at unduly high prices.

Idle for several years.

LUCIA MINING CO. DURANGO

Office: 15 William St., New York. **Mine office:** Pánuco de Coronado, San Juan del Rio, Durango, Mexico. H. M. Hubbard, v. p.; Myra B. ..., sec.-treas.

Inc. 1900, in West Virginia. **Cap.,** $25,000; shares $5 par. This company is controlled by the San Luis Mining Co. and its property is described under that title.

NATIONAL MINES & SMELTER CO. DURANGO

Office: Magee Bldg., Pittsburgh, Pa. **Mine office:** Magistral, Durango, Mexico.

Officers: S. H. McKee, pres.; Wm. L. Curry, v. p.; John S. ..., sec.-treas.; Renald Ailes, financial agt.; E. A. Kennedy, supt.; R. W. ...

Inc. 1911. **Cap.,** $2,500,000; issued, 1,700,000 shares. Authorized ... collateral income bond issue; issued, $375,000. Company owns all the ... of the Santa Maria del Oro Mines Co., which company purchased ... the Lustre Mining & Smelting Co. from old stockholders, paying for ... stock and bonds of the National Mines & Smelters Co.

Property: the Magistral and Cocinera mines, 32 claims, 441 ... 1,080 acres of mineral lands, 397 hectares of mill and smelter sites, ...s lands and leasehold timber lands. The Magistral mine is ... ...s and 9 shafts and has a large body of slightly cupriferous ... ...nestone gangue, carrying 0.5 to 5% copper, probably averaging ... ...z. silver and 15 to 20 grams gold per metric ton.

The Cocinera mine developed an ore-shoot, 1,000′ long, 15′ wide and said to age $10 in gold and copper with a little silver. Depth over 600′.

Ore reserves: in this and the Azurite mines are estimated by the management at 190,000 tons, developed in new ground since 1911. The old company reported reserves of 185,000 tons in other and entirely distinct orebodies, in 1910.

Equipment: is complete, including a central power plant having two 1,000-h. p. and two 350-h. p. gas engines, one 200-h. p. and three 400-h. p. gas producers, 2,300-volt 3-phase generator, two 6-drill air-compressors and 10 hoists from 100 to 300-h. p. The 40-stamp mill, 750-lb. heads, has Huntington mills, 1 tube mill and 10 Frue vanners.

The smelter has 6 blast-furnaces, including two 150-ton hot-blast furnaces and three 200-ton furnaces, air for blast being heated by waste gases in a specially-designed heater. Produced 8,000 tons matte sent to the A. S. & R. Co. at Aguascalientes, averaging 15 to 17% copper, $155 gold and $4 silver per ton.

The old company apparently spent a million dollars or so for installation before the mines were sufficiently developed to provide the ores necessary to keep the various plants running and in 1907-08 became financially embarrassed. The mines are not yet on a profitable basis, but with the new concentration plant, completed in 1915, it is expected that the property will yield a satisfactory return on the investment, as soon as operations become normal in Mexico.

The plant is reported to have been badly damaged by bandits.

PENOLES MINING CO. (CIA MINERA DE PENOLES) DURANGO

See Minerales y Metales, Compania de, under "Mexico."

SAN LUIS MINING CO. DURANGO

Office: Myra B. Martin, sec., 15 William St., New York. **Mine office:** Rancho de Coronado, Durango, Mexico.

Officers: David F. Beggs, pres. and treas.; C. P. Jacobs, F. C. Hanford, S. Raymond, Wm. T. Read and Walter S. Logan, directors.

Inc. 1900, in West Virginia, and cap. increased, 1905, to $3,000,000; shares par. First dividend, 1%, was paid January, 1906, and a second dividend was paid July, 1916. Direct title to this property is held in the name of Lucia Mining Co. Annual meeting, last Tuesday in February.

Property: 225 pertenencias, 500 acres, and a 25-acre millsite, in the San Luis and Panuco de Coronado districts of Durango. The property shows trachyte and porphyry, carrying fissure veins and contact deposits, whose ores are estimated by the management to average 3% copper, 12% lead, 1% zinc, 35 oz. silver and $4 gold per ton, mainly from sulphide ores. The mines were discovered 1650, and worked more or less irregularly until 1830, when closed on account of water and Indian troubles, remaining idle until reopened, 1901, by present company.

The Potosina mine is said to show, at the western end, a considerable body of smelting grade and a large quantity of milling ore.

The San Gonzalo mine, 450′ deep, has a vein showing mainly low-grade ore carrying silver values above, with copper on the lower levels, and is also reported to have a 2′ vein carrying 25 kgs. silver per ton, with some gold.

The Sidney has a 2′ vein of galena, giving assays up to 45% lead, 4 oz. silver and 3 grams gold per metric ton, opened by a shallow shaft, but has been idle for some years on account of water.

The San Lucas mine, 19 hectares, about 35 miles N. W. of Gabriel, is an old property claimed to have nearly 2 miles of workings, carrying mainly lead silver ores, and is idle.

The San Pablo mine has parallel veins said to carry 6 to 36″ paystreaks of high-grade ore, giving assays up to 16% copper, 360 oz. silver and 14 grams gold per ton, opened by a 175′ vertical shaft, equipped with headgear and hoist.

Equipment: at the various mines includes steam plants, claimed to be 750 h. p., with 6 hoists and 2 air compressors of 12 drills combined [illegible] Buildings include a machine shop, carpenter shop, smithy, offices, 4 [illegible] and a large number of dwellings for workmen, with a total of 175 [illegible] 3 crushers, 1 jig and 4 Bartlett tables. Concentration [illegible] more satisfactory than leaching.

Inc. Sept. 13, 1906, in New Jersey. **Cap.**, authorized and outstanding $1,000,000 6% cum. pfd. and $500,000 common, reduced from $2,000,000 and $5,000,000 respectively June 24, 1916. Shares: preferred $50; common, $1 par. Preferred stock has preference as to assets and is subject to call at par, and accrued dividends an any dividend date. Stock transferred at company's office. Annual meeting, first Friday after second Tuesday in June at 15 Exchange Place Jersey City, N. J. Fiscal year ends December 31.

Dividends: preferred, 1907, to Oct., 1913, inclusive, 6% per annum; none reported since. Common, none. Preferred payable April and October 1 at 50 Broad St., New York.

Property: 5 claims, 300 acres, covering 3,200' on the main Pinguico vein, near Guanajuato, Gto. **Ore:** silver-gold. **Development:** Pinguico shaft, 80 deep, and the Fortuna, 670' deep, with several miles of underground workings. **Equipment:** includes a 40-stamp mill and a cyanide plant. Capacity under normal conditions, about 8,000 tons per month.

In March, 1920, company was unwatering the Esperanza mine at Santa Ana. K. A. Cunningham in charge.

GUANAJUATO REDUCTION & MINES CO. GUANAJUATO

Address: Columbus, Ohio. Mines and mills at Guanajuato, Gto., Mex.

Officers: C. L. Kurtz, pres., Columbus, Ohio; Wm. G. Moore, v. p. Geo. D. Bounton, v. p.; Philadelphia; C. J. Kurtz, sec.-treas.; with C. J. Schlichter, Wm. D. Sherrerd, Robt. T. Moore, Geo. W. Chase, W. G. Moore, G. D. Bouton and L. O. Bailey, directors. W. G. Wheaton, auditor; H. P. Smith, gen. mgr. at Guanjuato; August McDonald, mill supt.

Inc. 1904, in Colorado, as a consolidation of several silver and gold mines in the Guanajuato district. **Cap.**, $75,000; $1 par. Stock transferred at company's office, Columbus. Empire Trust Co., New York, registrar. Annual meeting, first Tuesday in February, at Colorado Springs, Colo. Listed on New York Curb.

Bonds: authorized $3,000,000; outstanding, $2,800,000, first mortgage 6%, 20-year, $100, $500, and $1,000 gold bonds, dated July 1, 1904, due July 1 1924; interest January 1 and July 1, at office of the trustee, Empire Trust Co., New York.

Bond interest was deferred January 1, 1915, and operations temporarily suspended in August, 1916, due to the revolution in Mexico and also to the inability to secure cyanide and other supplies.

The company was unable to convert its product into cash on account of the Mexican revolution and defaulted, July 1, 1914, interest on its first mortgage 20-year 6% bonds; this interest was paid in January, 1915. On February 1, 1916 interest was paid for the period July 1, 1914 to January 1, 1915.

Comparative Income Account, years ended December 31:

Year	Gross Earnings	Operating Expenses	Net Earnings	Bond Interest	Balance for Year
1917.....	$1,214,145	$1,043,940	$170,205	$168,000	$2,205
1916.....	353,357	339,314	14,048	168,000	153,957
1915.....	489,724	366,434	123,290	168,000	44,690
1914.....	1,523,668(a)	1,361,720	161,948	168,000	6,852
1913.....	1,149,176	839,674	309,502	168,000	141,502
1912.....	1,004,290	693,477	310,813	168,000	142,813
1911.....	930,280	648,247	282,033	168,000	113,033
1910.....	931,562	618,414	313,148	168,000	145,148

(a) Includes deduction of $64,191 for conversion of accounts from 2 to 1 ratio to U. S. currency. (b) Deficit.

Property: a group of famous bonanza silver mines in the Guanajuato

Development: a total of 8,130 meters of new work was done in [illegible] tonnage in any one year. No new large orebodies were found, but profitable ore were favorable.

Operating results for 1918:

Mine	Production, tons	Silver, grams	Gold, grams	Cost	Profit	Reserves, tons
yac—Valenciana	6,187	279.6	2.33	$3.34	$1.17	11,544
avillas—Cata	15,054	233.9	2.81	3.03	0.69	50,913
ado—San Miguel....	30,612	269.0	2.43	2.93	1.54	54,233
ado—Kurtz	18,895	218.1	2.18	....	....	49,575
ado—Rayas	16,169	269.0	3.94	3.69	....	26,055
ado—Garrapata	32,477	200.0	2.99	2.10	1.14	63,818
ips	68,194	158.1	1.40	0.49	1.37	440,400
Totals	187,588					696,538

In addition to the above reserves there is a probable tonnage of 138,022, aging 242 grams of silver and 3.31 grams of gold. The grand total of 834,560 compares with 870,444 tons in 1916, and 772,980 tons in 1917.

Equipment: includes the Bustos 160-ton stamp and concentrating mill Flores cyanide plant. Crushed ore is sent from the mill to the treatment s through 6,000′ of 8″ pipe. A new 200-ton mill with 20 stamps, ball-mill cyanide plant is under construction.

Production, year ending December 31:

	Tonnage	Silver, grams	Gold, grams	Extraction, Silver, %	Extraction, Gold, %	Cost Mining per ton	Cost Milling per ton
...	187,760	209.7	2.29	78.08	80.39	$2.91	$2.10
...	.....	.....	....	.....	.....	....	....
...	64,030	245.7	2.49	80.18	85.35	1.44	1.68

Since April, 1918 mine and mill have been operating full capacity, the first in 5 years. Normal output is 230,000 tons of ore per annum, and with sil- t $1.30 an ounce, company should soon be able to make up for the long period activity.

PRIETARY MINES COMPANY OF AMERICA GUANAJUATO

Office: 25 Broad St., New York; or D. C. Catlin, 60 Broadway, New

Officers: D. C. Catlin, pres.; E. J. Page, v. p.; Chas. E. Pope, 2nd v. p.; . Pope, sec.-treas.; above with Horace E. Parker, Wm. A. Robinson, Jr., dore Dwight and W. B. Cogswell, directors.

Inc. 1907, in Nevada. **Cap.**, $3,000,000; shares $5 par; $2,250,500 issued. **Is:** authorized, $750,000, 6% convertible; outstanding, $703,400. New Trust Company, registrar. Stock transferred at company's office. Annual ng, second Monday in June. Is a holding company, controlling through ownership the Mineral Development Co., the Providencia M. & M. Co. of ajuato, Mexico; and the Carmen Syndicate, which see under Sonora.

Latest financial report available, year ending May 31, 1914, showed assets: rty, $2,249,000; stock, bonds and notes of subsidiary and other companies, 542; accounts receivable, $31,076; cash, $5,427; furniture, $313; accounts organization of company, $132,632; loss and gain $8,700. Liabilities, amount- $3,737,193, include outstanding stock, $2,250,500; outstanding bonds, $703,- stock exchanged for Min. Dev. Co. shares, $6,380; accounts payable, $5,996; ngent, $21,417.

The 1915 annual report contains a reference to necessary "additional financ- when the orebodies of the Nueva Luz mine have been more thoroughly ped and when political conditions in Mexico permit the reopening of the de Dolores mine.

Company has an option on and is developing the Carmen mine in the district of Sonora, with Frank W. Royer in charge. A 25′ vein has opened, 15′ assaying 20 to 35 oz. of silver per ton. Conditions on the 150′ are extremely good.

Inc. Feb. 15, 1916, in Delaware. **Cap.**, $1,000,000; shares $5 par; 100,000 preferred; issued 10,000 preferred, 100,000 common, no bonds. Company organized to take over a deposit of jamesonite—a lead-antimony ore—on one of the properties of the Cortez Associated Mines Co., which see, in Zimapan, Mexico.

Property: 48 hectares, 120 acres patented, Zimapan, State of Hidalgo, Mex., said to show ore carrying jamesonite, consisting of 50.8% lead and 29.5% antimony, and carrying silver. The occurrence is fully described by W. Lindgren and W. L. Whitehead, Econ. Geol., July, 1914, p. 435, and R. W. Raymond, E. & M. Journal, January 2, 1915, p. 9.

Operations were conducted under great difficulties in 1916, but were suspended in April, 1917, due to trouble with bandits and excessive taxation. The great lead-antimony mass does not seem to persist, but a silver-lead-antimony vein was disclosed, which would be valuable were it in the United States.

CORTEZ ASSOCIATED MINES — HIDALGO

Office: 53 State St., Boston, Mass. **Mine office:** Jacala, Hidalgo, Mex.

Officers: Joseph S. Fay, pres.; Olof Wenstrom, v. p.; Freeman Hinckley, sec.-treas.; preceding officers, Wm. F. Ray, Robt. A. Manning and Philip W. Wreen, directors.

Inc. Jan. 3, 1910, in West Virginia. **Cap.**, $1,500,000; shares $3 par, non-assessable; $825,000 issued. Company began business with $275,000 cash, and early in 1919 had about $1,500 cash plus its holdings in the Antimony Corporation. Boston State Safe Deposit & Trust Co., transfer agent. Stock is listed on the Boston Curb. Annual meetings, first Tuesday in March.

The company is primarily a development and holding corporation, formed to explore and develop mining properties until they are ready to produce, and then to promote an operating company.

Property: 1,079 pertenencias, 2,666 acres, in 4 groups, in the districts of Jacala, Zimapan, and Ixmiquilpan, about 20 miles distant. The lands include the entire old mining camp of Jacala.

The Jacala property shows thickly bedded blue limestone intruded by granular monzonite with alteration along the contact and mineralization of the metamorphosed limestone by copper and silver-lead sulphides. The intrusive mass is 1¼ miles long and 700′ wide. The contact zone carries numerous orebodies showing chalcopyrite and magnetite below the 300′ zone of oxidization.

Careful exploration has shown that most of the ore-shoots are low in copper and carry but 1 to 3 oz. in silver. Main development is by the Cortez Level tunnel, which has opened up about 35,000 tons of pyritic ore containing magnetite and chalcopyrite, the average copper contents being 1.72%. Several hundred thousand tons may possibly be developed here, and as the ore contains 35% iron, it will be valuable for a flux.

The Humboldt, Cortez, Abeja and Santa Maria show promise of making producing mines. The Humboldt has a magnetite-garnet outcrop, explored by the 1,304′ Humboldt tunnel with drifts and a 130′ incline winze, mostly in ore. The Santa Maria 394′ shaft has developed a body of soft, leached copper-bearing gossan of 6,000 sq. ft. area. This shaft will connect with the Humboldt tunnel.

Small replacement deposits of silver-lead ore in limestone also occur at Jacala, but the Carmen mine is the only one of promise. This well-known producer, 1½ miles north of Jacala, yielded 40 oz. silver-lead ore for many years. The mine workings are on the contact between limestone and porphyry and developed a replacement chimney of silver-lead ore in limestone, worked by an incline shaft to a depth of 900′. The company's new work has not yet cut the downward continuation of this ore shoot.

The San Nicholas group includes the Soledad and Ensino Largo mines.

Zimapan lies in a broad, arid valley with the 4,000′ deep Mocteruma canyon 9 miles west and the 3,000′ deep Toliman canyon 6 miles west. The mines are in the Toliman canyon and on the ridge between it and the Mocteruma. The ore deposits lie around a large intrusion of monzonite porphyry and are contact deposits carrying copper, or silver-lead deposits in the surrounding limestone, especially along fissures and intrusive dikes. The latter form pipes or chimneys, either vertical or inclined. The copper properties at this place [illegible]

actically undeveloped, but a contact deposit showing disseminated copper pyrite, ıc blende and galena, promises to develop a large tonnage.

The Sirena lead-antimony mine lies 9 miles north of Zimapan. Ore occurs a replacement deposit, in Cretaceous limestone, cut by a porphyry dike, and parently follows the bedding of the limestone, dipping about 40° S. The ore massive and consists of pyrrhotite, arsenopyrite, blende and jamesonite, form- an orebody 700′ long and 30′ thick.

In 1916, the company sold its Sirena property to the Antimony Corporation.

The mines have been closed down since 1913, owing to revolutionary dis- rbances, during which period all supplies were stolen and machinery destroyed. ıxation became very onerous, and company will have to be reorganized before erations can be resumed.

RANADENA MINING CO. **HIDALGO**

Closed down by revolution. Mine at Santa Barbara, Hidalgo, Mex., pro- ces silver-lead ore with a small amount of copper. Fully described Vol. X.

IDALGO COPPER MINING & SMELTING CO. **HIDALGO**

Office: Avenida 16 de Septiembre No. 26, Mexico D. F. **Mine and rks office:** Zimapan, Hidalgo, Mexico.

Officers: Sydney Ludlow pres.; Ricardo T. Sobey, v. p.; R. A. Mills, .; Hedley Ludlow, treas.; preceding, with George A. Camphuis and W. H. mstrong, directors; Hedley Ludlow, gen. mgr.; Jas. H. Armstrong, supt.; nio Lopez, engr.; Halarion Diaz, chemist.

Inc. Aug. 14, 1907, in Arizona. **Cap.**, $2,000,000; shares $10 par, in 000,000 preferred and $1,000,000 common stock. Annual meeting, third Mon- in August.

Property: 44 mines, 500 acres, with a 500-acre millsite, said to carry per ores, with small amounts of lead ore. Lands show monzonite-porphyry l limestone, with contact ore deposits. Copper ores are estimated by the npany to average 2.8% copper and 800 grams silver per ton. The mines yield reat variety of ores, including oxides and carbonates, and sulphides of lead copper.

Development: by shafts and tunnels, with a total of 3,000 meters of kings, estimated to show 50,000 tons of ore, with 20,000 tons blocked out for ning.

Equipment: includes a small steam plant and 16 buildings. Company loyed about 800 men at the mines and works when operating.

The 50-ton smelter, at Zimapan, 5 miles from the mine, received ore by pack- n. Copper is smelted to a 20% matte that is sent to the Aguascalientes lter. The lead smelter was run after many years' idleness, in 1913, on ore n Nevada group of mines, averaging 25% lead and 900 grams silver. Com- y planned installing oil engines and electric light, etc., at smelter in 1917. bably closed down, owing to disturbed conditions in Mexico. No recent rns secured.

CHUCA; COMPANIA BENEFICIADORA DE **HIDALGO**

See Santa Gertrudis Co., Ltd.

AL DEL MONTE y PACHUCA; COMPANIA DE **HIDALGO**

Subsidiary of the U. S. Smelting Ref. & Mining Co., 55 Congress St., ton, Mass. **Directors in Mexico:** Salvador M. Cancino, pres., and D. S. and

Inc. 1867, in Mexico, with 2,554 capital shares; all but 19 owned by the S. Sm. Ref. & Mng. Co.

Property: 180 mining claims, 1,736 hectares or 4,270 acres, and approxi- ,000 acres agricultural land, at Real del Monte, 7 miles from Pachuca, Mexico. In August, 1919, the Santa Ana mine and property of 200 acquired by purchasing 90% of the $2,200,000 capital of Cia de Minas Anexas., It contains part of the famous Vizcaina vein. An aerial with the Loreto mill.

of ore was made shortly after the Conquest of Mexico principal of the principal properties were large producers

Inc. Feb. 1
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...the development of the mines, and the equipme
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...er oz., and treating 500 tons of ore daily from El Bor
...this and Santa Gertrudis should eventually reach
...ary. 1920, it was claimed that by increasing El Bordo
...e monthly profit would be from £70,000 to £80,000.
...t Santa Gertrudis—new openings and reserves ma

	New Work, feet	Reserves—Ore, tons	Silver recoverable, oz.	Gold recoverable, oz.
.....	8,162	718,579	7,128,996	40.1
.....	7,014	880,433	9,595,800	53.9
.....	8,856	1,125,000	12,381,080	61.9
.....	14,865	1,214,000	13,392,981	66.9
.....	15,838	1,287,000	14,595,567	72.9
.....	.....	1,194,000	.....	....
.....	.....	1,047,000	.....	...
...ien purchased)	.....	1,150,000 (containing profit of £1,650,000)		

...El Bordo, the work is still preparatory, but the mine was expected to ...ing ore in January, 1920. Over 5,000′ of work has been done since acq... ...e property in 1918, mostly to determine the width of veins, some of w... ...rom 5½′ of 43-oz. ore up to 36′ of 50-oz. ore, with 44′ of 12½-oz. ore. ...Reserves in June, 1919, were 444,000 tons, averaging 14 oz. silver and 0.06 ...per ton.

The Bordo main shaft is 575 meters deep. At Malinche the workings of ... ...Tomas shaft, 230 meters deep, show the vein to assay 20.3 oz. silver a... ...dwt. gold across a width of 6.7′, for a length of 200′. In El Cristo there ...000 tons of 0.04 oz. gold and 9.5 oz. silver ore, but this mine will not be work... ...mill El Bordo is producing.

Equipment: Santa Gertrudis has a complete electrically-driven ... ...plant; also the old Guadalupe mill (closed) and the new mill. At El Bo... ...steel head-frame, 300 h. p. ...ic hoist, 1,400 cu. ft. compressor, machine ... ...and 4-mile aerial tram, wi... ...anch to Malinche to new mill. The tra... ...can handle 1,500 to... ...ore daily. It includes sixty 1,550-lb. ... ...Hardinge ball-mil... ...-mills, elevators, thickeners (the ore is ... ...colloidal nature, ...ettling area was increased by re-arrang... ...addition of ta... ...the Guadalupe mill), Dorr agitators, ...-filter for ... ...nide solutions, aluminum dust pre... ...superseded ...olitation apparatus. ... ...(65% recovery) ...lopment, cannot ex... ...mpany's ore. ...treat 2,000 tons ...

Production, years ending June 30:

ar	Tons*	Value	Extraction, %	Gold, Oz.	Silver, Oz.	Price of Silver, Cents per oz.
)19..	362,122	£1,037,606	.....	24,359	4,304,812	102.52
)18..	324,762	951,605	87.95	21,856	3,775,745	96.77
)17..	223,736	395,374	89.84	11,154	1,989,761	81.42
)16..	277,616	379,651	.....	12,550	2,286,450	49.68
)15..	211,669	249,728	.....	10,727	2,000,856	65.66
)14..	293,836	498,754	.....	.....	.....	54.81
)13..	263,554	631,718	.....	.....	.....	57.79

*52.7% of capacity in 1915; 56.6% in 1916; 53.2% in 1917; 80.7% in 1918; 0.2% in 1919; and 98.3% by July, 1919. The low capacity was due to the revolution in Mexico, which caused a loss of at least $1,500,000 in possible profit.

From January, 1910, to June, 1919, inclusive, the total output was 30,709,871 . of silver and 163,930 oz. of gold from 2,215,399 tons of ore. The average ade was 13.9 oz. silver and 1.48 dwt. gold per ton.

The Santa Gertrudis management has anticipated the depletion of its mine buying another to take its place, and with its 1,500-ton mill working at full pacity, and present high prices for silver, good dividends should be earned.

November, 1919, through The Mexican Corporation, Ltd., which see, company quired a 25-year lease on property of the Teziutlan Copper Mining & Smelting . The mines, 500-ton mill, power-plants and smelter, are in the State of axaca. Prior to 1913, when the revolution prevented operation, the annual tput was 7,000,000 lb. of copper, with a fair quantity of silver and gold. There re 2,500 men employed. Control was also obtained on the Fresnillo Mining ., which has a mine in Zacatecas.

STATE OF JALISCO

;UILA CONSOLIDATED MINING CO. JALISCO

Address: 185 Summer St., Boston, Mass.

Officers: D. E. Makepeace, pres., Attleboro, Mass.; E. B. Estes, sec.; A. Floyd, treas.

Inc. 1917, in Arizona. **Cap.**, $1,200,000; shares $1 par. Company is a re-anization of the Aguila Amalgamated Mining Co., described Volume XI, which succeeded the Mazeppa Cons. Mining Co. Stockholders in the old npany were given the option of exchanging their holdings on a basis of 1 re of new for each 5 shares of old and payment of 4c. per share of new stock.

Property: near Cinco Minas, said to have one-half mile of workings and how ore assaying from $100 to $160 per ton, mainly in gold and silver. Mine ow operated by W. S. King, under a 5-year lease.

AJAC MINES CO. JALISCO

Address: Guadalajara, Mexico.

Officers: W. L. Barclay, pres.; J. I. Higbee, v. p.; W. J. Pentland, gen. ; C. A. Sidler, sec.-treas.

Inc. Dec. 16, 1910, in Delaware. **Cap.**, $2,500,000; shares $1 par. Com- was formed for purpose of purchasing the Refugio, Animas, and Tres [illegible] mines in the Hostotipaquillo district. Later an option was taken on the [illegible] and Mexicano mines.

[illegible]ty: the Refugio mine, 125 acres, was worked for 25 years prior to [illegible] by present owners, down to the 500' level. The main vein has a [illegible]5' with well-defined walls. Ore contains gold and silver with [illegible]alue of $15.00 per ton. The Animas property, 144 acres, lies west [illegible]d is apparently on the same vein. The ore is said to contain [illegible]nd $3 to $5 gold per ton.

[illegible] both mines is by means of tunnels, the Animas having [illegible]ga. The Tres Estrellas property, 120 acres, is a mile from [illegible] been developed at depth.

Equipment: includes a 15-stamp mill and a 50-ton cyanide plant in course of construction. Hydro-electric power is used. The revolution in Mexico has interfered with operations, and the mines have only been worked intermittently since 1914. In 1919, the manager wrote that a strong effort was being made to complete the mill during that year.

AMPARO MINING CO. JALISCO

Office: 541 Drexel Bldg., Philadelphia, Pa. **Mine office:** Etzatlan, Jalisco, Mexico.

Officers: A. F. Bracher, pres.; W. H. Kister, and A. S. Miller, v. p.'s; Henry Freund, treas., with J. H. Stopp, F. W. Stanton, Alfred Gratz, G. B. Reimensnyder, J. H. Scott, L. H. Adler, Jr., and C. K. Smith, Jr., directors. J. S. Williams, sec.; J. H. Howard, gen. mgr.; W. Howard, asst. mgr.; C. F. Joyce, mine supt.; W. R. Askew, engineer.

Inc. 1902. **Cap.**, $2,000,000; shares $1 par; reduced from $3,000,000 in 1907.

Financial Statement, years ending December 31:

Year	Revenue	Net Profit	Dividends	Balance	Current Assets	Current Liabilities
1918....	$1,707,197	$308,595	$300,000	$8,595	$1,470,256	$174,710
1917....	1,220,964	178,065	320,000	.....	1,293,455	517,850
1916....	1,297,236	456,970	400,000	56,970	1,377,538	428,056

Dividends: the total is not available, but for the last 3 years amounts to $1,020,000. One of 5% was paid in November, 1919.

Property: includes the Canada, La Union, San Juan, Amparo, San Domingo and Natividad mines, and Rancho Embocado of 4,390 pertenencias, 7 to 9 miles S. of Etzatlan, State of Jalisco.

Development: by general shaft to depth of 1,300'; also has an auxiliary shaft. New work in 1916 totaled 10,501'; 9,806' in 1917; and 13,690' in 1918. The orebody at 1,100' was good, but the shoot was very spotty on 1,300' level. In 1918 further discoveries of good ore were made, and a large tonnage of probable ore developed.

Ore reserves: of positive, probable and prospective ore have varied from 750,000 tons in 1908, to 472,350 in 1916; 481,572 in 1917; and 481,000 in 1918, only there is an increase in positive ore. Shrinkage stoping is practiced, resulting in reduction of costs.

Equipment: electrically driven throughout, including hoists, compressors, 65 drills, underground hoists, pumps, sorting plant, aerial tram, telephone line, crushers, 50 stamps, 4 tube-mills, concentrators, Dorr classifiers, Pachuca tanks, and 3 Oliver filters; also a ranch and hospital.

Production: 50,000 tons in 1908; 63,398 in 1909; 68,217 in 1910; 73,783 in 1911; 92,365 in 1912; 104,330 in 1913; 87,320 in 1914; 114,166 in 1915; 99,040 in 1916; 84,277 in 1917; and 120,046 in 1918. Recent work is given below:

Year	Tonnage	Silver, grams per ton	Gold, grams per ton	Extraction,%	Total Cost
1918.....	120,026	315.7	7.90	89.30	$18.85
1917.....	84,277	326.0	7.93	87.84	19.70
1916.....	99,040	320.0	9.95	91.10	—
1915.....	114,166	310.0	7.60	.....	—

CINCO MINAS CO. JALISCO

Offices: 61 Broadway, New York; and 1026 Citizens National Bank, Los Angeles, California.

Officers: James W. Gerard, pres.; Marcus Daly, v. p.-treas.; T. D. McCarthy, sec., with Mrs. J. W. Gerard, and H. E. Crawford, mgr. Geo. F. Zoffman, supt.

Inc. March, 1910. **Cap.**, $500,000; $100 par; all issued. Transfer office, 61 Broadway, New York.

Property: in the Hostotipaquillo district of Jalisco. Examined by A. B. Farish.

Geology: deposit is a fissure vein with andesite hanging and dacite footwall; it is 10 to 40′ wide, dips 65° S.-W., and has a N. 45° W. course. Ore shoots are 500 and 250′ long by 25 and 20′ wide. Ore is a sulphide assaying 12 oz. silver and $2 gold per ton.

Development: by 900′ vertical shaft and 1,000′ of tunnels. Workings aggregate 35,600′. Reserves are estimated as 500,000 tons. Mining is by overhand stoping and back filling.

Equipment: electric power, 500-h. p. hoist, compressor, pump, tram, and 600-ton cyanide mill.

No production figures are obtainable, but mine and mill are operated to full capacity, and little time was lost by the revolution.

EL FAVOR MINING CO. **JALISCO**

Offices: Makeever Bros., Journal Bldg., Boston, Mass., and 170 Broadway, New York. Mine at El Monte, Hostotipaquillo district, Jalisco, Mex.

Officers: Sanford Makeever, pres.; Dr. H. D. Meredith, v. p.; J. L. Makeever, treas.; M. M. Makeever, sec.; Walter Neal, gen. mgr.; J. H. Nelson, supt.; J. G. Murphy, cons. engr.

Inc. July, 1906, in Arizona; protocolized, 1906, in Mexico. **Cap.**, $3,500,000; shares $1 par. Stock not listed. After 6 years of development work, mine paid total dividends of $210,000 in 1913-1914. Property said to represent investment of $1,000,000.

Property: 476 acres mineral land and extensive surface areas at El Monte, 75 miles N. W. of Guadalajara, Jalisco, Mex. A branch line of the Southern Pacific R. R. runs to Quemada, near the mine, and the Chapala Hydro-Electric Co. furnishes power for $50 per h. p. year. Vein reported as 10′ to 14′ thick with shoots of bonanza silver-gold ore workable to 1,300′ by tunnels.

Development: by over 3 miles of workings to No. 7, the deepest, level. In May, 1919, a new orebody assaying $140.80 in silver, free from manganese, was opened on No. 7, also on No. 3; while rich ore was found on No. 5. These discoveries are considered to be of great importance. Reserves are said to be sufficient to supply mill for several years.

Equipment: includes 250-ton cyanide mill, equipped with 35 stamps, crusher, tube-mills, Dorr classifiers and thickeners, Oliver filters, pachuca tanks, Wilfley tables. Extraction claimed to be nearly 90%. Total production to date reported as $1,500,000.

Mill buildings, burned by bandits in 1918, were rebuilt; and in September, 1919, daily output was 55 tons of $12 ore. Capacity of mill is to be increased.

KEYSTONE MINING CO. **JALISCO**

Office: at last report at Shamokin, Penn. Is a reorganization of Keystone Copper Smelter Co., of Philadelphia, and is the holding company for the Mexicana Co., Tapalpa district, Jalisco, Mexico. W. H. Childs, gen. mgr.

Property: about 100 hectares, in 5 groups, in Tapalpa, including the Mexicana, America and Palma groups; also timber rights to 50,000 acres of adjoining lands. Principal development is on La Mexicana group, 82 hectares, 15 miles west of Tapalpa, mine having a 200-metre crosscut tunnel, cutting 4 veins, with about 1 mile of workings. Veins are fissures in porphyry, averaging 5′ width, carrying auriferous and argentiferous chalcopyrite, sphalerite and pyrite.

Equipment: includes steam and electric power and 30-ton mill. The entire plant was enlarged and remodeled and resumed operations in January, 1912. Presumably idle, 1915-19, owing to unsettled conditions in Mexico.

LA REGINA MINING CO. **JALISCO**

Office: 2120 W. Tioga St., Philadelphia, Pa. **Mine office:** San Martin [illegible], Jalisco, Mexico.

Officers: Chester P. Ray, pres.; F. W. Schmidt, v. p.; A. W. Brack[illegible] sec.-treas.; M. J. Slattery, gen. mgr.; John P. Delaney, supt.

Inc. Nov. 1, 1909. **Cap.**, $1,000,000; shares $1 par, as successor of [illegible] Copper & Gold Mining & Smelting Co. **Debentures**, $200,000 author[illegible]

[illegible] La Perla, La Fe, La [illegible], carrying auriferous

and slightly argentiferous chalcopyrite. The Ajax mine shows a 12′ vein estimated to average 4% copper, 2 oz. silver and $1.33 gold per ton.

Development: property as a whole has 8 shafts, of 100′ average depth, with a total of about 1,000′ of workings, claimed to put in sight 125,000 tons of auriferous copper ore. Development in recent years has been confined to the gold-silver vein, said to show at depth of 115′, ore averaging 2 oz. silver and 15 grams gold per ton.

Equipment: includes a steam hoist and air compressor, at the San Vicente group. The mill has a 25-ton Elspass mill, 25-ton experimental cyanide plant, Huntington mill and 3 Pachuca tanks. Idle on account of political disturbances in Mexico.

MAGISTRAL-AMECA COPPER CO. JALISCO

Mine office: Ameca, Jalisco, Mexico.

Officers: H. L. Percy, pres.; Fred M. Lyon, v. p.; Geo. C. B. Robinson, sec.-treas.; Jas. P. Harvey, gen. mgr., and H. N. Manington, directors; Percy A. Babb, cons. engr.

Inc. May 20, 1909, in Arizona. **Cap.,** $1,500,000; $1 par; issued, 1,250,000 shares. Holds direct title to lands through Magistral-Ameca Copper Co., S. A. inc. in Mexico. Annual meeting, second Wednesday in November.

Property bought of Las Moras Copper Mining Co., for $100,000 by Patrick Clark, Jas. P. Harvey, H. L. Percy and Fred M. Lyon, the first named selling his quarter interest to his associates for $55,000.

Property: 74 pertenencias, 185 acres, known as the Mina Magistral in the Hacienda Hegira, 8 miles S. W. of Ameca, has veins in diorite that are cut by porphyry dikes. The veins occur on dike contacts and show outcrops of silicified rock with quartz stringers and hematite. The vein varies from 4 to 25′ in thickness and carries lenticular orebodies connected by mere films of quartz or fissures with wall rock impregnated with chalcopyrite. The Magistral ore shoot occurs where 3 veins intersect. The ore carries copper sulphides (chalcopyrite), and averages from 4 to 7% in copper with about $2 in combined gold and silver value.

Development: by 321′ shaft, and by tunnels with about 1 mile of openings, developing copper ground for width of 5 to 50′, said to assay 4 to 7% copper. The Magistral was worked many years ago for bluestone, used by neighboring mines in the process of treating silver-lead ores.

Equipment: includes two 80-h. p. high-pressure boilers and a 150-h. p. tandem compound engine, with hoist good for 500′, at the Magistral. The mines are connected with Ameca by a good wagon-road, 8 miles long, with a 1½% grade, built with the idea of using it for railway tracks in the future. About 100 men are employed. The concentrator was re-built in 1914. It includes a ball-mill and flotation plants.

Owing to disturbed conditions in Mexico, operations have been greatly interfered with. No recent returns securable, but it was reported in March, 1918, that work had been resumed, treating 100 tons daily. Letters to previous address in Los Angeles returned in March, 1919.

MASCOTA COPPER CO. JALISCO

Supposedly dead. **Mine office:** Ameca, Jalisco, Mexico.

Officers: Chris D. O'Brien, Sr., pres.; J. M. Bowler, v. p.; Byron J. Mosier, sec.-treas.; Chris D. O'Brien, Jr., gen. mgr., at last accounts.

Inc. June, 1908, in Arizona, as successor of Independence Mining & Smelting Co. **Cap.,** $1,500,000; shares $1 par.

Lands: 46 hectares, said to include an antigua mine, in the Guanango division of the Mascota district, 24 miles from the Mexican Central line. The claims show an 8′ fissure vein in porphyry, said to be traceable about 2,000′ and proved to depth of 486′. The ore is reported to average 5% copper, 7 oz. silver and 6 grams gold per ton.

Development: includes 300′ shaft and 375′ tunnel, with 4,825′ of workings, estimated to show 40,000 tons of ore, with 28,000 tons blocked out for stoping.

Equipment: included 50-h. p. steam plant, with 3-drill air-compressor

5-ton wooden stamp-mill, with 10 Allis-Chalmers gravity stamps, and a small centrator, equipped with 2 Overstrom tables, a vanner, 4 slime tables and a r. Operations suspended for several years on account of revolution.

EXICANA MINING CO. **JALISCO**

Is the operating subsidiary company of the Keystone Mng. Co., of Shamokin, which see.

)LOLOA MINING CO., LTD. **JALISCO**

Controlled by Makeever Bros. of Boston, Mass.

Address: Hostotipaquillo, Jalisco, Mexico.

Officers: W. G. Miller,, pres.; F. G. Stevens, managing director; W. Mathews, treas. and gen. mgr.; Edward Fenley, supt., at last accounts.

Inc. 1908, in Canada. **Cap.,** $250,000.

Property: 130 hectares, include antiguas opened by the Spaniards in 16th century, reopened in 1904. Several fissure veins in andesite carrying d-silver ore were worked in 1914, and shipments made to the El Favor mill.

Development: by Mololoa tunnel to depth of 800. In 1919 the Soledad ot of the Mololoa mine was said to show silver ore which, on No. 6 level, ond the fault, was 12′ wide and assayed $38.50 per ton. The ore carries so e manganese that cyanidation will extract 85% of the silver.

N FELIPE MINING CO. **JALISCO**

Address: Hostotipaquillo, Jalisco, Mexico. Col. N. Z. Seitz, pres. and mgr.

Inc. 1902, in Arizona. **Cap.,** $1,000,000; shares $1 par.

Property: includes a 50-ton mill. The company is said to have paid dends from stock sales and was considered by Horace J. Stevens as a rank of stockjobbery. Probably defunct.

MEXICO, D. F.

S ESTRELLAS, COMPANIA **MEXICO, D. F.**

Address: El Oro, Mexico.

Property: a large gold-silver mine and extensive equipment adjacent El Oro and Esperanza. No information procurable.

ORO MINING & RAILWAY CO., LTD. **MEXICO, D. F.**

Offices: T. Dundas Pillans, sec., 24 Lombard St., London, E. C. 3, Eng-; 61 Broadway, New York.

Directors: R. T. Bayliss, chairman; H. V. Hart-Davis, Alfred Naylor, Breitmeyer, P. L. Foster, J. H. M. Shaw, R. M. Raymond. **Staff:** A. F. n, gen. mgr.; F. Jenkin, asst. mgr., El Oro, D. F., Mexico.

Inc. July 27, 1899, in Great Britain, to acquire the capital stock of the erican Mng. Co. and the American Railroad & Lumber Co., the former ing the El Oro Gold & Silver mine in the El Oro district of Mexico, the latter owning the railroad connecting the mine with the Mexican onal Ry. Purchase price was £886,072; paid £820,084 in cash and ,988 in stock. The two American companies have since been dissolved. ., £1,150,000; outstanding shares £1 par. £1,147,500 issued. Annual ing in October. Listed on London Stock Exchange.

Accounts for fiscal years ending June 30:

	Bullion Recovered	Railway Receipts	Deprec.	Loss on Exch.	Deprec. of Invest's	Profit
..	£75,541	£7,944	£25,000	£20,444	£21,343	£78,398*
..	415,436	35,497	25,000	23,242	.....	103,690

* Deficit.

No statement of accounts has been rendered since the above.

Dividends: 148% from 1900 to 1913; 1913-'14 to 1915-'16, nil; 1916-'17, 1917-'18, 5%; 1918-'19, 5%, October 31, 1919. The total is £1,955,750.

The El Oro Mng. & Ry. Co., Ltd., owns 42,687 shares (par £1), and £14,000

7% debentures of the Suchi Timber Co., Ltd., which declared a dividend of 5% on June 30, 1913.

Property: the San Antonio, San Rafael, Trianon, Diamante, Ofir, and Carmen No. 2 claims, 786 acres, at El Oro, 100 miles northwest of Mexico City. In 1912-1913, the adjoining Ofir claim, 11⅛ acres, was bought for £130,000 cash. This claim controls the rights of the San Rafael vein in depth. Ore is gold bearing. Orebodies vary in width from 10′ to 60′.

Development: by shafts from 1,500′ to 1,600′ deep. **Equipment:** includes a 200-stamp mill, 8 tube-mills and a cyanide plant. Mine and mill operations were resumed October, 1916, with 100 stamps and 70 were in operation at last accounts.

Production for years ending June 30:

Year	Tons Milled	Value	Costs	Profit	Yield
1913	433,708	$5.04	$3.59	$1.45	$2,188,723
1912	387,157	5.75	3.79	1.96	2,228,190
1911	360,294	6.63	3.90	2.73	2,389,340
1910	316,138	8.10	5.17	2.93	2,562,705
1909	285,181	8.56	5.42	3.14	2,442,374

No later information is available, save that at the end of 1918 the monthly output was 30,000 tons of ore, and that costs were $7 per ton. The usual annual reports are being withheld on account of the political situation.

ESPERANZA, LTD. **MEXICO, D. F.**

Office: C. L. Johnson, sec., No. 1 London Wall Bldgs., London, E. C. 2, England. **Office of American company:** E. L. Gruver, pres., care Hayden Stone & Co., 25 Broad St., New York City.

Directors: R. J. Frecheville, chairman; F. W. Baker, Sir F. M. Crisp, A. A. Kelsey, Charles Hoyle, gen. mgr.; E. Ph. Herivel, asst. mgr.

Reg. Oct. 6, 1913, in Great Britain. **Cap.,** £455,000; shares £1 par; all issued and credited, except seven, as fully paid. Acquired by agreement with the Guggenheim Exploration Co., and the Venture Corporation, Ltd., 449,800 shares of $5 each, all the capital except 200 shares, in the Esperanza Mng. Co. of New York, inc. in New Jersey, and owning gold and silver mines covering 390 acres, adjoining the El Oro mine at El Oro, Mexico. Purchase price was £454,993 in fully paid shares.

Financial Statement, years ending December 31:

Assets.

Year	Invested in Esperanza M. Co., etc.	Cash and Materials	Total
1918	£459,933	£7,730	£467,723
1917	459,243	8,711	467,954
1916	464,992	4,655	469,647

Liabilities.

Year	Capital	Creditors, etc.	Surplus	Total
1918	£455,000	£8,233	£4,491	£467,723
1917	455,000	11,263	1,690	467,954
1916	455,000	11,055	3,592	469,647

Profit and Loss.

Year	Dividends from Esperanza M. Co.	Total Income	Expenses, taxes	Balance
1918	£27,680	£29,576	£8,876	£20,700
1917	23,067	27,002	8,248	18,754
1916	11,609	16,499	12,907	3,592

Dividends: 1903-'04, 10%; 1904-'05, 14 months, 82½%; 1906, 160%; 1907, 105%; 1908, 70%; 1909, 25%; 1910, 30%; 1911, 30%; 1912, 15%; 1913, 10%; 1914, 5%; 1915, 5%; 1916, nil; 1917, 5%; 1918, 5%. To June, 1918, 60 dividends totaled 557½%, equal to £2,536,625.

Esperanza Mining Co.

Controlled by Esperanza, Limited, which see.
Inc. in New Jersey. **Cap.**, $2,250,000; shares $5 par; all issued.
Dividends are paid to Esperanza, Limited.

Financial Statement, years ending December 31:

Assets.

ear	Property	Absorptions, etc.	Deferred charges	Current	Total
)18.....	$2,006,687	$64,447	$8,459	$1,139,236	$3,218,830
)17.....	2,006,221	61,441	24,472	1,074,458	3,166,592
)16.....	2,003,835	104,887	269	901,413	3,010,405

Liabilities.

ear	Capital	Reserve for Deplet., etc.	Esperanza Ltd.	Current	Surplus	Total
)18.....	$2,250,000	$742,888	$13,585	$37,307	$175,051	$3,218,830
)17.....	2,250,000	505,176	.....	61,359	350,056	3,166,592
)16.....	2,250,000	345,816	.....	112,857	301,732	3,010,405

Profit and Loss.

ear	Gold receipts, etc.	Expenses	Reserves for dep. & deprec.	Profit or loss	Dividends paid	Surplus
)18...	$1,681,827	$1,484,111	$237,721	—$40,005	$135,000	$175,051
)17...	1,822,895	1,463,967	236,963	+121,965	112,500	350,056
)16...	892,085	702,234	.....	+189,851	56,250	301,732

Property: 6 patented claims, 390 acres, adjoining El Oro mine, at El ro, shows fissure veins in shale, cut by andesite intrusions. The dip is 70° the S. W., and course N. 45° W. The ore shoots are from 50 to 150′ long, id from 2 to 100′ thick.

The San Rafael vein is traceable for 10,000′ through El Oro district, but is it by many transverse faults which displace the orebodies. The Esperanza in fills a fault that has a displacement of 500′. The San Rafael vein fills a ult fissure whose displacement is approximately 1,000′ vertical. This vein irrows at depth of 2,000′ in the Esperanza mine and extends for 2,500′ through e property, with 7 payable branch veins.

Company has under option and made first payment on the Union en Cuale ines, near Banderos bay, 25 miles from Las Pinas, Jalisco. The property shows ry large and persistent veins of zinc ore carrying silver and gold, as well as id ore. These veins were worked until 1893 for the silver only, two of the ines yielding about 6,000,000 ounces up to that date.

If the Esperanza completes payment, and spends approximately $2,000,000 equipment, development, etc., the mines should produce 2,000 tons of ore daily.

Development: at El Oro, by vertical shafts, 1,600, 1,000, and 400′ deep. d a 1,000′ tunnel for tramming. Deep work on the San Rafael and San rlos veins showed that the limit of pay ore had been reached.

Recent work shows the following results:

ar	Feet	Total, feet	Reserves, tons	Profit in reserves
18.....	4,817	183,637	35,131*	£19,322
17.....	9,908	178,820	65,368	39,727
16.....	8,900	168,912	111,723	.....

* Plus 50,000 to 100,000 tons of payable fills.

Equipment: electric power, 400-h. p. hoist, and cyanide mill, using 120 mps and 14 tube-mills of 1,000 tons daily capacity. The stamps are being placed by ball-mills.

Production: ar	Tons Milled	Value per Ton	Year	Milled Tons	per Ton Value
18.....	200,589	$9.88	1916.....	113,921	$6.67
17.....	200,548	10.00	1915.....	22,684	.....

During most of the years, 1914 and 1915, revolutionary disturbances prevented work, production being 143,670 tons ore, yielding $1,180,184. Operations were suspended from February 25, 1915, until April 23, 1916.

Extraction in 1918 was 86.43% of the gold and 68.25% of the silver. To end of 1918 the total output was $78,003,993 (Mexican gold currency) from 2,82[illegible] tons ore.

MEXICO MINES OF EL ORO, LTD. MEXICO, D. F.

Officers: 2 St. Helen's Place, London, E. C. 3, England; and 18 Rue Chaveau-Lagarde, Paris, France.

Directors: Sir E. M. Clarke, Don Guillermo de Landa y Escandon, F. J. Fournier, H. Higgins, and Sir R. J. Price, F. L. Allan, resident manager, El Oro, Mexico; J. Vincent, asst. mgr.; C. R. Pinder, cons. engr.

Reg. Oct. 14, 1904, in England. **Cap.,** £210,000 shares £1 par; increased from £180,000 in July, 1914; 180,000 shares issued and fully paid; [illegible] to be issued for acquisition of the Nolan properties.

Financial statement for year ending June 30, 1916, showed that owing to suspension of operations due to the revolution, there was a loss of £21,855. Balance forward on June 30, 1916, was £59,073, compared with £91,127 the previous year. For 1917 there was a profit of £271,174, of which £115,500 was distributed. Balance forward was £214,747. Assets exceeded liabilities by about £295,000. For 1918 the profit was £264,606. Dividends absorbed £199,500, and £179,465 was carried forward. In 1919 the profit was £196,222, of which £189,000 was paid in dividends.

Dividends, including bonuses:

Year		Year		Year	
1907-'08	5s.	1911-'12	16s.	1915-'16	nil
1908-'09	12s. 6d.	1912-'13	18s.	1916-'17	11s.
1909-'10	14s.	1913-'14	18s.	1917-'18	19s.
1910-'11	16s.	1914-'15	nil	1918-'19	10s.

Property: company was formed to acquire by agreement with the Exploration Co., Ltd., 26.63 hectares (65.79 acres), total with surface rights, 75 acres, adjoining the Esperanza mine, near El Oro, Mexico. The land, formerly held by the Mexico Venture Syndicate, Ltd., includes the Mexico gold and silver mine. The properties of the Compania Miniera de Oro Nolan were acquired in January, 1915, for 30,000 fully paid shares. The ore is gold and silver bearing, occurring in fissure veins.

Development: by the North shaft 1,574' deep, and the South shaft, 1,467'.

Ore reserves: on June 30, 1917, were estimated at 457,100 tons, $11.89 gold, and 8 oz. silver; while in 1918 they were 416,200 tons, and 379,000 tons in 1919.

Equipment: includes a 40-stamp mill, 7 tube mills, and a cyanide plant.

Production: Year	Tons Milled	Yield	Value per Ton	Costs per Ton	Profit per Ton
1918-'19	130,665	£509,000	.....	.....	.....
1917-'18	121,793	520,000	.....	.....	.....
1915-'16	84,030	440,818	.....	.....	.....
1914-'15	30,825	84,650	.....	.....	.....
1912-'13	158,395	1,669,540	$10.50	$4.10	$6.[illegible]
1911-'12	142,884	1,555,095	10.80	4.30	6.[illegible]
1910-'11	136,408	1,528,229	11.20	4.30	6.[illegible]
1909-'10	136,372	1,392,336	10.20	4.70	5.[illegible]
1908-'09	101,105	1,257,560	12.40	5.60	[illegible]
1907-'08	62,394	807,971	12.90	[illegible]	[illegible]

This famous and efficiently managed property appears to have passed the zenith of its career and to have become a liquidating asset.

STATE OF MICHOACAN

RIO COPPER CO. **MICHOACÁN**

Idle owing to political disturbances in Mexico. **Mine office:** Ario de osales, Ario, Michoacán, Mexico.

Officers: Frederick Moser, pres.; Geo. H. Walsh, Jr., treas.; A. P. tramler, supt.

Cap., $2,000,000; shares $10 par. Holds lands through Ario Copper Co., . A. **Inc.** April 13, 1907, in Mexico. **Cap.,** 500,000 pesos.

Property: 126 hectares, including the Flora, Roma, Bohemia, San Anonio and San Valentin mines, old properties showing silver and copper ores, bout 5 miles from the Inguaran mines, on the projected line of the Morelia y 'acambaro railway, partly constructed.

Development: principal work is on the Flora and Bohemia mines, with shafts aggregating 500′ depth, and 12 tunnels, aggregating 2,600′ length. La loma has ore assaying up to 25% copper. Equipment includes steam and gasone power. Patzcuaro, 70 miles distant, is the nearest railway point.

NGUARAN; COMPAGNIE D'. **MICHOACÁN**

Office: 56 Rue de Provence, Paris, France. **Mine office:** Inguarán. Ario, lichoacán, Mex. Ch. Laforgue, gen. mgr.; Maurice Armand de Lille, agt.; . L. Phillips, supt.

Inc. Jan. 15, 1898, in France. **Cap.,** 12,000,000 francs, shares 500 francs ar. Is controlled jointly by the French house of Rothschild and the Banque lirabaud; a considerable portion of the company's stock is owned by the Comanie du Boleo. Property is said to have cost 1,500,000 pesos, and company eported to have expended about $8,000,000 thereon, which is undoubtedly an verestimate.

Property: 185 hectares, and a mineral zone of 5,000 additional hectares, n the Tacambaro district 70 miles north of the Balsas river, Michoacán, lying n the plateau of the volcano Jorullo, 1,500′ above the plains.

Geology: the Inguarán mountain is traversed by a dike 2,000 to 3,000′ ide, of fine-grained pink granite, traceable several miles across country. The ranite rock is sprinkled with specks of chalcocite and chalcopyrite forming a isseminated, or so-called porphyry deposit whose payable ores occur in belts or ands in the dike. Proved depth of the ore is about 300 meters, at which point apparently cuts off.

Development: by a 2,500′ tunnel and 2 main shafts, deepest 350, with evels opened at 80′ intervals. Both ore and country rock are exceedingly firm, ttle timbering being required. Estimates of size and value of the orebodies ary greatly, but the best authorities estimate an average of 3.25% copper, with ,000,000 to 3,000,000 metric tons of ore blocked out. The ore is not well adapted o wet concentration as the metallic sulphides are firmly interlocked with the ranite minerals, but it is admirably adapted to treatment by froth flotation, and pparently could be put about 8 or 10 into 1.

The Inguarán was the particular bugaboo of the copper situation at the end f the nineteenth century, the exigencies of the buyer's demanding that there lways be some mine, just about to begin production, that can make several undred million pounds of copper yearly at a merely nominal cost. The Inguarán as a large body of low-grade ore, but it is not equal in quantity or quality to at of any of our "porphyry coppers."

The property has been idle some years and cannot become a serious producer ntil rail connections are secured.

ICHOACAN RAILWAY & MINING CO., LTD. **MICHOACÁN**

Address: G. A. Mitchell & Co., secretaries, 2 Suffolk Lane, Cannon St., ondon, E. C. 4, England. **Mine office:** Angangueo, Michoacán, Mexico. **Vorks office:** Ocampo, Zitacuaro, Michoacán, Mexico.

Directors: G. A. Mitchell, chairman; C. H. Potter, W. J. H. Moll, and . R. Scott.

Inc. Jan. 29, 1889, in Great Britain. **Cap.,** £105,364; £1 par; in £21,015

assessable. Debentures, $1,000,000 at 6%. Owns a 72% stock interest in the Cia. Minera Explotadora El Magistral y Anexas, and also sundry lands acquired from the Bankers Mining & Development Co.

Property in the Magistral district shows contact deposits between limestone and diorite. The deeper workings show chalcopyrite associated with hematite having garnetiferous quartz gangue in the sulphide zone.

Due to the revolution the property has not been operated since 1913.

TEZIUTLAN COPPER CO. **PUEBLA**

Inc. in New Jersey. Cap., $1,000,000; shares $100 par. Entire stock issue owned by Teziutlán Copper Mining & Smelting Co. Fully described Vol. V, Copper Handbook.

TEZIUTLAN COPPER MNG. & SM. CO. **PUEBLA**

Office: 82 Beaver St., New York. R. E. Safford, sec.

Property leased for 25 years to The Mexican Corporation, Ltd. (which see), company receiving 37½ per cent. of the net profit of operations. See Vol. XIII for details of organization.

STATE OF SAN LUIS POTOSI

DOLORES MINE **SAN LUIS POTOSI**

Address: American Smelting & Refining Co., Matehuala, San Luis Potosi, Mexico.

Geology: ore occurs as contact deposits in limestone and porphyry. The shoots are large for this type, one being 300′ long, 70″ thick, and 300′ deep. The contact rock contains pyrite and chalcopyrite, and averages 3% copper, $1.50 gold and 2 oz. silver per ton, with 40% silica.

Development: by 326′ shaft and crosscut adits. Underground work is done on contract.

Equipment: is driven by power from the Matehuala smelter, 8 miles distant. Mine has 25-drill air-compressor, side-dump steel cars, machine-shop, assay-office and hospital, and employs 700 Mexicans.

Production: averages 500 tons daily, but can be increased to 1,000 tons.

MATEHUALA SMELTER **SAN LUIS POTOSI**

Owned by American Smelting & Refining Co.

Address: 120 Broadway, New York; and Matehuala, San Luis Potosi, Mexico.

Company operates a smelter, acquired in 1910 from National Metallurgical Co., drawing ores from the nearby mines of La Paz and Catorce.

The smelter on the Mexican Central railway, has a complete plant including jaw-crusher, sampler, ore-bedding plant, 4 hand-fed blast-furnaces, total capacity of 400,000 tons annually, 3 cycloidal blowers giving 24-oz. blast pressure driven by 180 and 200-h. p. steam engines, 5 boilers, forehearths, slag-cars, electric locos for slag dump, generators, machine-shops, and 30-ton reverberatory furnace for smelting flue-dust. The plant turns out a matte averaging 45% copper and 42% sulphur, which is sent to the Aguascalientes smelter for conversion. The smelter was idle in 1916, but was blown-in early in 1917, and operated continuously since then.

NATIONAL METALLURGICAL CO. **SAN LUIS POTOSI**

Smelter was acquired 1910, by A. S. & R. Co., which see.

SANTA MARIA DE LA PAZ Y ANEXAS; NEGOC. MIN. DE

Office: Avenida Uruguay 70, Mexico City, Mexico.

Officers: José de Caso, pres.; Vincente Etchegaray, Deogracias Adolfo Prieto, Baltoasar Marquez, Jose Sainz, and Eusebio Gomez Allende, assistant presidents; Manuel F. Garrido, mgr. and cons. engr.; Geoffrey M. Watneys, managing director.

Inc. in Mexico, in 1864. Reincorporated March 29, 1917, and capitalization changed from 240,000 pesos to 625,000 pesos; 25 pesos par. Listed on Mexico City Exchange.

Net profit in 1918 was 947,377 pesos. Monthly expenses are 125,000 pe-

Dividends: from 1895 to 1904, inclusive, 5,778,270 pesos. A distribution 2 pesos per share is paid monthly besides extras, the total being from 30 to 35 os per annum.

Property: 282 hectares in the Matehuala district of San Luis Potosi. : mines are opened to depth of 1,500'. The ore, which is a hard quartz with ite, occurs in fissures along porphyry dikes, averaging 32 oz. silver per ton.

Equipment: steam, air, and electric power, with total capacity of 2,500-). The 300-ton concentrating mill and 80-ton smelter are idle as ore is sent smelters at Matehuala and Monterrey.

Production: in 1918, 54,267 kg. (1,728,000 oz.) of silver. Monthly out- is 6,000 kg., to be increased in 1920 to 8,000 kg. There are 1,600 men employed.

RO GENERAL; CIA. MINERA DEL SAN LUIS POTOSI

Sold property to the Cia. Metalurgica Nacional de Matehuala, San Luis osi, Mex., which is controlled by the American Smelting & Refining Co.

RO GENERAL De CHARCAS MINE SAN LUIS POTOSI

Mine address: Charcas, San Luis Potosi, Mexico. Owned by Cia. Metal- ica Nacional de Matehuala, controlled by the American Smelting & Refining Mine was formerly owned by the Cia. Minera del Tiro General, S. A.

Property: 72 pertenencias, 178 acres, with 46-acre millsite, and 50-acre n, in the Venado district. The mine was worked on a small scale for 3 uries, and in a larger way since 1859. It shows 2 main ore zones, carrying ire veins in porphyry, near a limestone contact, with a generally E.-W. strike dip of about 70°. The N. vein, of 3 to 8 meters width, with known length 00 meters, is opened to depth of 1,361', showing chalcopyrite and sphalerite nated by the management to average 2% zinc, 430 grams silver and 8 grams per metric ton. There are 9 tunnels with 13,129' of workings.

Equipment: includes a 700-h. p. steam plant, with hoists of 100-h. p. and h. p. and a 10-drill air compressor. There is a 10-stamp mill and a 150-ton entrator, having crushers and 5 sets of rolls, with trommels and other neces- equipment. The mill has 10 pneumatic dry concentrators, which treat hide ores and give a preliminary lead concentrate cut out from the final concentrate, the latter being a 45% zinc product, secured largely from rosin

STATE OF SINALOA

)IX CONSOLIDATED MINING CO., LTD. SINALOA

Office 516 Grant Bldg., Los Angeles, Cal. **Mine office:** Choix, Sinaloa, ico.

Officers: C. J. Heyler, pres.; A. E. Pomeroy, 1st v. p.; J. R. Thomas, A. M. McDermott, supt., with Richard Lamson, directors.

Inc. May, 1902, in Arizona. **Cap.**, $5,000,000; shares $1 par; non-assess- issued, $3,155,534. Is protocolized under laws of Mexico. Owns 45% of tock issue of Los Platanos Development Co. Annual meeting, first Monday ctober.

Property: 269 hectares, in El Fuerte district or Sinaloa and Urique dis- of Chihuahua. Orebodies are contact deposits between diorite and limestone porphyry and limestone, with fissure veins in granite and quartzite carrying and silver.

Shipments of 1,062 tons of ore, to the Aguascalientes smelter, gave returns 1.5 to 28% copper, with gross values of $127,915, and net value of $47,940.

A 100-ton smelting plant, purchased 1911, has never been erected owing to utionary disturbances.

In March, 1919, secretary reported that half of property had been leased to Mining & Smelting Co. (which see).

[illegible] MINING & SMELTING CO. SINALOA

[illegible] care Choix Consolidated Mining Co., 516 Grant Bldg., Los [illegible] McDermott, gen. mgr.

[illegible]

BONANZA MINING CO. SONORA

Office: Cananea, Sonora, Mexico.

Officers: T. Evans, pres.; C. T. Knapp, v. p.; Geo. Young, sec.-treas.; Casey Stiles, asst. sec.-treas.; and R. E. Howe, directors. Is the operating Mexican corporation of the Superior Bonanza Mining Co., which see.

Inc. June 7, 1904, in Mexico. **Cap.,** authorized and issued, 10,000 pesos par value of shares $1 (Mexican). Holds title to the mineral properties of that company, located near Imuris, Sonora, Mex., consisting of 198 pertenencias, or approximately 491 acres. Controlled through stock ownership by Greene Cananea Copper Co. Contains a silicious ore, low in copper content, but with some gold. Mine has been worked for the past two years, to provide a reserve of flux for the Cananea ores.

BOSTON-MOCTEZUMA MINING CO. SONORA

Address: W. C. Humphrey, Nacozari, Sonora.

Directors: C. P. Vaughn, Ira Vaughn, and Oliver Cutts of Philadelphia, and L. V. Banker of Newton, Mass. Organized in Mass., December, 1919.

Property: the Cieneguita silver mine, 20 miles S. of Nacozari, developed by several thousand feet of tunnels, opening large quantities of $10 ore.

BOSTON SONORA MINES CO. SONORA

Probably dead.

Inc. about Dec., 1911, in Arizona, by Thomas Patterson, Wm. A. Clark, H. C. Wilderson, James V. Howard and Royal B. Young, all of Massachusetts. **Cap.,** $1,000,000; shares $5 par.

Property: at Cananea, Mexico, includes several claims near the Calumet-Sonora (Carnegie Lead & Zinc Co.) ground, crossed by several replacement veins showing bunches of good ore in the shallow pits and prospect shafts thus far put down. Is a prospect only.

BUFA MINING, MILLING & SMELTING CO. SONORA

Office: 1030 Van Nuys Bldg., Los Angeles, California. Mine at La Bufa, Sahuaripa, Sonora, Mexico.

Officers: Wm. E. Richardson, pres. and gen. mgr.; H. A. Sibbet, v. p.; Baron W. Riley, sec.

Inc. 1902, in Arizona. **Cap.,** $1,500,000; shares $1 par. Has paid 5 dividends, last being $60,000, July, 1905.

Property: 123 acres, showing 6 fissure veins, 2 of which average 4' width, are opened by a 600' incline.

Ore: said to assay 10% copper, 10% lead, 4% zinc, 150 oz. silver and $2.50 gold per ton. Values are in argentiferous tetrahedrite and copper sulphides.

Development: shafts of 300' and 600', and a 225' tunnel, with 8,000' of workings; 20,000 tons of high-grade ore said to be blocked out, with low-grade ore on the dump.

Equipment: includes a 120-h. p. plant, with hoists, air compressors and 7 power drills.

The 35-ton concentrator has a small sampling mill attached. There also is a 20-ton leaching plant. The smelter, at the mine, includes 10-ton and 25-ton reverberatory furnaces. Product is matte carrying 50% copper, 600 to 800 oz. silver and 1.5 oz. gold per ton, shipped by burro, to Aguascalientes, via Guaymas, for refining. Production, 1906, was about 750,000 lb. fine copper.

Secretary reported in June, 1919, that mine had not been operated for over 8 years, due to the revolution.

CADENA DE COBRE MINING CO. SONORA

Address: care C. A. McDonald, sec.; Bisbee, Ariz. Mine office: Sahuaripa, Sonora, Mexico.

Officers: Emil Marks, pres.; C. H. Holz, v. p.; M. Newman, sec.; R. F. Koehler, J. Pennypacker and John Treu, directors; Arthur Hook, mgr. engr.

Inc. Jan. 5, 1905. **Cap.,** $1,000,000; shares $1 par.

Property: 83 hectares, in Los Chinos mountains, on the Yaqui river, shows iron outcrops up to 300' in width.

Development: by the 96′ Bisbee tunnel, showing ore assaying 4 to 25% pper. Idle on account of revolutionary disturbances in Mexico.

ANANEA CONSOLIDATED COPPER CO. **SONORA**

Owned by Greene Cons. Copper Co., which is controlled by the Greene-manea Copper Co. (q. v.).

ANARIO COPPER CO. **SONORA**

Address: care Cameron Michel & Co., 8 West 40th St., New York, and oom 23, First National Bank Bldg., Douglas, Arizona.

Officers: James P. Harvey, pres. and mgr.; F. O. Schellenberg, v. p.; M. Simonton, sec.; Jacob Schaefer, Jr., treas. Directors: James P. Harvey, O. Schellenberg, Hon. John B. Wright, Wm. McDermott and B. A. Packard.

Inc. in Arizona, with capital of 2,000,000 $1 shares; 600,000 issued; but incorporated in Delaware, with capital of $20,000,000; shares $10 par value;),000 issued. Registrar & Transfer Co., New York, transfer agent. Commer-l Trust Co., New Jersey, registrar. The company owns all the capital stock El Canario Copper Co., S. A., and Mountain Consolidated Copper Co., S. A., h of Mexico, which see.

RACAHUI MOUNTAIN COPPER CO., LTD. **SONORA**

Office: 3222 Jefferson St., Kansas City, Mo. Mine near Llano, Mag-ena, Sonora, Mexico.

Officers: M. H. Greene, pres. and gen. mgr.; Chas. M. Howell, v. p.; J. Sprink, sec.-treas., with T. McClure, J. C. Brewer, Thos. James and Wm. Berryhill, directors.

Inc. May 20, 1907, in Arizona. **Cap.**, $1,500,000; $1 par; issued 964,000. nual meeting, first Tuesday in June.

Property: 2 groups, 50 hectares, 9 miles S. E. of Llano, shows copper-ring veins in granite.

Development: by shafts of 50′ and 410′, and a 195′ crosscut tunnel.

Equipment: includes a 40-h. p. boiler and 8x10″ hoist good for 1,000′ th. Idle since 1910, but company has no bonded indebtedness, pays all taxes expects to resume work as soon as peace is restored in Mexico.

RMAN CONSOLIDATED COPPER CO. **SONORA**

Mine near Arizpe, Sonora, Mex. Joseph Backus, of Virginia, Minn., pres., orted to have taken over the property for an indebtedness of $50,000 in 1916, to be planning organization of new company.

Inc. 1906. **Cap.**, $500,000, increased to $750,000; shares $2.50 par. Held to lands through Compania de Oro y Plata, S. A., inc. in Mexico.

Property: 351 pertenencias, 877 acres, in 9 groups, in the vicinity of the razzini and Chispas mines, show several strong silver veins, with 1,911′ of kings. The Carman and Don Placidio groups have dumps carrying about 0 tons of ore, claimed to average 4.65% copper, 62.2 oz. silver and 0.21 oz. l per ton. Shipments to El Paso smelter have given returns ranging from 98 to $4,575 per ton.

RMEN SYNDICATE **SONORA**

Subsidiary of Proprietary Mines Co. of America, in Guanajuato, Mexico.

Office: D. C. Catlin, 60 Broadway, New York. Original members of dicate were D. C. Catlin, E. B. Kirby, C. E. Knox, and G. W. Cannon, who cribed $19,000 to take up property.

The Proprietary Mines Co. issued $35,000 two-year, 7% notes due May 25, , convertible into shares of a company to be organized if the Carmen prop-is purchased, on the basis of $8 par value for each dollar of notes sub-ed. The privilege of conversion may be exercised up to April 10, 1921. l of new corporation will be $1,500,000.

Property: 136 acres, includes the Carmen, Chonita, Carmen Anexas, and Angeles mines in the Arizpe district, Sonora, 58 miles by road from Cananea , thence 15 to 18 miles to the mine; or 32 miles from Nacozari. Cost of rom Nacozari is $7 to $8 per ton. Examined by N. H. Burley, H. V. W. Royer, and Sill & Sill.

main vein, 15 to 24′ wide, outcropping for a length of contact between andesite and rhyolite or latite; other veins

Development: mainly by tunnels, one of 1,200′ with 2 shallow shafts and a total of about 3 miles of workings. These workings are not sufficient to block out any large amount of ore, but show that the property has merit.

Equipment: includes 100-h. p. steam plant, a 6-drill compressor and all necessary mine buildings and houses for employes.

A small smelter has crushers and rolls, a 75-ton calcining furnace and two 50-ton reverberatory furnaces, burning wood. Smelting plant inadequate and poorly adapted for the ore. Idle, pending restoration of peace in Mexico.

CONSOLIDATED SONORA MINES CO. SONORA

Address: C. P. Shaver, sec., care Bank of Thibodaux, Thibodaux, La., who says nothing has been done at the mine near Fronteras since 1914. See Vol. XIII.

COPETE CONSOLIDATED COPPER CO. SONORA

Office: 15 William St., New York.

Officers: Wm. T. Read, pres.; F. C. Hanford, v. p.; Myra B. Martin, sec.-treas., with Ralph Melczer and John C. Morrow, directors.

Inc. March, 1906, in West Virginia. **Cap.**, $1,000,000; shares $1 par, non-assessable; issued 549,170½ shares. Annual meeting, first Wednesday in March.

The company was organized to develop the property owned by the Melczer Mining Co., legalized in Mexico, the entire stock issue of which is held by the Copete Consolidated Copper Co.

Property: 70 pertenencias, comprising the Last Chance, Copetito, Jalisco, Santiago, and El Copete claims, about 173 acres, at El Copete, Sonora, show an immense gossan capping, apparently the remnant of a great blanket vein, the greater part of which has been eroded away.

Development: by several tunnels and a 615′ shaft with about 7,000′ of workings. Ores are mainly low-grade copper with considerable iron pyrite, gold and silver, giving average assay value of $6 per ton. The bottom of the ore zone seems to have been reached at about 300′.

It is believed that those in control of the company will use every effort to bring the enterprise to a successful issue and the past may be considered a closed chapter. Those interested in the history of the company will find it given in Vols. X and XI, The Copper Handbook.

Idle on account of the revolution.

COPETE MINING CO. SONORA

Office: 15 William St., New York. Myra B. Martin, sec.

Inc. 1900, in West Virginia. **Cap.**, $5,000,000; shares $5 par. Owned stock of the Melczer Mining Co., transferred, 1906, to Copete Consolidated Copper Co., which see.

CUBANA CONSOLIDATED COPPER CO. SONORA

Mine near Arizpe, Sonora, Mexico.

Inc. Jan. 6, 1903, in Arizona. **Cap.**, $500,000; shares $1 par.

Lands: 244 hectares, bought for $20,000; show 6 orebodies, of 4′ to 30′ width, of which 3 carry estimated values of 12% copper, 10 oz. silver and ¾ oz. gold per ton.

Development: 6 shafts, deepest 102′, and a number of tunnels, longest 250′ and 575′, with a total of 1,415′ of underground openings. Mine is about 3 miles from Cananea. Sample carload smelter shipments returned 23% copper with fair gold and silver values. Property considered promising, but idle at last accounts.

DEMOCRATA CANANEA SONORA COPPER CO. SONORA

Office: Fourth National Bank Bldg., Cincinnati, Ohio. Mine at Cananea, Sonora, Mexico.

Officers: H. [illegible] Hoffman, pres.; C. E. Hoffman, v. p. and gen. mgr.; Herbert H. Ho[illegible]; H. W. Santen, sec., with R. C. Swing, directors.

Inc. May [illegible] Arizona. **Cap.**, $3,000,000; shares $10 par; issued $2[illegible]70. C[illegible] registrar. Annual meeting, last Tuesday in M[illegible]. [illegible] lying between the Copete and Ve[illegible] Co., [illegible] mines. Orebody is of contact m[illegible]

norphic origin, consisting of a breccia of fragments of altered limestone, cemented y quartz, bornite and copper pyrite, in a fracture zone 50′ wide in limestone. The orebody lies about 300′ north of the Democrata shaft and also outcrops in patches of garnet rock surrounded by diorite porphyry, good carbonates being ined at the surface.

Development: comprises a 700′ shaft and 1,600′ tunnel, with 5 miles of orkings. On the 500′ level, the known orebody proved to be larger than previously estimated and the stopes yielded 5% ore. The East orebody near the Kirk mine, developed by tunnel workings, has also materially increased the proven re reserves. Average assays at present are 3½% copper and 1.5 oz. silver per on.

Equipment: includes electrically-operated hoists and air-compressor. melter contains 3 blast-furnaces of 250 and 300 tons daily capacity. A converter nd electric power plant were completed in November, 1917.

When in full operation company employs 600 men.

Production: in 1916, 8,950,000 lb. copper; 306,000 oz. silver; 1,265 oz. old; and from November 1, 1917, to December 31, 1918, a total of 15,221,504 lb. f copper, 8,877 oz. of silver, and 334 oz. of gold.

Operations have been intermittent due to the revolution. Work was resumed 1915, and continued until March, 1919; there was a suspension until October, hen one furnace was blown-in and 300 men employed. Property is a valuable ne.

OLORES MINING & DEVELOPMENT CO. **SONORA**

Dead. Described in Vol. XIII. See Empire Mining Co.

ULUTH-MOCTEZUMA MINING CO. **SONORA**

Inactive. **Office:** Room 610 Lonsdale Bldg., Duluth, Minn.

Officers: Geo. H. Crosby, pres.; Cassius Bagley, v. p.; A. O. Rabideau, c.; all of Duluth.

Inc. 1909, in Minnesota. **Cap.,** $500,000; shares $10 par; $300,000 issued. exican holdings forfeited on account of excessive taxes. Minnesota iron lease ld for enough to clear up indebtedness on same.

ULUTH-SONORA COPPER CO. **SONORA**

Address: 602 Palladio Bldg., Duluth, Minn. Mine near Cananea, Sonora, exico.

Officers: B. Silberstein, vice-president, preceding with W. D. Under-ll, sec.. Theron H. Hawkes., treas, with Geo. M. Tallant and A. F. orton, directors. P. C. Probert, mine and smelter supt. and purch. agt.

Property: about 3,621 acres, embracing a part of the former holdings the Calumet & Sonora Co., and the South Cananea, or Mitchell property. The tter shows a strong vein with wide silicious outcrop and has been developed a 400′ shaft and some underground work, but an examination of dumps fails show ore. Norton shaft, one-fourth mile distant, said to be 293′ deep and to ow good ore. Remainder of property considered of questionable value. Idle ice 1910. Is a prospect only.

ASTERN CANANEA DEVELOPMENT CO. **SONORA**

Mine about 18 miles N. E. of Cananea, Sonora, Mexico. John Martin, supt., last accounts.

Property: said to show copper sulphide ore, is developed by shaft, held der lease and bond from M. L. Fay, of Duluth, Minn., who controls the Fay anea Copper Co., the owner of the mine through the Cananea Eastern Mining ., S. A., a Mexican corporation. No returns secured, and idle for years.

ANARIO COPPER CO. **SONORA**

Owned by Canario Copper Co., which see.

Address: Nacozari, Sonora, Mexico; and Room 23 First National Bank Douglas, Arizona.

Management: James P. Harvey, res. mgr.; S. H. Pyle, supt.; C. H. engr.; John H. Banks, cons. engr.

Includes El Canario mine, 15 miles east; and the Lillie and mines, 3 miles west of Nacozari, Sonora. El Canario adjoins

La Caridad of the Moctezuma Copper Co. Geologic report of the Lillie made by C. H. Dunning, gives but little data on which to base an opinion.

El Canario ores carry enargite, and run from 2 to 18% copper, with some silver. The property is crossed by the El Caridad vein and two east-west cross-veins. An 800′ tunnel, whose face is 500′ below outcrop, has not yet cut the intersection of veins as planned. Work temporarily discontinued to carry on development of the Lillie mine near Nacozari.

The Lillie Mine has a vein from 40 to 60′ wide, which consists of a replacement of limestone between quartzite, intersected and parallelel by andesite porphyry dikes. The vein outcrops boldly for several thousand feet.

Development is by tunnels; No. 3 will gain a vertical depth of 600′, and is expected to enter the ore-zone 500 to 600′ from the portal, and 500′ under the large high-grade ore stope above in the No. 1 tunnel. Thirty-three cars of high-grade ore have been shipped to the Copper Queen smelter at Douglas, Arizona, from surface workings.

The Lillie Segunda mine joins the Lillie mine on the south. The geologic conditions are said to be similar to that of the Pilares mine in the same district, owned by the Moctezuma Copper Co. The main 250′ shaft on the north end of the orebody, encountered sulphide ore at a depth of 20′ and extending to a depth of 100′, where the foot-wall zone was encountered. The ore averaged 2.25% copper with 1.75 oz. silver per ton. The 100′ crosscut shows ore for 110′ and was extended to intercept another ore-shoot. The 250′ level encountered commercial ore at a point 310′ from the shaft. By January, 1920, the heading had averaged 4½% copper and 2 oz. silver.

Equipment: the main shaft is equipped with 60-h. p. hoist and compressor, capable of furnishing about 1,300 cu. ft. of air per minute. An air pipe line has also been extended to the Lillie No. 3 tunnel.

The Lillie and Lillie Segunda mines embrace 278 pertenencias. A tunnel-site has been located on the east side of Lillie Segunda mountain, where an air-compressor and other machinery will be installed to drive a 3,000′ tunnel to crosscut the Segunda orebody 700′ below the surface. The tunnel-site is 1½ miles from Nacozari. Recent development is said to be highly favorable, and it looks as if the Lillie Segunda would make up for the disappointing results in other properties owned by this company.

ELENITA DEVELOPMENT CO. SONORA

Office: Room 3300, 120 Broadway, New York.

Officers: Henry B. Paull, pres.; Thomas H. Collins, v. p.; Frederic J. Kennedy, sec.-treas., with Thomas F. Cole, and John F. Bankerd, directors.

Inc. March 15, 1907, in Arizona. **Cap.,** authorized 40,000 shares, par $10, $400,000; issued 6,000 shares at $10; 21,310 shares at $9 paid in; part paid stock subject to final call of $1 per share; in treasury 12,690 shares.

Property: Bonanza de Cobre mining claim, 182 pertenencias, approximately 450 acres at Cananea, Sonora, Mexico. Title to property held by the Lomita Mining Company, S. A., a Mexican corporation.

EL GLOBO MINING & MILLING CO. SONORA

Probably dead. Mine near Nacozari, Sonora, Mexico. See Vol. XIII.

EL PROGRESO SILVER CO. SONORA

Offices; 4108 Dupont Bldg., Wilmington, Dela.; and Box 744 Nogales, Arizona.

Officers: E. D. Dier, pres.; Andrew Macfarlane, v. p.-gen. mgr.; Maurice Brooke, sec.-treas., with E. W. Wilson, and T. M. Johnson, directors.

Inc. in Delaware. **Cap.,** $2,000,000: $1 par; non-assessable; 1,000,000 outstanding.

Company owns entire capital of Compañia de Plata El Progreso, a Mexican corporation, which see.

El Progresso, Compania de Plata.

Subsidiary of El Progresso Silver Co., which see for address and officers.

Staff: Andrew Marfarlane, gen. mgr.; W. C. Laughlin, cons. met.

C. Shotwell, cons. min. eng.; Jackson Elliott, mill supt.; E. E. Noon, mine ot.; J. V. Macfarlane, engr.; John Logan, assayer; A. C. Burnett, accountant.

Property: the Progreso-Colorada mine of 28 acres, opened in 1895, and jacent ground acquired in 1919, in the central part of Sonora, near junction of : Yaqui and Sonora rivers, and 160 miles S. of the international boundary. arest town is Suaqui de Batuc. Nearest rail is Verde, on the Mina Prietas e, a narrow-gauge road joining the Southern Pacific at Torres. In 1919 a mile wagon-road was built to connect with the Moctezuma-Lampazos wagon- id, giving a direct route to Nacozari, 110 miles distant. Economic condi- ns in the district are generally favorable. Shallow workings on the vein have lded silver worth $1,500,000. Mine examined by W. A. Farish, James Mac- lane, W. C. Laughlin, and Walter Harvey Weed (May, 1919).

Geology: the district shows uptilted limestones and overlying tuff beds, by intrusive igneous rocks and by andesites; the fissure veins are in the rusives. At Progreso-Colorada, the country rock is quartz-diorite. The k north of the Progreso vein is a porphyritic andesite, badly altered by vein- ming agencies, and impregnated with magnetite, pyrite and chalcopyrite. merous well-mineralized fissure veins, characterized by banded quartz, cut se two rocks, and carry shoots of rich silver-gold ore. Five nearly parallel ns which occur in a zone 500′ wide, are of the typical silver-gold type, run and W., and dip N. Only two, the Progreso and Colorada veins, 200′ apart l parallel, have been mined, but all five can be developed and mined from the v shaft now being sunk, and all five may be expected to show ore to depths 500 to 1,000′.

Progreso vein is developed to depth of 300′ by 2 shafts developing the vein a length of 500′ or more. The ore shoot is from 7.8 to 13′ wide in the old pes, and is continuous for a length of 500′ on the 215′ level.

Reserves, above 215′ level total 21,800 tons, averaging 33 oz. silver and gold per ton. There is also about 10,000 tons of indicated ore in the mine, l 5,100 tons of $26.25 ore on dumps.

The **Colorada** vein has been opened to a depth of 130′ and a length ng its outcrop of 355′. On the 130′ level continuous ore is exposed for a gth of 147′. Samples cut for a length of 100′ along this level averaged 6′ le and assayed 24.5 oz. silver and $1.60 gold. Reserves in Colorada mine, as March, 1919, are 5,00 tons of $25.25 ore, plus 2,600 tons on dumps containing 17 oz. silver and $2.75 gold per ton.

Old Colorada and San Jose veins also show very promising outcrops opened shallow shafts.

The new 500′ shaft now being sunk will have levels at 100′ intervals, begin- g at 200′. New work late in 1919 cut ore 9′ wide, that assayed $15 to $45 ton. The San Fernando vein south of the main shaft, was opened in 1919 a 30′ shaft in $22 ore.

Equipment: is complete for an output of 300 tons per day, including 80-). hoist, 8-drill compressor, sinking pump, 10 machine-drills, and 100-ton mill sisting of stamps, tube-mill, concentrates, and cyanide plant, to be enlarged 00 tons.

The mill started in October, 1919, and has treated dump ore from El Pro- so averaging $26.66 per ton. Profits are expected by manager to be over 00 daily when the mill is fully equipped.

Progreso-Colorada is considered a promising young mine, containing a d tonnage of high-grade ore and a mill in which to treat it.

TRIUNFO CONSOLIDATED MINING CO. **SONORA**

Mine office: Bacoachi, Arizpe, Sonora, Mexico.

Officers: at last accounts, A. C. Chalot, pres. and gen. mgr.; Dr. S. vton Leo., v. p.; A. L. King, treas.; preceding, with T. B. Johnstone, Albert neman, Julius G. Miller, Henry Stern, Wm. H. Freystadt, I. Neuberger, A. Wand, D. Powdermaker, Dr. Moritz Gross, Adolph Oltmann and John H. wn, directors; John Martin, supt.

Inc., in Arizona. **Cap.**, $2,000,000; shares $1 par. Property is held ugh a Mexican corporation with capital of 10,000 pesos, shares 100 pesos

par, entire stock issue of which is owned by El Triunfo. Annual meeting first Monday in October.

Property: 136 acres, in 12 different groups, principal property, about 4 miles from the Picacho mines, about 8 miles S. W. of Bacoachi, 2 miles from the Sonora river and about 75 miles by wagon road from Cananea. Lands carry 5 veins 2′ to 5′ wide, said to be traceable 2 miles, and to carry azurite, malachite, bornite, chalcopyrite and chrysocolla, all silicious, and occasional native silver, with a claimed average value of 5% copper, 25 to 600 oz. silver and $3 gold per ton.

Development: about 7,000′ of workings, main shaft 400′ deep, connecting with a tunnel for extraction.

Equipment: includes a 90-h. p. steam plant at the mine, small sawmill, 50-ton reverberatory furnace and 26 buildings. Wells provide water for boilers and potable use.

A 50-ton mill has a 25-h. p. steam engine and 4 Behrend tables, with a 3-inch pipe-line to the Sonora river, where there is a small pumping station.

Company paid a dividend of 1% in August, 1911. During 1912, company operated its smelter (reverberatory), shipping matte to El Paso, running $25 per ton.

Transportation facilities are poor, nearest railroad station being at Cos[illegible] miles distant by mule trail.

Closed down since 1913 on account of unsettled political conditions and insecurity of property rights during revolution.

EL VAN COPPER CO., S. A. SONORA

Mine near Nacozari, Sonora, Mexico. Not operated for several years; several claims forfeited to government for non-payment of taxes.

EMPIRE MINING CO. SONORA

Mine address: care Ben Bound, supt., Cananea, Sonora, Mexico. [illegible] Mexican holding company of the **Dolores Mining Development Co.**

Property: the Major Domo copper mine, 85 hectares, a few miles [illegible] Cananea. A 200′ shaft shows a N. E.-S. W. vein, 2½′ to 3′ wide. Company also owns the Dolores, Empire, Bonanza, Spanish, Golden Cross and Providencia, silver-gold properties, 65 hectares, in the Magdalena district, Sonora, Mexico. Planned erecting a 3-unit Pittman mill at the Golden Cross property, 14 miles S. W. of Cananea. No recent reports received: presumably idle.

ESMERALDA COPPER CO. SONORA

Has no representative at former mine office: Llano, Magdalena, Sonora, Mexico. F. C. Emery, pres.; W. D. Fredericks, mgr., at last accounts.

Property: 88 hectares, has about 300′ of workings, showing copper with silver said to increase at depth. Presumably idle.

ESQUER y CIA; ALEXANDER SONORA

Mine at Baroyeca, Alamos, Sonora, Mexico. J. J. Esquer, mgr., at last accounts.

Property: the Mexicana, Esperanza and other mines, developed by shafts and tunnels, carries auriferous and argentiferous copper ores; idle for years.

FAY-CANANEA COPPER CO. SONORA

Probably dead. Last address: 2105 East Superior St., Duluth, Minn. Mine near Cananea, Sonora, Mexico. Described in Vol. XII.

GARRETSON-SAHUARIPA CO. SONORA

Probably dead. Mine at Calera, Sahuaripa, Sonora, Mexico. [illegible] Farnsworth, pres.; Laurens Enos, v. p.; W. H. H. Davenport, sec.; [illegible] Sherman, treas.; John A. Moore, supt., at last accounts.

Inc. 1903, in Arizona. Cap., $600,000; shares $100 par; non-assessable; issued, $450,000.

Property: 96 hectares, and 14,000 acres of surface rights, about 30 miles S. E. of Sahuaripa, includes La Calera mine, having 6 orebodies in development, of 3′ to 6′ width, estimated by company to average [illegible]

oz. silver and $14 gold per ton, which is interesting, if true. Mine has ut 1,200' of workings.

The smelter, 1 mile from the mine, has a 50-ton 29"x48" Garretson itic blast furnace. Idle for years awaiting construction of the Sonora ntral railway from Tonichi, which has been surveyed to pass through s property.

EENE CANANEA COPPER CO. **SONORA**

Office: 42 Broadway, New York.

Officers: W. D. Thornton, pres.; Cornelius F. Kelley, v. p.; Jos. W. en, sec.-treas.; E. J. Dudley, asst. sec.; W. S. Harper, asst. treas.; H. B. ill. aud.; Robert M. Raymond, Cornelius F. Kelley, Walter Douglas, W. Thornton, Wm. E. Corey, John D. Ryan, Jos. B. Cotton, Jos. W. Harri- n and L. D. Ricketts, directors.

Inc. Dec. 26, 1906, in Minnesota. **Cap.**, $60,000,000; shares $100 par; ed $50,000,000. The New York Trust Co. and Old Colony Trust Co., ton, transfer agents; Bankers Trust Co., New York, and State Street st Co., Boston, registrars. Shares listed on the New York and Boston k Exchanges.

The Greene Cananea owns practically entire stock issue of Cananea sol. Copper Co., the operating company which holds title to the Mexi- properties. The steps by which this result was reached are given in XIII.

Balance Sheet, years ending December 31, for Greene Cananea and sub- ries:

Assets.

	Mines, railways, buildings, equipment	Current	Total
.....	$50,992,008	$8,032,608	$59,024,625
.....	50,787,446	8,405,579	59,193,025

Liabilities.

	Capital	Reserves	Current	Surplus	Total
....	$50,000,000	$636,352	$905,001	$7,483,272	$59,024,625
...	50,000,000	251,990	892,384	8,048,652	59,193,025

Income Account.

	Sales of Metals etc.	Net Charges	Depreciation	Net Balance	Total Surplus	Dividends	Final Surplus
..	$10,801,766	$6,916,251	$528,734	$3,484,620	$11,483,272	$4,000,000	$7,483,272
..	9,392,689	6,623,137	350,455	2,497,888	12,002,867	3,954,215	8,048,652

ividends:

	Rate	Par Value Shares	Amount
(February)	$1.50	$100	$750,000
.....	8.00	100	4,000,000
.....	7.90	100	3,954,215
.....	7.00	100	3,418,947
.....	....	100	.....
.....	2.00	100	972,645
.....	1.25	100	1,093,143
.....	0.75	20	1,819,877

ne since.

rty: mineral lands held under title from the Mexican government 14,062 hectares, or approximately 34,738 acres. The surface lands the company comprise 130,414 hectares, or approximately 322,123 of the mines, works, offices, warehouses, stores, etc., of the ocated on its own land and in addition the company owns properties in Cananea, which are occupied by its local

y of 16,000 inhabitants, located 40 miles south

of the international boundary line, on a branch railway of the Southern Pacific lines of Mexico.

Geology: the producing mines of the company are situated in the Cananea mountains, which rise from the headwater valleys of the San Pedro and Sonora rivers in northern Sonora. The mines are distributed along a mineral belt, or series of belts, about 6 miles long, in a N. W.-S. E. direction, and about 2 miles wide. The oldest rock is pre-Cambrian granite, which is overlaid by Cambrian quartzite, in turn overlaid by Cambrian limestone. Breaking through these rocks, and covering much of the mineral belt, is a series of eruptives of Tertiary age, in which 12 different rocks may be recognized, one, a bedded tuff, the others massive. Three main classes of ore deposits may be recognized: (1) Deposits containing secondary chalcocite together with iron pyrite either massive or disseminated along shear zones in diorite porphyry; (2) Contact deposits containing chalcopyrite associated with iron pyrites and some zinc blende in a matrix of altered limestone; (3) Disseminated chalcopyrite associated with zinc blende in a diorite porphyry breccia.

The great mines of Cananea are the **Veta Grande, Oversight** and **Capote,** which have had large bodies of high-grade ore and now have large bodies of direct smelting ore and also contain great deposits of concentrating bodies. This ore contains copper as chalcocite, disseminated through diorite porphyry in broad shear zones.

The Capote mine differs from the Veta Grande and Oversight in that the ore occurs not only disseminated in diorite porphyry but also in the underlying granite. There are 3 principal ore shoots connected by continuous ore on the various levels. The ore in the upper levels is chiefly chalcocite, but the new shoot consists of massive pyrite with primary chalcopyrite and bornite in granite. This mine has attained a depth of over 1,050', and has ore on each level from the 1st to the 10th. The Capote mine yields both concentrating and direct smelting ores. A new 5-compartment shaft was completed to the 12th level in 1916, to provide an outlet for the new orebody on the lower levels, and has been completely equipped. The pumping stations at Capote No. 15 shaft were completed in 1917 and 1918, while No. 16 was equipped with a hoist, ore-pockets, and stations in 1919.

The **Cobre Grande** mine, the original mine of the Cananea Consolidated Copper Co., has been idle for some years, save to supply converter lining. The ore occurred in a wide vein traversing both altered limestones and igneous rocks.

The **Kirk** mine is situated in an extensive area of highly-altered limestone capped with diorite porphyry and cut by small, irregular dikes and intrusions of the same material. The ore is not adapted to concentration and it is necessary to hand-pick it as mined. The sorted ore carries a desirable high percentage of lime and iron.

The **Chivatera** has a large body of oxidized ore containing about 2% copper, but averages 12 to 15 oz. silver and some gold. As the orebody now stands it contains several years' reserves on the basis of 150 to 200 tons daily production, and there is a considerable territory lying ahead of present exploration that gives promise of important development.

The **Sierra de Cobre** property was acquired by purchase from the Phelps-Dodge interests several years ago, and since its acquisition has proved to be one of the largest and most profitable productive mines.

The ore from this mine occurs in limestone. Fissures extending out from the Eureka fault have acted as channels for mineralizing solutions, making ore along the veins and for a considerable distance into the walls, replacing the limestone by pyrite and chalcopyrite along the bedding planes. There appear to be notable bodies of heavy sulphides on and below the level of the Combination tunnel and these sulphides have been developed with very satisfactory results. The Sierra de Cobre property also has an

ctensive area of undeveloped ground lying in the limestone areas, along hich smelting ore has been found in the Kirk mine and elsewhere.

The **Elisa** mine contains a number of lenses of ore lying approximately ırallel to a nearly vertical fault between limestone and the diorite porhyry. These lenses occur in the limestone at the fault and back of it ır a distance of 150', along a zone some 1,500' in length. The ore consts of a garnet matrix containing chalcopyrite and iron pyrite. It is a esirable ore for the smelter, being more than self-fluxing, containing about)% of lime in addition to the iron. Recent developments in the Elisa ine have been satisfactory and a large amount of first-class ore has been ɔened up on the deeper levels. The ore from this mine is now delivered rough the Combination tunnel to bins at the Capote mine.

The **Henrietta** is a small mine whose ore occurs on a contact between orite porphyry and quartz porphyry. The orebodies are not large and e ore is silicious. New development work in the vicinity of Henrietta ıs not yet shown workable orebodies.

The **Puertecitos** mine and the town of that name are located at the . W. end of the mineral belt and at the terminus of the narrow-gauge ilroad of the company. The Puertecitos ore deposit has a great outop of limestone altered by igneous contact metamorphic action to lime-iron-ırnet rock and containing carbonates of copper and some chalcopyrite ıd bornite. Large areas of this outcrop contain enough copper to warnt mining, which is carried on by means of large quarries. The ore as ined is not sufficiently rich to be sent direct to the smelter, but has to broken and hand-sorted, yielding about 4 tons of waste material to each ɔn of ore.

During 1917 an important development was made near the Campaña ıaft, in a hitherto unproductive zone of large extent. Orebins were cometed, and in 1918 a 3,000 cu. ft. compressor was installed.

The **Elenita** mine, one of the earliest producers of the camp, located ıuthwest of Puertecitos, has been reopened with a view to again putting in the producing class. The ore from the mine is similar to that of ıertecitos.

The **Cananea Duluth** mine has an orebody about 1,200' long with a aximum width of 200'. This orebody is a neck of diorite intruded in ıdded tuffs. The intrusion is shattered, altered and for 200' to 300' below e surface is impregnated throughout with pyrite and copper minerals. n the 600', the lowest level, the central portion is not commercial; the lues being concentrated around the border of this long canoe-shaped oreɔdy. The ore carries good silver and gold values, with about 2% copper. ractically all of the product of this mine is concentrated before smelting. ıe shaft is being sunk below 600'.

The **American** mine, idle since 1907, produced only such ore as was ɔtained through development work. Not fully developed, though there e sufficient indications of ore occurrences to warrant a resumption of velopment operations. Mine has a 3-compartment shaft to the 100' level d ore bins of 900 tons capacity.

Development: total development work since the organization of the mpany, December, 1906, to 1918, is 100 miles, which does not include 53 iles done under previous management. Development work done in 1918 ıounted to 13⅛ miles, compared with 5 miles in 1917, 11 in 1916 and 1½ 1915. Development of new ore has kept pace with that extracted.

Equipment: power is delivered from a central power plant at the ıelter, and electrical power is used exclusively except for the steam pumpg plant at Ojo de Agua. The power house, also containing the boiler ant, has three 1,500 k. w. and one 3,000 k. w. horizontal Curtis turbines, livering current to the switchboard at 2,300 volts. Electrical energy is ansmitted to various parts of the property at from 2,300 to 11,000 volts. ıe furnace blast is supplied by 7 Curtis engines and 1 piston blower, havg a combined capacity of 176,000 cu. ft. of free air per minute. The blast

is conveyed to the furnace through a pipe 6' in diameter. Converter blast is supplied by 5 blowing engines having a total piston displacement of 55,000 cu. ft. of free air per minute, and is conveyed to the converters through two 30" pipes. In the power house there is also one 6,000-cu. ft. capacity compound condensing air compressor, furnishing air to the mines for drilling and other purposes; also one 1,200-cu. ft. compressor, used to furnish air for ramming converter lining and for sundry pneumatic tools around the works. Condenser water is cooled in a spray-pond.

There are 16 boilers, with a total capacity of 6,034 b. h. p. Crude oil, imported free from the United States, under a Federal concession, is used as fuel. The waste-heat boiler plant nearby consists of 7 Stirling water-tube boilers having a combined nominal capacity of 2,700 b. h. p., heated by the waste gases of 2 reverberatory furnaces. In connection with the waste-heat plant there is a battery of 4 Green economizers, consisting of 288 tubes each. All boilers are equipped with Foster superheaters. The feed water is carefully measured after a simple treatment for the removal of scale-forming material, and is fed to the boilers by means of electrically-operated plunger pumps. The power house is equipped with 2 condensing current barometric condensers, each having a separate water pump and separate dry air-pump. All engines are operated condensing except those whose exhaust is used in heaters.

At the Sierra de Cobre mine, in the Capote basin, there is an Ingersoll-Rand air-compressor having a capacity of 2,500 cu. ft. of free air per minute, which is directly connected to a 2,300-volt A. C. motor. This machine is used to boost the pressure in the mains in the outlying districts. There is also a 3,000-cu. ft. machine erected in 1918. Fuel oil is stored in 3 steel tanks with a capacity of 10,000 bbl. each.

The main shops near the smelter include a 200-ton hydraulic press, milling machine, 1,500-lb. steam hammer, foundry, pattern and electric shops.

Water supply: the principal supply of the company comes from the Ojo de Agua, 9 miles from the town, where a pumping plant, with water-tube boilers, using crude oil as fuel, runs a Reidler high-duty compound condensing engine delivering 1,500,000 gal. of water per day against a pressure of 967'. A 10" main connects the pumping plant with a 600,000 gal. tank on a hill near the concentrators. The Ojo de Agua supply is used exclusively for domestic purposes and for feed water for the boilers and is delivered under substantial working pressure. A very well equipped fire department with a complete system of mains to pressure tanks, is maintained. Water from the mines is delivered to the concentrator through wooden pipes and is there used in milling operations.

Reduction works: the concentrating department has a capacity of [illegible] tons per day, including a crushing plant, sampling mill, gravity and flotation plant.

The crushing plant has storage bins holding 2,000 tons, ore from the mines being delivered in Ingoldsby side-dump cars of 30 tons capacity each. From the storage bins ore is fed to a 30" conveying belt by automatic feeder. This belt delivers the ore to 2 grizzlies, inclined at 48° with openings. The screened ore falls on an 18" conveyor, transferring to a 24" conveyor, taking it to the mill bins of 4,800 tons capacity.

The oversize from the grizzly goes to two 36" picking belts, where first-class ore and also pieces of wood and steel are sorted out. The ore left on belt is then delivered to crushing bins and fed by automatic plates to feed to five 10x20" Blake crushers of the Cananea type, which reduce the ore to 1½" size. This crushed ore passes to 16x36" rolls, breaking to pieces which pass a 2-inch ring. This product is delivered to a 24" conveyor which delivers to the mill bins, together with the grizzly undersize. The crushing plant is electrically driven and has a capacity of 2,000 tons per 24 hours. An automatic sampler at the head of the 24" conveyor cuts out

ieth of the total ore, which is ground and automatically cut to sample. rejects drops to elevator and return by conveyor to mill bins.

Ore from the 4,800-ton storage bins is fed by automatic feeders into h section. Concentration begins on all material finer than 2" ring. The rse of the ore is as follows:

The ore is delivered to two ⅝" trommels, the undersize passing to two trommels. The undersize of the latter goes to two 3/16" trommels and undersize from these to four 2 mm. trommels. The various coarse sizes n screenings are passed to Hartz jigs, and all tailings from jigs coarser ı ⅜" ring are passed through rolls, elevated and returned to screen, so no material coarser than ⅜" goes to the Hardinge mills. The coarser erial is concentrated on 20 concrete Hartz jigs in each section. The ailings finer than ⅜" pass to 3 Hardinge mills and are ground to about n. The discharge from the Hardinge mills is deslimed in a drag-belt sifier, the coarser sands are classified, the resulting product being ted on 30 tables. The fine sands and slimes are treated on 36 vanners. ings from tables and vanners are settled out and sent to the slime plant further treatment. The mills are 8′ by 28", and are driven by 150-h. p. s-Chalmers motors.

The tailings, containing a gross value of nearly $2 per ton in copper, r, and gold, are impounded in a dam, the slime settling. The clear r is pumped back for re-use in the mills but is first passed through ipitating tanks, where the dissolved copper is precipitated and recov-. Concentrates are delivered in narrow-gauge cars to the spreading

All ores, concentrates, fluxes and secondaries for blast-furnace treat-t are weighed and delivered to the main receiving bins by the com-'s narrow-gauge railroad. The bin system consists of 11 wooden and el bins, having a combined capacity of about 3,000 tons. From the ving bins all material is discharged on a conveyor belt which passes ugh the sample mill on its way to the ore-bedding plant, described by e in "Min. and Sci. Press" of November 8, 1919. In the sample mill ore is crushed to about 4" through a 24x36" Farrel crusher. One-tenth he ore stream is cut out and passes through a 10x20" crusher of the inea type; one-tenth of this is cut and passed through a Gates gyratory her, one-fifth is cut and passed through a set of 17x27" rolls, when the sample is cut out, amounting to about one-four-thousandth of the nal material. This final sample is quartered down, dried and prepared he laboratory. The reject from the sample mill is elevated back to the conveyor system. All material is sampled in this manner with the ption of concentrates, which are hand-sampled.

The ore after passing the sampling mill is conveyed to the spreading and distributed evenly over the entire length of the bed by an over-belt which is automatically tripped. The bedding plant is of steel ruction being 453′ long, and 198′ wide, and contains 3 ore beds of t 9,000 tons capacity each. The composition of each bed is known in ace and in this way an even mixture is assured to the furnaces. When l is completed it is reclaimed by a machine which advances into the of the pile and discharges on to a conveyor which delivers the mixed re into bins over the blast furnaces, each bin having a capacity of 75 The reclaiming machine has a capacity of about 175 tons per hour. is dropped by gravity from the 75-ton bins above the furnaces hoppers holding 2,000 lb. There are 5 such hoppers to and these are discharged either directly into the furnace or by means of arc-gates.

furnace contains 8 blast-furnaces, 48x210" at the 10′ 5"x19′ inside of brick lining, each settler overflows continuously into self-dumping slag Trains of 6 to 8 cars are hauled to the dump

by electric locomotives. The matte is tapped from the settlers into 60-t cast-steel ladles and transferred to the converters by electric crane

Gases from the furnaces are discharged into a steel balloon flue, thro through 2 cross-flues and 2 goose-necks into the main brick dust cham From here the gases pass through a flue to another chamber, thence brick-lined steel stack. All flue-dust is drawn from the dust chamb balloon flue into small cars and trammed to the reverberatory fu The coke bins at the west end of the furnace building have a capac about 3,000 tons.

The roaster building contains ten 18' six-hearth McDougal and calciners. There is a special bedding plant for the roasters, consis 4 bins of 500 tons capacity and 2 beds of 3,000 tons each. The mixed charge is reclaimed and delivered by conveyor belts into 60-ton bin and charging into the roasters. The roaster product is hauled by motor in 5-ton cars to the reverberatory furnaces.

The reverberatory plant consists of two 19' 6"x100' oil-fired fu Waste gases fire two 250, three 300, and two 500-h. p. Stirling placed parallel, and then pass through 4 units of Green economizers taining 1,152 tubes, thence through a brick flue 130' long to a stack diameter by 152' in height. Slag is skimmed into 112-cu. ft. elec tilted slag cars and hauled to the dump by electric locomotive. tapped into 66-cu. ft. ladles and hauled to converter buildings in ba from which it is transferred to the converters by electric cranes.

The converter building contains 3 electric cranes of 40, 50, and capacity, 6 electrically-operated stands of the Great Falls type of with 7 basic-lined shells, 12' in diameter, for same.

The copper from the Bessemer converters is poured into the 2 straight-line electrically-operated casting machines, each equip tilting ladles of 66 cu. ft. capacity. Each machine has a chain of casting bars weighing about 260 lb., dumping into molds from wh are removed by drag conveyor to the buillion platforms. The bar then stacked by an air-operated radial crane, picked up on trucks, and loadde into standard-gauge railroad cars. The converter skimmed into ladles, transferred by crane to slag cars, hauled by motor to pits and reclaimed by a 10-ton steam shovel. It is then in narrow-gauge cars to the receiving bins of the main sprocket system.

The converter gases pass through balloon flues of steel con and enter into a steel dust chamber, with a circular arch roof ha radius. The gases then pass to a steel stack 12' in diameter by

The company owns and operates 36 miles of standard and gauge railway, including branches, spurs and sidings. The nar line is double-tracked from the smelter to Capote basin, and has 65, and 70-lb. steel rails. The equipment includes 3 standard-gau narrow-gauge locomotives, all oil burners, and about 140 cars which are 25 and 30-ton steel ore cars. The railway system has connection with the Nogales and Naco branches of the Southern Pa of Mexico, and by this line with the El Paso & Southwestern Naco, Ariz. In 1918 the railway handled 1,838,256 tons of freig

The Cananea Consolidated Copper Co. operates practically public utilities in Cananea. Its Public Service Department water system; an electric light system; a telephone system drops and approximately 450 telephones; and many other utilities. The company's Mercantile Department operates a large department store located near the smelters and 8 branch tered throughout the various camps. The [illegible] include 619 buildings, consisting of rooming houses, [illegible] dences, bunkhouses, etc.

The following table summarizes operations:

ar	Ore Concentrated tons	Cost of Milling	Products Smelted, tons	Cost of Smelting
8.....	289,098	$1.25	902,520	$3.38
7.....	171,202	.....	481,632	2.61

Production: output and earnings since beginning of operations:

r	Tons Mined	Mng. Cost per Ton	% Cu.	Copper, Lb.	Silver, Oz.	Gold, Oz.	Cost per Lb. Cu. Cents	Earnings
)...	.....	.....	.....	42,800,000	1,709,000	.....	.....	.....
....	1,169,998	$3.240	2.420	52,694,781	1,666,998	9,846	15.062	$3,424,620
....	574,582	2.900	2.278	24,711,204	655,656	3,804	17.951	1,497,888
....	1,148,508	2.612	2.258	48,668,881	1,464,808	8,710	11,386	4,908,518
....	285,701	2.498	2.700	16,836,081	685,997	3,778	11.086	1,410,548
....	413,766	3.146	2.201	21,656,920	907,810	4,655	10.724	688,955
....	765,063	2.854	2.868	44,480,513	1,497,988	8,021	9.681	2,844,502
....	1,121,346	2.902	2.146	48,157,847	1,559,996	7,252	10.510	2,580,749
....	945,160	2.855	2.414	44,897,466	1,359,589	5,862	9.488	1,518,478
....	.....	.....	.....	45,771,925	1,187,820	5,488	11.437	459,202
....	.....	.....	.....	44,547,689	938,549	5,887	11.612	544,107
....	.....	.....	.....	18,619,609	447,663	2,879	.....	214,141
...	.....	.....	.....	58,180,856	780,423	6,109	.....	3,220,247
...	.....	.....	.....	247,144,706	8,006,579	13,795	.....	9,870,762

a) To July 31, 1906. (b) August 1, 1906, to December 31, 1907.

First quarter of 1920 yielded 10,000,000 lb. copper and 400,000 oz. silver.

The Cananea Consolidated Copper Co., S. A.

Mines and works: Cananea, Sonora, Mexico. C. E. Mills, pres.; T. as, v. p. and gen. supt.; Geo. Young, sec.-treas.; Casey Stites and W. arper, asst. sec'ys; T. Evans, traffic mgr. and purch. agt.; G. W. Prince, ter supt.; F. J. Strachan, mill supt.

Inc. Sept. 30, 1899, in Mexico. **Cap.,** 20,000 pesos, shares $1 gold par. e stock owned by Greene Cananea Copper Co. the C. C. C. Co. being y the operating company, holding direct title and right to operate roperty, as is necessary under the laws of Mexico.

RRERO MINING CO. SONORA

s the Mexican incorporation of the Victor Mining & Smelting Co., t owns 2 properties in Magdalena district, Sonora, Mexico, 10 miles S. f Cananea. Properties about one-half mile apart, contain 15 and 32 nencias, respectively.

RIS COPPER CO. SONORA

ld its property, El Caridad group, to the Moctezuma Copper Co., of Dodge Corp'n, February, 1916. Company has no assets.

FORD MINING & MILLING CO. SONORA

dress: H. B. Brandenburg, Nogales, Arizona; or Mark Wondless, illo, Sonora.

perty: a silver mine, 34 miles N. W. of Hermosillo.

elopment: by over 3,000' of workings, opening milling and ship-

ment: 20-ton plant using Hardinge mill and a cyanide installation.

SILLO COPPER CO. SONORA

1914 Columbus Savings & Trust Bldg., Columbus, Ohio. Operat-

ce: Aptdo. 98, Hermosillo, Sonora, Mexico.

ficers: J. L. Zimmerman, pres.; C. P. West, v. p.; F. E. Resler, sec.; Whitaker, treas., with A. J. Rushing, R. D. Wood, L. A. Clark, A. W. and E. C. Pixley, directors. R. D. Wood, gen. mgr., and James , supt.

Feb. 13, 1909, in Mexico. **Cap.,** $1,500,000; shares $1 par; non- le; issued $1,047,267. Authorized bond issue, $200,000 of 7% con- gold bonds, amount outstanding $85,860.

perty: about 1,300 acres, with 200 acres of mill and smelter sites, Hermosillo district, about 28 miles N. W. of Hermosillo, consists of , reported to carry porphyry and lime cut by granite. The Picacho

and Verde Grande have contact deposits in limestone, near igneous intrusives, carrying oxidized ore giving assays of 6% copper, 8 oz. silver and $1 gold per ton. La Cobriza group and La Verde have contact deposits between granite and quartzite, of 30′ to 60′ claimed width, traceable 7,000′, carrying auriferous and argentiferous copper ore said to assay 5.5 to 20% copper, with gangue of talcose limestone. Company reports 7 orebodies under development of 10 to 100′ width, averaging 5.44% copper, 8.6 oz. silver, and 75c gold per ton.

Development: by 20 shafts and tunnels with over 7,000′ of workings reported to show over 200,000 tons of ore. Some shipments made carrying 20% copper, 30 oz. silver, and $1.25 gold per ton.

Equipment, includes a 100-ton Allis-Chalmers blast-furnace and several hundred horse-power of boilers, 40-h. p. hoist, 6-drill air-compressor, large churn-drill, 22-h. p. traction engine, boilers, etc. Smelter is 1½ miles from principal workings, consisting of large buildings, assay office, machine and blacksmith shop, 3 large boilers in engine room, coal and ore bins and reservoirs holding thousands of barrels of water, and with an inexhaustible supply of good water.

Company recently installed an oil engine and rock-drills for sinking shafts and crosscutting sulphide orebody.

Management expects to continue development but will not mine ore until the smelter and oil flotation plants are in operation, and the company is in shape to handle its own concentrates.

Company recently acquired a ranch of 25,000 acres lying between the mines and Hermosillo for the timber and agricultural land, and the new road through this tract will shorten the haul to Hermosillo several miles.

INTERNATIONAL COPPER ORE CORPORATION SONORA

Office: 424 Scarrit Bldg., Kansas City, Mo. A. M. Conard, Superior, Ariz., was president at last accounts. **Mine office:** Noria, Sonora, Mex. Is the Mexican operating corporation of the Sonora Copper Smelting Co.

INTERNATIONAL MINES DEVELOPMENT CO. SONORA

Main office: 523 Los Angeles Investment Bldg., Los Angeles, Cal. **Eastern office:** Room 1606, 20 Broad St., New York.

Officers: Max Muller, pres.; P. Schabarium, v. p.; N. S. Hanks, sec.-treas.; above with Augustin Freese, H. J. Wendler, S. A. Joseph and C. F. O'Brien, directors. A. C. Barke, mgr.

Cap., $3,000,000; shares $1 par; $2,400,000 issued. Stock listed on New York Curb.

Property: the Santa Rita, Santa Gertrudis, Santa Ana and El Carmen mines, 160 acres in Sonora, Mexico, about 200 miles from Bisbee. Company also reported to have a 5-year option on the Ash Peak mine at Clifton, Arizona. The Mexican properties have been silver-gold producers in the past, but are undeveloped and owing to revolutionary conditions will probably remain undeveloped for some time to come. Their position aggravated by being in the Yaqui zone. The Santa Rita is an "ancient" or old Spanish mine. It was worked by a 1,500′ open-cut and numerous narrow drifts, etc. The veins contain a number of pockets of rich ore. Seventeen adobe furnaces were kept in blast in the early times. The group of all the Mexican mines of this company, which are close together, is for the treatment of large bodies of milling ore amenable to cyanidation.

JUANITA MINING CO., S. A. SONORA

Office: Sellwood Bldg., Duluth, Minn. **Operating address:** Bisbee, Ariz. **Officers:** Byron M. Pattison, v. p. and mgr.; Lemuel E. Smith, sec.-treas.

Property: about 1,000 hectares, known as the Juanita group, adjoining the Carnegie L. & Z. Co. property, 3 miles N. W. of Cananea, cut by several narrow fissure veins in volcanic tuff beds. These carry small oreshoots with chalcopyrite, galena and sphalerite. No. 1 shaft is 220′ deep and there also is a 75′ shaft. Work suspended since 1910 owing to political disturbances in Mexico. Is an undeveloped prospect.

A COBRIZA DE COBRE. **SONORA**
Address. Rafael Elias, Cananea, Sonora, Mexico.
Property: 14 claims, adjoining Carnegie L. & Z. property on S. E., ows several veins in bedded volcanic tuffs with complex, silicious lead-pper-silver ore. Developed by 200' shaft with short drifts in ore.
A COBRIZA MINING CO. **SONORA**
Described in Volume XIII. Property acquired by Aztec Consolidated ning Co., which see.
A EXPOSICION MINING CO. **SONORA**
No information about this company has been obtained since 1917. See l. XIII.
MPAZOS SILVER MINES CO. **SONORA**
The only data obtainable about this corporation is from George Gra-n Rice's "Industrial and Mining Age."
Office: formerly at 40 Exchange Place, New York; or the Registrar & nsfer Co., 900 Market St., Wilmington, Del.
Officers: at last accounts, W. Barrett Ridgely, pres.; Newhouse Hotel, Lake City, Utah. H. J. Wendler, v. p.-gen. mgr.; I. H. Weinberg, sec.; n C. S. Herzig and J. J. Harper, directors. Judge H. D. Rummel, rleston, W. Va., attorney.
Inc. Jan. 15, 1918, in Delaware. **Cap.,** $3,000,0000; $1 par; 2,000,000 ed.
Property: the Lampazos mine, now owned by Max Muller and Epes dolph, 443 acres, containing 17 mines, 4 of which have been developed. mine is reported to have 200,000 tons of 30-oz. silver ore, blocked out continuous bands of ore for 1,500 to 2,000', that extend down to bottom ine, 750' below surface. A 12-mile wagon-road was constructed.
The Lampazos is a good mine whose name has been clouded by scan-us promotion methods.
NITA MINING CO. **SONORA**
Holding company for the Elenita Development Co., which see.
MINA MEXICO **SONORA**
Address: Potter Palmer, 144 S. Wabash Ave., Chicago, Ill. E. P. Ryan, C. D. Cline, cons. engr.
Property: closed for 4 years owing to the revolution, but reopened in 1920. The workings and machinery are said to be in good condi-A 50-ton flotation plant is to be added. The smelter will not be for the present.
REINA UNION MINING & REDUCTION CO. **SONORA**
Property: near San Javier, Hermosillo, Sonora, Mexico, includes the ores mine, said to show a fissure vein carrying lenses of complex lead-er-sulphide ore with gold and silver.
Development: by shaft, cut a vein that assayed from 15 to 30 grams and 400 grams silver per ton.
Equipment: includes steam and electric power, and an air compressor.
Idle for several years, owing to revolution in Mexico.
GHLIN MINING CO. **SONORA**
Address: W. C. Laughlin, or George Schrotter, San Javier, Sonora, ico.
roperty: Las Animas silver mine at San Javier, leased from the an Mining Co., of Cleveland, Ohio. A leaching plant to handle 50 to ns of ore a day was put in operation early in 1918.
NION CONSOLIDATED COPPER CO. **SONORA**
ddress: C. B. Bell, Douglas, Ariz., owner.
roperty: 660 acres, in Cerro Tordillo section of the Ajo mountains, Fronteras, Sonora, Mexico, shows a 3' to 20' vein traceable a mile, arries high-grade copper, gold, silver, zinc ore in a contact deposit in ear an intrusion of porphyry.
evelopment: by 5,000' of tunnels and shafts to depth of 500'. Ship-of 1,500 tons made 1914, returned 15% copper, 15 oz. silver and 0.1

The property was worked in 1882-'86, acquired by present [illegible] and considerable work done in 1912-'13-'14. C. B. Bell plans [illegible] operations when peace is restored in Mexico.

MOUSE MINING CO. SONORA

Address: H. J. Wendler, mgr.; Buena Vista, Montezuma district, Sonora, and Charleston, W. Va.

Property: a silver mine on which a 50-ton flotation mill was erected in 1917 and a large quantity of silver ore developed to depth of 300'. The company plans construction of a reverberatory matting furnace in 1920.

LUCKY TIGER COMBINATION GOLD MINING CO. SONORA

Office: 1012 Baltimore Ave., Kansas City, Mo. Mine office: Ensenada, Sonora, Mexico.

Officers: J. Z. Miller, Jr., pres.; W. A. Moses, E. D. Fisher, and A. F. Mosier, v. p's.; O. V. Dodge, sec.; H. Vanderslice, treas., with F. D. Winning, asst. treas.; G. M. Smith, W. G. Catron, John Kelley, J. T. Mollenick, L. R. Budrow, gen. mgr., and H. B. Duke, directors; D. J. Haff, counsel; O. E. McMullen, asst. sec. and auditor

Inc. March 16, 1903, in Arizona. Cap., 800,000 shares; $10 par; 715,[illegible] shares issued Annual meeting, third Monday in March. Company owns the entire capital stock of Tigre Mining Co., S. A.

Financial Statement, years ending December 31:

Year	Revenue	Operating Charges	Operating Profit	Dividends	Current Assets	Current Liabilities
1918.	$2,636,810	$1,351,539	$1,251,583	$786,871	$768,363	$208,[illegible]
1917.	.....	.....	.....	422,049	.....	.....
1916.	1,624,817	979,697	645,120	515,042	423,268	169,[illegible]

Dividends, paid since organization of the company:

Year	per Share	Number
1918	$1.10	93-104
1917	.59	86- 92
1916	.72	77- 85
1915	.69	69- 76
1914	1.00	58- 68
1913	.63	46- 57
1912	.47	40- 45
1911	.50	30- 39
1910	.60	18- 29
1909	.10	6- 17
1908	..	1- 5
Total		

Property: the El Tigre mine, 6 claims, 587 acres, at El Tigre, Montezuma district, Sonora, Mexico, contains veins of gold-silver-lead-copper ore cutting through rhyolite. Vein is 25' wide, proved for 4,000' in length, runs N.-S. with average dip of 65°.

Development: by 1,300' incline shaft and 5,000' tunnel, with over 2 miles of workings. Ore is mined mostly by overhand shrinkage, and [illegible] haulage is employed underground. Company also has zinc leases in Oklahoma, and to the end of 1918 had spent $180,558 on their development.

Equipment: includes electric power, 25-h. p. electric hoist, 250-ton central [illegible] mill and cyanide plant. Reported extraction in 1916 was [illegible] concentrates averaging 31 oz. gold, 683 oz. silver, 2.93% copper, [illegible] lead [illegible] being satisfactory; a plant was [illegible] reagents [illegible] consumption and lower costs.

[illegible] tons in 1913; [illegible]

1914 [illegible] $2,638,937. Ore [illegible]

silver [illegible] December 1919, [illegible]

Company has been able to continue operations and shipments more or
s regularly, notwithstanding disturbed conditions in Mexico during the
st years, but it issues no production figures, merely a balance sheet.

ANHATTAN DEVELOPMENT CO. **SONORA**

Owns Arnold Mining Co. property near Santa Cruz, Sonora, Mexico.

ANHATTAN EXPLORATION CO. **SONORA**

Office: 52 Broadway, New York. **Mine:** at Hermosillo, Sonora, Mex.
Officers: John M. Bishop, pres., Washington, D. C.; A. H. McCarthy,
p.; T. Addison Bell, sec.-treas.; with Gen. Jas. S. Clarkston and Wm.
rney, directors.
Inc. Feb. 6, 1909, in Maine. **Cap.**, $2,000,000; shares $100 par; $1,806,000
standing. Company is a close corporation.
Property: several valuable properties near La Dura in the Yaqui River
trict, Central Sonora. Two of the properties, the Promontorios, silver-
d and the Mesita, copper-silver-lead ore, had just reached the shipping
ge when the Mexican revolution stopped all operations, May, 1912. Com-
y expects to resume operations as soon as country is once more safe.

NTO MINE **SONORA**

Address: D. L. Fain, mgr., Carbo, Mexico. J. C. Underwood, pres.
e in 1918 it was reported that this property had been reopened.

RIA MINING CO. **SONORA**

Office: 516 Providence Bldg., Duluth, Minn.
Officers: Joseph Backus, pres., Virginia, Minn.; Jas. A. Butchart, sec.-
s.; with Thos. F. Brady, Martin Trewhella and Thos. A. Armstrong,
ctors.
Cap., $500,000; shares $1 par.
Property: the Carmen mine, in Arizpe mining district, Sonora.
Ore: silver, gold, in veins in andesite and rhyolite.
Development: by shaft; greatest depth 350', with 3,000' of underground
kings. Had been idle 4 years, owing to the revolution, but resumed
k in February, 1917. Rich silver ore was extracted but on account of
dits work was again suspended.

LCZER MINING CO. **SONORA**

See Copete Consolidated Copper Co.

SA RICA GOLD CO. **SONORA**

Address: A. G. Frick, sec., Freeport, Ill.
Inc. 1905, in South Dakota. **Cap.**, $3,000,000; $3 par; 700,000 issued to
Smith, A. F. Tanner, and others of Chicago, the organizers.
Property: 415 acres, 40 miles E. from Sahuaripa, Sonora. About 3,000'
evelopment has been done, mainly on the surface. No work is being
, but taxes are paid and a caretaker is in charge.

XICANA DESSARALLADORA DE MINAS (MEXICAN DEV. & MNG. CO.) **SONORA**

Address: C. N. Knutsen, mgr., Cumpas, Sonora, Mexico.
In May, 1919, it was reported that this company, headed by L. G.
d, had leased the San Nicholas silver mines from the Transvaal Co.
property is 15 miles west of Cumpas, in the Moctezuma district, and
been examined by W. H. Weed for the Transvaal Co.
Equipment: includes a 50-ton flotation plant yielding 2 tons of con-
ate daily assaying 800 oz. silver, 80% lead, and 6% copper. Concen-
is sent to El Paso. Fifty men are employed.

XICAN EXPLORATION & MINING CO. **SONORA**

Controlled by Pacific Smelting & Mining Co.

XICAN METALS CO. **SONORA**

Office: 35 Congress St., Boston, Mass.
Officers: Geo. E. Keith, pres.; Geo. H. Woodman, v p.; Sumner M.
, sec.; Harold C. Keith, treas.; with Eldon B. Keith, directors.
nc. Aug., 1916, in Arizona. Cap., $5,000,000; shares $5 par; assessable;
issued; $2.55 paid.
succeeded the Arizpe Mines Co. and holds title to property

through the Moctezuma-Arizpe Development Co., legalized in Mexic Fully described in Vol. XI, Copper Handbook.

Old Colony Trust Co., registrar; Federal Trust Co., transfer agt. Annual meeting, second Monday in September. Listed on Boston Curb.

Mexican property near Cananea, Sonora, Mexico, closed down in autumn of 1914. After geological survey of property made by J. M. Litch checked by A. H. Rogers, Boston, and Franklin W. Smith, of Bisbee, it was decided to sell or abandon such property as directors considered unworth and to purchase new properties.

Company took a 5-year lease in 1917 on the Ajax property at Cripple Creek, Colo. The ore assays $25 to $40 per ton, and is said to have yielded about $20,000 net monthly.

MEXICO MINING, REFINING & EXPLORATION CO. SONORA

Mail unclaimed, at former office, 501 I. W. Hellman Bldg., Los Angeles, California.

Officers: Wm. T. Calderwood, pres. and gen. mgr.; Dr. Chas. B. Nichols, v. p.; F. C. Lamb, sec.-treas.; preceding with E. B. Lovie, C. A. Neil, L. A. Davis and A. A. Snodgrass, directors. B. A. Ogden, supt.; A. Wainwright, engineer.

Inc. 1905, in Arizona. **Cap.**, $5,000,000; $1 par. Annual meeting, second Monday in April, at Nogales, Ariz.

Property: El Creston de Cobre mine, 35 miles west of Hermosillo, an antigua dating from the eighteenth century. The property carries ore bodies, 2 of which are said to be 30′ wide, and traceable 1,400′, with ore averaging 4% copper, 8 oz. silver and $1 gold per ton.

Development: by 8 shafts, deepest 300′, and 4 tunnels with 1,000′ of workings estimated by the company to show 100,000 tons of ore.

Le Cobriza mine, at Soyopa, is said to show a 16′ vein with a 7′ pay streak, carrying copper-silver ore.

Equipment: includes 235-h. p. steam plant, 2 hoists, 6-drill air compressor, and 20-ton mill. Company was planning to erect a 100-ton smelter but revolution interfered. No recent information secured.

MINA MEXICO MINING CO. SONORA

Out of business. Succeeded by the Minas de Mexico, S. A., Compania de, which see.

MINAS DE MEXICO, COMPANIA DE SONORA

Office: Mina Mexico, Sonora, Mexico.

Officers: H. L. Hollis, pres., 1025 Peoples Gas Bldg., Chicago, Ill.; P. Ryan, v. p.-gen. mgr., 1202 Mills Bldg., El Paso, Texas; J. M. Gonda, sec.; E. F. Bryant, treas.

Property: the copper mine formerly worked by the Mina Mexico Mining Co. at Mina Mexico, Sahuaripa district, Sonora, Mex.

Equipment: includes a power plant, small mill and smelting plant. Property has been in charge of caretaker for several years, will be operated when Yaqui River branch of the Southern Pacific has been rebuilt.

MINERA CONSOLIDA LOS AZTECAS, S. A., COMPANIA SONORA

Controlled by Aztec Consolidated Mining Co., which see.

Inc. in Mexico. **Cap.**, 10,000 pesos; 1 peso par; 9,997 held by Aztec Cons. M. Co. Company holds title to Mina Verde and La Polka mines.

MINES COMPANY OF AMERICA SONORA

Acquired by Dolores Esperanza Corporation, which see.

In a statement dated January 25, 1919, company said that on account of the revolution in Mexico, it had been unable to operate, was subjected to great expense, and had incurred debts the inability to pay which endangered company's title to its property.

In 1910 and 1911, a total of 581,014 tons of ore yielded $5,670,[illegible], which $1,933,053 was profit. Raids occurred at Dolores and El Rayo in 1912. The latter was closed for some months in 1913, but was re-opened in February, 1914, for a time. Efforts to work El Rayo and Creston mines were suspended, but in 1916 the latter was operated at a loss of $239,[illegible]

INNEAPOLIS COPPER CO. **SONORA**

Mine address: Cumpas, via Nacozari, Sonora, Mexico.

Officers: J. W. Christy, pres.; James Thompson, sec.; F. A. Guice, gen. r.

Inc. June, 1906, in South Dakota. **Cap.** $1,000,000; shares, $10 par; o inc. in Mexico as Minneapolis Copper Co., S. A., the South Dakota poration being a holding company. Is operated in the United States ler the title of Minneapolis Copper Development Co., the reason for ich has not been explained.

Property: 277 hectares, about 30 miles S. E. of Cumpas. Property ries several fissure veins, in andesite, with N. E. strike, of which 4, under elopment, are of 5′ to 8′ estimated average width, carrying tetrahedrite, imated by company to average 10% copper, with traces of lead and zinc, o 40 oz. silver, and $1 and upwards in gold, with occasional very high ays.

Development: the Archipelago mine, the principal property, has a 250′ line shaft, and the mine as a whole has about 8,000′ of workings, mostly ore.

Equipment: includes a 35-h. p. gasoline hoist and 5 buildings. There lso a 75-ton smelter, built in 1912. Transportation is by wagon-road to npas, freight being carried in two 90-h. p. gaso-electric trucks.

Operated under lease, 1917, by Samuel E. Greenidge, of Douglas, zona. No later returns received.

)CTEZUMA COPPER CO. **SONORA**

Fully described under title of Phelps Dodge Corporation, U. S.

)UNTAIN CONSOLIDATED COPPER CO., S. A. **SONORA**

Owned by Canario Copper Co., which see.

Office: Room 23 First National Bank Bldg., Douglas, Ariz. **Mine ad-**ss: Nacozari, Sonora, Mexico.

Officers: same as Canario Copper Co. **Management:** same as El Can-Copper Co.

Property: Batamoti mine, containing 63 pertenencias, situated about 7 :s west of Purica station which is on Nacozari railroad, about 10 miles th of Nacozari, Sonora, Mexico.

Geology: the Batamoti vein is from 350 to 500′ wide and heavily min-ized on the surface for a length of 2,000′. The wall rocks consist of esite and monzonite. The mineralization occurs in acid-porphyry and ceous rocks. The orebody is cut off on the west by a large quartz-por-ry dike, and on the east by an extensive granite-porphyry intrusion.

Development: old workings consist of 300′ shaft and several tunnels racing about 6,000′ mining work, mostly in the andesite on the foot-wall of the main orebody. New work consists of 350′ crosscut tunnel to cut orezone the full width of 500′. Tunnel is said to be in ore, sampling 1.5 to 9.9% copper. Upon completion of tunnel, a drift will be run n the bottom of the old shaft 1,100′ west to intercept the main orebody depth of about 1,000′.

A road has been surveyed from Purica to the mine, a distance of 8 s. The maximum grade will be 8%. Work was started on road-build-May, 1919.

:OZARI CONSOLIDATED COPPER CO. **SONORA**

Controls the Tharsis-York Co., which see.

Office: First National Bank Bldg., or P. O. Box 1074, Douglas, Ariz. **e office:** Pilares de Nacozari, Sonora, Mexico.

Officers: John G. Alexander, pres.-gen. mgr.; T. D. East, v. p.; B. R. ell, sec.; Roy Hiatt, treas.; with L. M. Williams and R. C. Heath, direc-Fred Alexander, mill supt.; George Motz, mine supt. and purch agt.

Inc. July, 1907, in Arizona. **Cap.** $6,000,000; $5 par; increased Feb., from $3,000,000; 658,848 issued; 541,516 shares in treasury, February 919. Annual meeting, second Monday in July.

Balance sheet of February 14, 1919, showed cash on hand, $2,969. Oper-

ating expenses at the mine from November, 1917, to February, 1919, were $15,899. Mine expenses for year ending November 1, 1919, were $

Property: 17 claims, 502 acres, in 3 contiguous groups, adjoining the Pilares mine of the Moctezuma Copper Co. on the E. and S. The Galera tract shows andesite and brecciated rhyolite cut by several large quartz veins containing copper lead and zinc sulphides, with gold-silver values. The Tharsis-York or Central group was acquired by the company in December, 1918, by purchase of a majority of the Tharsis-York stock. This land, with that of the Copper King group, to the east, contains a big outcrop or red 'reef', 600' wide, of brecciated silicious vein-matter, which is regarded by the Nacozari Cons. management as an extension of the Pilares deposit.

Development: by a main crosscut tunnel to cut the Pilares reef at a depth of 600'. This tunnel was advanced 1,440' in 1919, and at 4,000' from portal cut a diabase dike forming south wall of Pilares lode. On the main tunnel level 100' of drifting was done; total work, 11,500', including shafts, crosscuts and tunnels. The workings of the 400' San Pablo shaft on the Galera group develop ore that is mined for shipment, the last carload being said to assay 0.89 oz. gold, 98.89 oz. silver, 21.6% lead and 1.04% copper, or a value of $113 per ton.

The San Pedro claims of the Moctezuma Copper Company, have been leased to this company and a drainage-tunnel is being driven to connect with the San Pablo shaft. By acquiring control of the Tharsis-York property, the company was able to resume work on the main tunnel, stopped since April, 1917. Total development work for year 1919 was 2,140'.

Ore reserves: reported to be 15,000 tons of $35 ore; 60,000 tons of $ ore; and about 500,000 tons of $10 to $12 ore.

Equipment: includes compressor, air drills, and a 100-ton concentrator with flotation unit. Company plans erection of a 200-ton smelter.

NORTHERN SIERRA MADRE MINING CO. SONORA

Address: D. E. Alexander, Humboldt Savings Bank Bldg., San Francisco, Cal. Mine near Soyopa, Sonora, Mex.

Officers: Chas. K. Blender, pres.; Carlo Giovannetti, v. p.; John O'Donnell, sec.; Fred Townsend, treas.; preceding, with D. E. Alexander, Fred Trevarrow and E. C. Curtis, directors, at last report.

Inc. Aug. 2, 1901, in California. **Cap.**, $300,000; shares $1 par.

Property: La Reina de Cobre and Providencia copper mines and El Colosus silver-lead mine, 25 miles west of Suaqui de Batuc. La Reina shows diabase, shale and limestone, carrying orebodies of sulphide ores with quartz gangue.

Development: by 633' of workings. Management estimates 4,854 tons of ore in sight, with 3,214 tons blocked out for stoping. Idle some years.

NORTH TIGRE MINING CO. SONORA

Address: R. D. Brown, pres., and F. J. Holmes, mgr., Douglas, Ariz.

Property: La Protectora, La Protectora No. 2, and the Esperanza groups, leased to North Tigre Leasing Co., of Bisbee and Douglas, 2½ years. The mine is said to be located on the Lucky Tigre lode, which on this group is 4 to 20' wide and carries ore said to assay over 100 oz. silver, 6 to 7% copper and 25% lead.

Development: is by tunnels, the lowest, No. 8 tunnel, having a vertical depth of 800', with total of 5,000' of underground workings. Ore in sight is said to total 30,000 tons, worth $1,250,000. A 5' vein of ore carrying 1 to 2,000 ounces native silver per ton, was cut early in 1920.

Equipment: includes a 50-ton mill with flotation unit, completed February, 1920. Power is purchased from the Copper Queen plant at Douglas over a branch line run from El Tigre mine.

PACIFIC SMELTING & MINING CO. SONORA

Office: 20 Broad St., New York. **Mine and smelter office:** Fundicion, Sonora, Mex.

Officers: Melbert B. Cary, pres.; Geo. M. Ryall, v. p.; Nelson S. Hunt

, sec.-treas.; preceding, with Ronald E. Curtis, Howard McWilliams Charles E. Wetmore, directors. Thornton C. Kirkland, asst. gen. mgr. Inc. Oct. 6, 1909, in Maine. **Cap.**, $8,000,000; shares, $5 par, issued in 7,850 convertible cumulative 7% preferred stock and $6,262,150 com- stock; all issued. United States Corporation Co., New York, registrar. ıal meeting, third Monday in January, at Augusta, Maine. Listed on York Curb.

Holdings: company controls the Douglas Copper Co. and Mexican oration & Mining Co. by ownership of 98% of the capital of each com- . These companies hold practically the whole of the capital of 5 diary Mexican corporations, viz.: the Anita Mines Co., Yaqui Mining and the following smelting companies: Compania Metalurgica y Re- ora del Pacifico, S. A., owning the Fundicion smelter; the Mexican rican Smelting & Refining Co., S. A., owning the Guaymas smelter he Sinaloa Smelting Co., holding the Mazatlan, or Sinaloa smelter con- on.

Anita Copper Mines Co., S. A., owns the Anita mine with 330 acres, 25 north of the Fundicion smelter and station of that name on the ıern Pacific Railroad of Mexico. Mine has been developed to a depth 0' on the dip of the vein and ore reserves above the 7th level were esti- d by Courtney de Kalb at 55,000 tons, that average $2.58 gold, $1,17 in and 3.99% copper.

Geology: the Anita (or El Cobre mine), has a shear zone 115' wide with ›rite foot and rhyolite hanging wall. This zone traceable for several sand feet, with N.-S. strike and dip of about 45° W., carries ore in 5 s, or chimneys, the principal one being opened from the surface down e 8th level, branching at the 6th level. Faulting, cross-faulting and iation occur with displacements up to 200'. Ore is said to be a meta- tic replacement of diorite accompanied by a contact metamorphic sit. It contains the usual oxide minerals succeeded in depth by chal- rite.

Development: comprises a 900' inclined main shaft with 9 levels opened about 7,415' of workings. There are also 4 other shafts.

The surface equipment consists of 2 cross-compound 2-stage Rand ›ressors of 3,000-cu. ft. combined capacity; a Risdon second-motion x hoist, 14x21"; three 150-h. p. boilers; generator for light and power; crushers, picking tables, shops, assay office, office buildings, ware- s, dwellings, supplies, etc.

The Pirita mine, 81 acres, 5 to 7 miles from Victoria station contains ic ore having small values in gold, silver and copper. The deposit will ually become of value to the company for fluxing purposes.

Yaqui Mining Co., S. A., owns several slightly developed mining prop- s including the Rosamond and Aurora mines with about 1,600' of de- ment work, exposing commercial copper-silver ore.

Compania Metalurgica y Refinadora del Pacifico, S. A., owns the Fun- n smelter, built originally to treat the ores of the Anita mine and to do m business. The plant has a capacity of 350 tons a day, but was de- d and in part equipped for 3 times that amount. It has one 42x160" furnace, sampling mill, power house, shops, administration buildings, n electric plant for lighting and power purposes, all machinery except- rard locomotives being motor driven. The plant is of modern design in excellent condition. Plant idle for 5 years.

The L'Aime lime quarry, has 75 acres of limestone averaging 1.2% with about $1 in gold.

Mexican-American Smelting & Refining Co., S. A., owns the Guay- amelter with 250 acres, at Batuecas, a suburb of Guaymas, on tide ing between the Bay of Guaymas and the S. P. R. R. of Mexico. plant was erected by William C. Greene, founder of the Greene-Cananea ıer Co.

The Sinaloa Smelting & Refining Co., S. A., owns a concession from

ating expenses at the mine from November, 1917, to February, 1918, \$15,899. Mine expenses for year ending November 1, 191

Property: 17 claims; 502 acres, in 3 contiguous gr Pilares mine of the Moctezuma Copper Co. on the E. tract shows andesite and brecciated rhyolite cut by veins containing copper lead and zinc sulphides. The Tharsis-York or Central group was acqui December, 1918, by purchase of a majority of This land, with that of the Copper King group outcrop or red 'reef', 600' wide, of brecciated regarded by the Nacozari Cons. management deposit.

Development: by a main crosscut tu depth of 600'. This tunnel was advanced portal cut a diabase dike forming south tunnel level 100' of drifting was done crosscuts and tunnels. The working Galera group develop ore that is being said to assay 0.89 oz. gold, 9 per, or a value of \$113 per ton.

The San Pedro claims of th leased to this company and a with the San Pablo shaft. B erty, the company was able since April, 1917. Total de

Ore reserves: reported ore; and about 500,000 ton

Equipment: include with flotation unit. Co

NORTHERN SIERR

Address: D. E. cisco, Cal. Mine n

Officers: Chas. nell, sec.; Fred T Trevarrow and F

Inc. Aug. 2

Property: wide, with veins considerable quantity of chal Colosus silve nnels with 15,000' total workings, shows diab of workings in ore. Dwight E. W with quart San Antonio had 300,000 tons of ore averag nections to within 2.2 miles of the main **Devel** ations suspended on account of revolutionary of ore in 1917. Property considered promising.

NORTH INES & METALS CORP. SONORA

Ad y, New York City.

P ston, pres.; F. B. Spalding, and G. F. Powell, gro

2½ encias, containing a large silver-bearing vein on about 25 miles N. E. of Pora. sil miles a 200-ton reduction plant.

COPPER CO., S. A. SONORA

red after absorption by Cananea Consolidated C

COPPER CO. SONORA

Formerly operated mine near San Xavier S

MINING CO. SONORA

Terras, Sonora, Mex. Fred O. Colsen, le

O miles east of Nacozari, showing a f porphyritic porstreaks of gray copper, ga

The mine yielded ore which assayed up to 15% copper
metric ton.

MINING CO., S. A. **SONORA**
lled by Sonora Central Mines Co., also defunct.

INES CO. **SONORA**
also Vol. XI of Copper Handbook.

CO. **SONORA**
unned unclaimed March, 1919, from former
sas City, Mo. Mine near Suaqui de Batuc.

Dr. Moses T. Runnels, v. p. and treas.;
D. Stell and J. D. Waggener, directors.
ap., $1,500,000; $1 par.
e groups, 464 acres. The flotation
roperty had no such showing as
isted were tiny streaks, a few
high-grade ore, chalcocite and
e of the Yaqui river, is such
have been worth develop-
roperty is totally devoid

SONORA
10, at last office, 895

p.; Fred W. Web-
, at last accounts.
hares $1 par.
pe, in the Arizpe district,
workings, showing a 12" vein,

SONORA
d. **Last address:** 424 Scarritt Bldg., Kan-
oria, Sonora, Mex.
d, pres. and gen. mgr., at last accounts; J. M.
, sec.; W. R. Moore, treas.
8, in Arizona. **Cap.,** $3,000,000; shares $10 par.
posed to have been organized as successor of the Sonora
apparently owns only a 50% stock interest in that company,
ne Mexican property is held in the name of the International
e Corporation, which is controlled, in some manner, by this com-
e corporate relations being neither clear nor satisfactory.
operty: about 500 acres, including the Cobre Grande, 123 acres, 5
east of Noria, the principal mine, is not considered worthy of the
ey spent upon it and the past history of the president is such that the
pany is regarded with much suspicion.

ORA DEVELOPMENT CO. **SONORA**
Office: 500 New Ridge Bldg., Kansas City, Mo. **Mine office:** Cumpas,
ra, Mex.
Officers: H. P. Wright, pres.; D. J. Haff, 1st v. p.; H. C. Page, 2nd v. p.;
. Rule, treas.; J. W. Amerman, sec.; with William Huttig, directors.
national Commission Co., Y. Soto, mgr. agents.
Inc. in Arizona. **Cap.,** $2,500,000. Reorganization completed in 1919,
outstanding shares reduced to 500,000. Company absorbed the Good-
r Mining & Milling Co.
Property: 320 acres, includes Don Genario 50 acres; Nacozari Copper
n, 65 acres; La Madrugada, 40 acres; El Nocturno, 40 acres; La Gran
ublica, 25 acres; Lady Goodlander, 65 acres; and Wostenholm, 35 acres.
erties show silver, copper, lead and zinc ore.
ompany plans a resumption of development for 1920.

SALTILLO, S. A.; COMPANIA MINERA DEL. SONORA

Office: Primera de Galeana No. 2, Saltillo, Coahuila. Mine near Mazapil, Zacatecas, Mexico. Lic. Miguel Cárdenas, pres.

Inc. June 15, 1899, in Mexico. **Cap.**, 100,000 pesos; shares 100 pesos par, fully paid.

Dividends: were 10,000 pesos in 1907; 15,000 pesos in 1908. Annual meeting, January 31, each year.

Property: the Jesus Nazareno mine, in the Nazareno mining district of Mazapil, 10 miles from a railway. The mine produces 1,000 metric tons of silver-lead ore monthly, when conditions are normal.

Equipment: includes 5- mile private tram line, and 135h. p. gas and electric plant. Apparently connected with Compania Minera Nazareno y Alicante, S. A., which see.

SAN AGUILAR DE CANANEA, S. A., COMPANIA MINERA SONORA

Address: George Young, sec.-treas., Cananea, Sonora, Mexico.

Officers: G. H. English, pres.; C. E. Hoffman, v. p. **Cap.**, 7,500 pesos.

Property: 10 pertenencias, 15 miles S. E. of Cananea, developed to a depth of 250' by workings that show high-grade stringers of argentiferous bornite. Mine has been operated on a small scale, making ore shipments that returned about $20,000.

SAN ANTONIO COPPER CO. SONORA

Address: Geo. J. Eisele, sec.-treas., Iron Mountain, Mich. Mine office: San Antonio de la Huerta, Sonora, Mex.

Officers: Otto C. Davidson, pres.; Dr. J. A. Crowell, v. p.; precedent with John Uno Sebenius, D. M. Clemson, Hon. Richard C. Flanagan, E. V. Kingsford and W. H. Johnston, directors; John E. McIntyre, supt.

Inc. Sept. 23, 1908, in Arizona. **Cap.**, $2,500,000; shares $10 par; issued $1,000,000 full paid and $1,000,000 with $3.50 paid. Title is through the San Antonio Copper Co., S. A., inc. April 12, 1908, in Mexico, all stock being owned by this company. Annual meeting, 2nd Monday in April.

Property: 9 groups, about 7,500 acres, with 2,000 acres about 3 miles from San Antonio de la Huerta, near the Yaqui river. The property was worked 1862 in a small way.

Lands show a mineralized zone 200' to 500' wide, with veins containing copper oxides and carbonates, with a considerable quantity of chalcocite giving assays up to 11% copper.

Development: consists of tunnels with 15,000' total workings, opening 7 separate orebodies, with 4,000' of workings in ore. Dwight E. Woolbridge estimated that the San Antonio had 300,000 tons of ore, averaging 7% copper. Railway connections to within 2.2 miles of the main tunnel were secured, 1910. Operations suspended on account of revolutionary disturbances since August, 1917. Property considered promising.

SAN GERONIMO MINES & METALS CORP. SONORA

Office: 74 Broadway, New York City.

Officers: M. P. Dalton, pres.; F. B. Spalding, and G. F. Powell, etc. a close corporation.

Property: 80 pertenencias, containing a large silver-bearing vein on the San Miguel river, about 25 miles N. E. of Poza.

Equipment: includes a 200-ton reduction plant.

SAN PEDRO COPPER CO., S. A. SONORA

Company dissolved after absorption by Cananea Consolidated Copper Co.

SAN XAVIER COPPER CO. SONORA

Probably dead. Formerly operated mine near San Xavier, Sonora, Mex. See Vol. XIII.

SILVER SEAL MINING CO. SONORA

Mine at Pilares de Teras, Sonora, Mex. Fred O. Colson, [illegible] accounts.

Property: El Aguaje mine, 12 miles east of Nacozari, [illegible] vein in andesite rock, carrying narrow paystreaks of [illegible]

galena ore. The mine yielded ore which ran about 15% copper, nd 20 oz. silver per metric ton.

OMBRERETILLO MINING CO., S. A. **SONORA**

Dead. Was controlled by Sonora Central Mines Co., also defunct.

ONORA CENTRAL MINES CO. **SONORA**

Dead. See Vol. XIII, also Vol. XI of Copper Handbook.

ONORA CHIEF MINING CO. **SONORA**

Probably dead. Mail returned unclaimed March, 1919, from former ddress, 219 Argyle Bldg., Kansas City, Mo. Mine near Suaqui de Batuc, onora, Mex.

Officers: Jas. E. Crosby, pres.; Dr. Moses T. Runnels, v. p. and treas., A. Bruns, sec.; preceding with C. D. Stoll and J. D. Waggener, directors.

Inc. July 18, 1904, in Arizona. **Cap.**, $1,500,000; $1 par.

Property: the Phoenix and Lakeside groups, 464 acres. The flotation, as, it is believed, a crooked one. The property had no such showing as ported and described. Such veins as existed were tiny streaks, a few ches wide, which in places contained very high-grade ore, chalcocite and rhaps whitneyite. Its location, on the far side of the Yaqui river, is such at even a remarkably good showing would not have been worth develop- ent at the time the company was active. The property is totally devoid merit.

ONORA COPPER MINING CO. **SONORA**

Idle and probably dead. Mail unclaimed, March, 1919, at last office, 895 . Clarkson Ave., Denver, Colo.

Officers: Edward J. Wilcox, pres.; H. L. Peebles, v. p.; Fred W. Web- r, sec.; C. A. Parker, treas., and L. J. Stark, directors, at last accounts.

Inc. May 17, 1910, in Colorado. **Cap.**, $10,000; shares $1 par.

Property: 10 claims, 4 miles from San Felipe, in the Arizpe district, nora, developed by 820' of underground workings, showing a 12' vein, th some complex silver-lead zinc ore.

ONORA COPPER SMELTING CO. **SONORA**

Idle and not favorably regarded. **Last address:** 424 Scarritt Bldg., Kan- City, Mo. **Mine office:** Noria, Sonora, Mex.

Officers: A. M. Conard, pres. and gen. mgr., at last accounts; J. M. we, v. p.; C. E. Kroh, sec.; W. R. Moore, treas.

Inc. June 25, 1908, in Arizona. **Cap.**, $3,000,000; shares $10 par.

Company supposed to have been organized as successor of the Sonora pper Co., but apparently owns only a 50% stock interest in that company, l title to the Mexican property is held in the name of the International pper Ore Corporation, which is controlled, in some manner, by this com- y, the corporate relations being neither clear nor satisfactory.

Property: about 500 acres, including the Cobre Grande, 123 acres, 5 es east of Noria, the principal mine, is not considered worthy of the ney spent upon it and the past history of the president is such that the pany is regarded with much suspicion.

NORA DEVELOPMENT CO. **SONORA**

Office: 500 New Ridge Bldg., Kansas City, Mo. **Mine office:** Cumpas, ora, Mex.

Officers: H. P. Wright, pres.; D. J. Haff, 1st v. p.; H. C. Page, 2nd v. p.; A. Rule, treas.; J. W. Amerman, sec.; with William Huttig, directors. national Commission Co., Y. Soto, mgr., agents.

Inc. in Arizona. **Cap.**, $2,500,000. **Reorganization** completed in 1919, standing shares reduced to $500,000. Company absorbed the Good- Mining & Milling Co., and its

Property: 320 acres; 50 acres; Nacozari Copper acres; Sturmo, 40 acres; La Gran 35 acres; Wostenholm, 35 acres. show drifts, ary plans a

Extensive drilling at La Verde, of the Transvaal mine proper, has developed a large tonnage of low-grade primary ore, averaging 1¾% copper and estimated by the management at 3,000,000 or more tons, which will doubtless be treated some day by flotation methods. The drills have shown the ore to extend to a depth of 1,100'.

The **Cobre Rico mine** has 2 shafts, No. 1 of 100' and No. 2 about 140' deep, with several tunnels and about 16,400' of workings, (including diamond drilling) developing several orebodies in a mass of brecciated rock, locally called trachite. Ore is estimated to average about 2% copper, 1 to 2 oz. silver and a trace of gold. Management estimates 2,500,000 tons available in this mine.

The **Buckeye mine** has about 10,000' of tunnel work, on a blanket vein of 6" to 4' thickness, showing ore reported to have given average returns of 12% copper and 8 to 10 oz. silver, with a trace of gold. There are about 5,000 tons of high grade ore left in the mine and a considerable amount of low-grade ore of no present commercial value. The mine, however, has been thoroughly explored in the bottom, or lower tunnel level and the ore shoot found to have played out.

The **San Nicolas mine** is a silver property about 8 or 10 miles from the Transvaal. It shows a vein varying from 1 to 4' in width, carrying silver-lead ore said to change to copper in the lower workings. The mine is reported to have yielded 6,000 tons of 60 oz. silver ore and still has between 2,000 and 3,000 tons of 50-oz. silver ore. It is regarded as a promising prospect, especially for lateral development. In May, 1919, it was reported that the San Nicolas Leasing Co. operating as the Mexicana Dessaralladora de Minas, had secured a lease on this mine. A 50 ton flotation plant was erected.

The **Ultima Chanza mine** has a 300' incline shaft and a 100' winze, with about 5,000' of workings, developing a fissure vein of 10" to 42" width. The management estimates 50,000 tons of ore in sight, averaging 10% copper, 5 oz. silver and a trace of gold. This property is a good, but small mine, needing further development. Equipment includes a steam plant and hoist.

The nearest rail station is at Nacozari, 30 miles north, but the Cananea, Rio Yaqui y Pacifico railway has surveyed a line to within 9 miles of the smelter. The company has built about 35 miles of wagon roads and 25 miles of trails at a cost of $50,000, with a maintenance charge of about $5,000 yearly.

The main camp is at La Verde, 25 miles S. W. of Cumpas, where mining operations are centered. There are 20 buildings, including 3 power plants, machine shop, carpenter shop, smithies at the principal mines, 2 laboratories, a boarding house, general store, with a branch store at the smelter, a hospital and several dwellings.

Smelter: at Cumpas, about 25 miles from the mines, was located at this point because of a good site and ample water supply. Equipment includes a 125-ton 42"x120" El Paso Foundry & Machine Works water-jacket blast furnace, with room for 2 additional furnaces of the same size. There is a reverberatory furnace, of 50 tons daily capacity, and a sampling mill, capable of sampling ore to feed 3 furnaces. The smelter power plant includes three 80-h. p. Babcock & Wilcox boilers, an Allis-Chalmers tandem-compound engine and a Connersville blower. This smelter was blown in May 1, 1906, treating ores from the Buckeye and San Nicolas mines and doing a little custom business, producing matte shipped to the Laurel Hill works of the Nichols Copper Co., and from May 1, 1906 to November 3, 1907, a period of 18 months, the smelter, in operation about two-thirds of the time owing to scarcity of freighting outfits, smelted 18,550 tons of ore having an average assay tenor of about 10% copper and 8 oz. silver for copper ore, and 2% copper and 60 oz. for silver ore, making 3,089 tons of matte, yielding 2,178,555 lbs. fine copper, 407,607 oz. silver and 240 oz. gold.

[illegible] ment work done on the property since [illegible] veins of rich ore and large deposits of low

rade ore. The property will be worked on a large scale when given the ail connections now lacking but absolutely essential to the successful exloitation of the ores.

TRENTON-SONORA MINING CO. **SONORA**

Mine office: Tarachi, Sonora, Mexico.

Property: 4 miles S. of La Calera, includes the San José, Santa Edu-iges, El Porvenir and other mines, carrying copper ores, with values mainly in ilver. The San José mine is reported to show an 18" paystreak of highly urriferous chalcopyrite.

Development: by a 200' shaft sunk on the vein, equipped with a hoist. There is a mill and a smelter. No recent returns. Probably idle owing to Mexican conditions.

UNITED MEXICAN MINES **SONORA**

Idle at last reports. Mine near La Verde via Cumpas, Sonora, Mexico. O. .. Neer, mgr., Douglas, Ariz.

Property: 40 miles S. of Nacozari, includes the Veta Grande and Cerro Gordo groups, near the Transvaal mine.

Mines show rhyolite, granite and porphyry, with several orebodies occurring n fissure veins, and as breccia deposits between trachite and granite. Ores are opper sulphides.

VICTOR MINING AND SMELTING CO. **SONORA**

Office: 315 Schultz Bldg., Columbus, Ohio. **Mine address:** Cananea, Sonora, Mexico.

Officers: S. D. L. Jackson, pres.; M. F. Cole, v. p.; F. P. Jackson, sec.-reas.; preceding, with J. S. MacLean, W. H. Sartain, C. Thornton, Chas. Schindler and C. A. Stillwagen, directors. W. A. Woodlief, fiscal agent.

Inc. May 9, 1905, in Arizona. **Cap.**, $1,500,000, increased 1907, from 1,000,000; shares $10 par; issued, 90,000 shares. Title to property is held hrough the **Guerrero Mining Co.**, legalized in Mexico. Annual meeting, 2nd Monday in January.

Property: 47 pertenencias, in 2 groups in the Magdalena district, about 2 miles S. W. of Cananea, shows fissure veins in granite-porphyry intruding edimentary rocks.

Development: by 5 short tunnels, about 1,500' of workings, showing igh-grade copper ore with small gold and silver values, in 2 veins of about ' and 70' width, latter without ore.

Mine was ordered sold at receiver's sale, September 11, 1916, at Nogales, Ariz.

WASHINGTON MINES DEVELOPMENT CO. **SONORA**

Office: Douglas, Ariz. **Mine office:** Washington Mine, via Huepac, Sonora, Mex.

Officers: F. O. Bostwick, pres.; Geo. Cass, v. p.; Albert Sames, sec.-reas.

Inc. 1911, in Arizona. **Cap.**, $1,500,000; shares $10 par; issued 130,000 hares.

Property: 27 hectares in the Arizpe district, 60 miles from Nacozari, he nearest rail point. Claims show several big "pipe" deposits composed of brec-iated rhyolite in dacite. Ore is reported to average 3.2% copper, 0.35% tungstic cid, 1.5 oz. silver and some gold.

Development: by a total of about 6,000' of workings said to show 00,000 tons of ore blocked out for stoping.

It was reported in 1918 that L. D. Ricketts and J. S. Douglas had acquired he Washington mine. The price was said to be $400,000, of which $25,000 was aid down.

YAQUI CANYON COPPER CO. **SONORA**

Probably dead. Described Vol. XIII. Formerly at Suaqui de Batuc, Ures, Sonora.

YAQUI COPPER CO. **SONORA**

Found. See Vol. XIII.

Property: owns 25 sq. miles of mineral bearing land, including the Rosario mine and Sabana Grande mine nearby, at San Juancito, Honduras, C. A.

Development: results may be shown as follows:

Year	Footage	Ore Mined, Tons	Reserves, Tons	Value per Ton	Cost per ft.	Cost per Ton
1918.....	11,266	74,816	282,559	$15.15	[illegible]	[illegible]
1917.....	9,581	83,052	303,296	9.21	$12.21	$0.87
1916.....	12,637	81,513	312,143	9.51	9.91	0.97
1915.....	13,000	90,162	343,716	9.76	10.18	1.09

The Rosario contains about 20 mineral bearing veins, which have been or are now being worked. The south San Miguel was the main producer in 1918.

Geological investigations of the entire zone, as well as surrounding country, were concluded in 1916. Electric haulage on the Peña Blanca and lower 600 levels was very satisfactory.

Two crosscuts have been driven—the Peña Blanca—Esperanza, beginning at the S. E. end of the Esperanza No. 3 and running in a S. W. direction to develop the southern territory, and the Peña Blanca S. W. crosscut, starting at the junction of the Southwest and Jucuara veins in Block 84, and planned to reach Jucuara gulch. With this connection made, additional water power and cheap timber are obtainable from the western side of the mountain. The cost of timber was reduced from $22.50 to $12.50 per 1,000 board feet since the tramroad was completed. Rock passed through was not favorable for ore deposition. The Esperanza crosscut opened some ore, which is being developed.

Exploration of other properties is part of the regular work of this company. Results have been as follows:

Company spent 37,871 pesos for prospecting and development on the Chile Mountain concession without promising results. Three gold-silver veins of low value did not persist at depth and work was stopped.

An option on the Guasucaran area was dropped, also on Santa Rosa de Potosi. Some work is under way at the Aurora-Santa Elena group, adjacent to the Rosario.

The most promising property is the Sabana Grande, 40 miles west of the Rosario, which has been under development since 1915, and on January 1, 1919, contained 18,190 tons of ore averaging $57.40 per ton in silver and gold. A mill, described later, has been erected, and contains a flotation plant, the first of its kind in Central America.

Equipment: at Rosario, 1,200-h. p. hydro-electric plant, hoists, 5, 6, and 7-ton electric locomotives in the mine, 2 air compressors, machine-drills, sawmill, 350-ton cyanide mill using aluminum dust precipitation, machine shops, assay office, hotel, store, schools, hospital, and garrison consisting of a commandant, 58 officers and men.

At Sabana Grande—three 50-h. p. oil-driven air compressors, and 35-ton mill containing 100-h. p. Fairbanks-Morse oil engine, jaw-crusher, 4x6' ball-mill, Dorr machinery, K. & K. flotation machines, and Oliver filter, laboratory, shops and dwellings.

Production:

Year	Ore Treated, Tons	Extraction Silver, %	Extraction Gold, %	Extracted Silver, Oz.	Extracted Gold, Oz.	Total Cost per Ton
1918.....	143,050	86.75	88.31	1,587,468	9,748	$9.41
1917.....	141,218	93.79	94.00	1,670,612	13,790	7.49
1916.....	128,030	89.04	94.24	1,810,886	14,989	6.31
1915.....	117,790	87.45	92.32	1,748,803	15,211	5.74

New York & Honduras Rosario is an extensive property making good profits. Its resources are extensive, and exploration continues to open up new mines. Reports contain a wealth of interesting mining and metallurgical information.

WEST END OPOTECA MINES CO. HONDURAS

Subsidiary of West End Consolidated Mining Co. of Nevada.

Inc. 1920. Cap., $3,000,000; $1 par.

Property: 1,500 acres, including the Opoteca gold-silver mine, upon which nearly $100,000 has been spent. The mine is fully equipped, and extensive development work has revealed ore in 20 places.

NICARAGUA

BABILONIA GOLD MINES, LTD. NICARAGUA

Office: 1 London Wall Bldgs., London, E. C. 2.

Officers: J. H. Cordiner James, chairman, with J. A. Agnew and A. Pomeroy, directors. G. G. Hay, sec.; J. V. Lake, mgr.; James Brothers, cons. engs.

Inc. in England, June 9, 1911, as Sierra Guaranty Syndicate, changed Dec., 1911, to present title. **Cap.,** £200,000; shares £1 par; 170,007 issued, fully paid; 150,007 shares held by Lake View & Oroya Exploration, Ltd.

A profit of £1,290 ($6,200) was made in 1917.

Property: 3 gold claims—Crimea, Babilonia, and Santa Maria—at La Libertad, Chontales district, Nicaragua.

Development: ore reserves at end of 1917 were estimated as 37,095 tons, averaging 37s. 6d. ($9) per ton. Mining has been much hampered by water.

Equipment: includes 75-ton pneumatic (Holman) stamp-mill and cyanide plant.

Production:

Year	Tons	Value	Year	Tons	Value
1917	22,328	£42,941	1915	9,586	37,152
1916	19,344	40,526	1914	7,675	21,155

COCO RIVER MINING CO. NICARAGUA

Office: was at 50 Broadway, New York.

Officers: J. G. Turrif, pres.; H. A. Currie, v. p.; Gordon D. Bruce, 120 Broadway, New York City, sec.-treas.; A. A. Holland, managing director; J. A. Calder, J. T. Brown and J. H. Lamont, directors, at last accounts.

Inc. in Delaware. **Cap.,** $1,000,000; $1 par; 500,000 issued. U. S. Corporation Co., 28 Cedar St., New York City, registrar and transfer agent.

Property: 175 acres in Cabo Gracias district, Nic., C. A., 60 miles inland and 3 miles from navigable river, via Cabo Gracias.

Ore: free milling gold quartz said to average $5 per ton, including all developed oxidized ore.

Equipment: costing $125,000, includes 200-ton mill "of ironwood and mahogany," electric motors, etc. A report by A. A. Holland, mining engineer, is said to give 2,000,000 tons blocked out and 4,000,000 partly blocked out.

Company planned installation of 300-h. p. hydro-electric plant on Coco river and to enlarge mill to 500 tons daily capacity, addition of cyanide mill and disintegrator.

Management expected to make a 95% extraction less $1 a ton for all costs, leaving a profit of $1,875 daily when treating 500 tons. Costs seem to be figured too low. Nothing new available early in 1920. Probably dead.

CONSTANCIA-SIEMPRE VIVA MINES NICARAGUA

Property: in the Pis Pis district, now producing from $20,000 to $30,000 gold per month. The mill extracts 95% of the metal.

EDEN MINING CO. NICARAGUA

Controlled through ownership of 55% of capital stock, by Tonopah Mining Co. of Nevada.

Office: 572 Bullitt Bldg., Philadelphia, Pa., and Bluefields, Nicaragua, C. A.

Officers: J. H. Whiteman, pres.; C. R. Miller, v. p.; C. A. Higbee, Baston Hoopes, H. D. Moore, Samuel Bell, Jr., G. S. Munson, and W. I. Forbes, directors; F. S. Bickmore, sec.; W. H. Blackburn, con. eng.; M. B. Huston, gen. supt. The engineers responsible for bringing the property to the productive

stage were Louis Garbrecht, J. L. Phillips, and Robert Hawxhurst, Jr., successively.

Inc. Nov. 24, 1914, in Delaware. **Cap.**, $1,000,000, all outstanding; shares $1 par, non-assessable. Company office, transfer office, Fourth St. National Bank, Philadelphia, registrar. Annual meeting, first Wednesday in May.

Property: 9 square miles in the Pis Pis mining district, which is 100 miles in direct line from the town of Prinzapolca on the east coast of Nicaragua. Transportation of supplies from the United States involves 1,200 miles by ocean steamer, 90 miles by coast schooner, by barges up to Tunky, transfer into "pipans" to Miranda on the Tunky river, and finally 7 miles by narrow-gauge railway to the mine. The full distance from Prinzapolca is 187 miles. It costs from $90.78 to $131.28 per ton to carry freight from New Orleans to the mine. The rainy season lasts for 8 months, when wheel vehicles cannot be used. The Tunky Transportation & Power Co. which operates the railway and power-plant is controlled by the Eden company.

The financial statement for the year 1918 shows that receipts totaled $428,327, of which $355,000 was loans from the Tonopah Mining Co. Expenditures were $433,320. Cash on hand decreased from $13,172 to $8,178 at end of 1918. Current assets amount to $453,305, and liabilities $56,528. Loans from the Tonopah Mining Co. total $1,994,000. The Eden company lent the Tunkey Transportation & Power Co., a subsidiary $408,309.

Development: as the property is mountainous, the veins are all opened by tunneling, there being 6 main adits at an elevation of 652 to 1,307 ft. above sea-level. The main tunnel has an electric haulage system, the locomotive handling 20 tons a trip. The two veins so far developed—the Culebra and Eden—strike E. and W. and N. and S., respectively and dip steeply, so that shrinkage stoping is used. The oxide ore near the surface breaks easily; but the deeper ore is difficult to blast. The Culebra vein is rather more uniform in value than the Eden, in which the values are bunchy. The main tunnel will be driven 1,000 ft. to get under a known ore-shoot in the Hidden Treasure vein. Ore reserves are estimated as 107,879 tons, worth $11.92 per ton, equal to 2½ years supply for the mill.

Equipment: includes fully equipped machine-shops, sawmill, ice plant, wireless station for distant communication, hydro-electric plant of 700-h. p. turbine and 500 kva. generator, since increased to 1,400-h. p., sub-station, electric locomotive, two 600-cu. ft. air-compressors, drills, and 150-ton cyanide mill including ball and tube-mills.

Production: the mill started in November, 1918, and produced $45,947 to the end of the year. The extraction in December was 95.1%.

In 1919 the mill treated 36,159 tons of $12.94 ore, yielding $445,350. Costs averaged $10.65 per ton.

According to W. H. Blackburn, there should be a satisfactory profit for each month's operation in the future.

LA LUZ & LOS ANGELES MINING CO. NICARAGUA

Offices: 511 Fifth Ave., New York; and Frick Bldg., Pittsburgh, Pa.

Officers: J. Gilmore Fletcher, pres.; Jesse C. Scobey, mgr., at Pittsburgh; H. A. Watson, gen. mgr., Prinzapolca, Nicaragua; H. G. Smith, mill supt.; Dr. Benjamin Cuadra, attorney at Prinzapolca.

Property: near the Eden mine, but on a different branch of the Prinzapolca river, in the Pis Pis district, Nicaragua.

Ore is a soft altered shale, a considerable portion locally known as 'mantle' being no more than a stiff clay. Mine is generally regarded as a large, low-grade gold property, whose reserves of oxidized ore are nearing the end. The future of the mine depends upon a successful treatment of the underlying low-grade base ores.

Equipment: includes a milling plant employing six 3½' Huntington mills fitted with 20-mesh screens, and amalgamating inside and outside. Recovery by amalgamation averaged from 60 to 75% for a 7 year period, and quicksilver consumption was but 0.144% of that fed to the mills. The bullion is 840 fine in gold and 150 fine in silver.

Company has been working for 15 years, but informs us in effect that it considers it inadvisable to give out any information. It is said that production and profits have been regular for many years, and that property has been efficiently managed.

NICARAGUA MINING CO. **NICARAGUA**

Office: 1218 Locust St., Philadelphia, Pa.

Officers: B. C. Warnick, pres.; C. J. Fox, v. p.; W. H. Steigerwalt, sec.-treas.; with C. A. Daniel, W. H. Bilyeu, W. S. Duling, Barry Searle (cons. eng.) and J. M. Steele, directors. W. B. Daniel, gen. supt.

Cap., $2,000,000; $1 par; non-assessable; 1,000,000 being issued early in 1920.

Property: in the Pis Pis district, 100 miles from the Atlantic Coast, 60 miles from Prinzapolca, which is 90 miles north of Bluefields. Supplies are handled by the Tunky Transportation & Power Co., a subsidiary of the Tonopah Mining Co.

Andesite is the prevailing rock of the district, and is cut by diabase dikes and by numerous quartz veins. The main vein system runs N. E. and S. W. and dips 25 to 75° N. W. The vein zone contains many branch, cross and parallel veins, and is cut by faults. The vein quartz contains gold and silver, together with a complex mixture of copper, lead and zinc sulphides.

The company owns the following mines:

(1) the Concordia group discovered in 1894, from which gold worth $1,200,000 was extracted by simple amalgamation, which only saved 46%. The claims cover an area of 300 by 10,000', and include water-power sites that will generate from 300 to 1,000 h. p.

(2) the Lone Star claims of 113 acres, also 1,070 acres of farm land and a 5-acre water power site, completely equipped with 30-stamp mill, 500-h. p. hydro-electric plant, shops, etc., costing $270,000. This mine has yielded $1,200,000; though only 50% of the assay value was recovered.

Development work has proven a block of ore averaging 8½' thick, 925' long, and with an average back of 456', which contains 262,383 tons of ore averaging $10.82 per ton. Gross value of ore developed, $2,839,931. With an 80% recovery, net gross value is $2,271,953. With a working expenditure of $4 per ton or $1,052,531, the net profit is $1,222,415. A 150-ton mill is expected to treat this tonnage in 5 years.

(3) the Bonanza Mars mines of 335 acres, plus 1,600 acres of farm land, together with general equipment, consisting of hydro-electric plant, 100-ton stamp-mill and cyanide plant, houses, etc., which cost $400,000. Reserves are estimated at 2,000,000 tons with over 90,000 tons that will average $12 per ton, available. This mine has yielded over $1,200,000.

The consolidation of these producing properties and their operation by modern methods, are expected to yield large returns.

TONOPAH NICARAGUA CO. **NICARAGUA**

Controlled by the Tonopah Mining Co. of Nevada.

Property: the Santa Rita mines, 30 miles from the Eden Mining Co.'s mine. Diamond-drilling was completed in July, 1918. Work to date has developed 984,232 tons of carbonate ore, assaying 63 cents gold and 4.832% copper; 63,556 tons of sulphide ore, averaging $3.41 gold and 10.287% copper, and 08,800 tons of sulphide ore, containing 27 cents gold and 3.365% copper. There is also 35,500 tons of tailing, assaying $2.73 gold and 1.97% copper. The aggregate is 1,492,088 tons, carrying 91 cents gold and 5.059% copper. Work has been suspended until it is practicable to erect a mill, for which tests have been made.

SALVADOR

BUTTERS DIVISADERO CO. **SALVADOR**

Property taken over August 5, 1919, by El Salvador Silver Mines Co., which see.

BUTTERS POTOSI CONSOLIDATED MINES, INC. **SALVADOR**

Property acquired August 5, 1919, by El Salvador Silver Mines Co., which see.

WEST INDIES

Including Cuba, Hayti, San Domingo, and Porto Rico.

CUBA

METAL MINES OF THE REPUBLIC

The following mines, active at last accounts, are grouped by States:

Pinar del Rio

Asiento Viejo (copper).
El Brujo (copper).
Buena Vista Mining Co. (copper).
Cia. Minera de Cobre de Pinar del Rio y San Juan (copper).
Constancia (copper).
Francisco Mining Co. (copper).
Matahambre (copper).
Mercedita (copper).
San Gumersindo (copper).
Cia. Minera Occidental de Cuba (copper).

Mantanzas

Jack (chrome-iron).

Santa Clara

Carlota (copper and sulphur).
Mercedes (iron and copper).

Oriente

Cauto Mining Co. (manganese).
Cia. Mercantil de Crediror (manganese and copper).
Cuban Mining Co. (manganese).
Juragua Iron Co. (iron ore).
Ponupo Manganese Co. (manganese).
Spanish American Iron Co. (iron ore).

Mining in Cuba was extraordinarily active in 1917-18, but very dull during 1919, when one of the largest mining properties was closed indefinitely. The chrome and manganese deposits were examined for the U. S. Government in 1918 (described in Bull. 380 of the U. S. Geological Survey and in Bull. 153, September, 1919, of the A. I. M. & M. E.)

CUBA COPPER CO. CUBA

Office: 60 Wall St., New York.

Operations discontinued January, 1919, on account of low grade of the ore and abnormal conditions. Equipment being sold. See Vol. XIII for history and description of operations since 1907.

LOS CERROS COPPER CO. CUBA

Office: Blackstone Bldg., Cleveland, Ohio.

Officers: W. I. Boardman, pres.; W. C. Watkins, v. p.; Sherman C. Dalbey, sec.; W. L. Rees, treas.; Col. D. H. Pond, gen. mgr.

Inc. Aug. 12, 1905, in Arizona. **Cap.**, $500,000; shares $100 par.

Property: 2 claims, 100 acres, also 1,500 acres of non-mineral land, near Fomento, Prov. de Sta. Clara, Cuba, opened by 3 shallow shafts and 5 tunnels, longest 250', showing ore assaying 10% copper, 20 to 25% zinc, 20% sulphur and 30% silica, with gold and silver values. Zinc apparently decreases at depth

he vein has a 12' to 15' gossan outcrop along its strike. Property is an antigua st operated in 1750. The ore though mostly low-grade and zinciferous can be ncentrated and property is considered worthy of further development under mpetent direction.

IATAHAMBRE MINES **CUBA**

Address: A. H. Diaz, Consulado 57, Havana, Cuba. D. F. McCorick, Matahambre, Pinar del Rio.

Property: 12 patented claims, leased by estate of M. L. Diaz, about 000 hectares, in province of Pinar del Rio, 110 miles west of Habana.

Geology: ore occurs in lenses in a series of fault veins cutting the dimentary rocks; the ore is a clean sulphide which carries copper (17%), ld and silver.

Development: by 600' vertical shaft and tunnels.

Equipment: includes double-drum Lidgerwood hoist, Ingersoll comessor, De La Vergne oil engines, tramway, and 200-ton concentrator. A powerant is to be built.

Production: 6,000,000 lb. in 1914; 40,000 tons of 12% ore in 1915; 80,000 ns in 1916; and 25,000,000 lb. in 1918.

INAR COPPER CO. **CUBA**

Address: C. H. Hyde, 120 Broadway, New York.

Officers: C. H. Hyde, pres.; Caldwell Hardy, v. p.; with W. H. Hinkle, J. R. Muurling, G. H. Rohrdanz, and C. S. Sweetland, directors.

Cap., $5,000,000; shares $1 par; $3,546,000 outstanding. Listed on New ork Curb. Registrar & Transfer Co., New York, agents.

Property: El Mono claims adjoining the Matahambre copper mines, ar city of that name in Pinar del Rio, Cuba.

ONUPO MANGANESE CO. **CUBA**

Out of business. Formerly controlled by Chas. F. Rand, 61 Broadway, New ork City. See Vol. XIII for description.

EST INDIES MINES DEVELOPMENT CO. **CUBA**

Address: 25 Broad St., New York.

Property: the Constancia and other copper mines near Viñales, Western Cuba, and north of the Matahambre mine. M. Paetzold, former Austrian nsul at Habaña, controls mines.

HAYTI AND SANTO DOMINGO

LANTON COPPER MINING SYNDICATE **SAN DOMINGO**

Inactive. **Address:** The Bourse Bldg., Philadelphia, Pa. **Mine office:** caro, San Cristobal, Santo Domingo.

Officers: E. J. Hedden, pres.; H. A. Smith, sec.; J. B. Thom, treas.; th M. W. O'Boyer, A. D. Blackinton, J. F. Wilt, directors. F. T. Eddingfield, r., Santo Domingo; Otto Peterson, supt.

Inc. Feb. 16, 1910, in Delaware. **Cap.,** $500,000; shares $25 par; nonessable; $360,000 outstanding. Authorized bond issue, $400,000; $180,000 tstanding. Annual meeting, first Monday in January. **Total receipts from** sales from October, 1915, to July 15, 1916, amounted to $45,193, or net cash, ,440, for 857 tons selected ore, the ore averaging 12.4% copper and $1.60 in gold l silver. Shipments from January-July, 1917, totaled 231 tons of 12.78% per ore. This ore is hand sorted about 10 into 1. Property examined and orted on by F. Lynwood Garrison, Thos. F. Donnelly, Henry D. Adams, and T. Eddyfield.

Property: 1,700 acres, held under government concession, including the caro mine, on the Rio Nigua, 27 miles west of San Domingo, bought of San ristobal Mining Co. Property shows orebodies in limestone, near a porphyry ntact, one orebody in the Bucaro mine carrying chalcopyrite, bornite and chalcite, all auriferous and argentiferous.

Development: by tunnels, the work aggregating 3,500' in 1917. Com[redacted] 35,000 tons ore blocked out and that property is near the profitable

stage. The Ferdinand vein opened for 200′ on No. 1 level is said to average 16′ of 4% ore for 150′, and has 25,000 tons nearly probable ore. The Santiago vein appears to be 40′ to 80′ wide and assays ½ to 1½% copper for levels 130′ apart along 200′ drift.

Company out of funds and properties idle.

HAYTI MINES CO. HAYTI

Address: 25 Broad St., New York City.

Inc. 1910, in New York. **Cap.,** $1,000,000; shares $5 par; non-assessable.

Is a New York corporation. Property is held by the Minière de Terre Neuve, a Haitian corporation, whose title is direct from Haitian government, to whom company must pay 5% royalty on all copper or other ores mined, from a concession covering 250 square miles N. W. of Gonaives, Hayti.

The property contains at Memé a contact metamorphic deposit of bornite ore in garnetized Tertiary limestone, invaded and altered by andesite and by quartz diorite. Also veins of copper ore in the eruptive rock at and near the village of Terre Neuve. Considerable surface stripping and numerous shallow shafts and short tunnels have been driven on the property, and shipments of sorted ore made to New York smelters. Reports on property made to Vogelstein & Co. by Duncan Rogers and Bela Low. Examination also made by J. E. France and W. H. Weed.

PORTO RICO

Several copper deposits are known in this island, some of which were prospected 75 years ago, but since American ownership no mines have been worked or even prospected. The Department of Agriculture and Labor was to issue a bulletin on mining opportunities in this Territory.

ABUNDANCIA; MINA LA

Mine near Rio Blanca, Porto Rico, opened in 1869. Produced a small quantity of rich oxidized ore from a paystreak of 8 to 15″, carrying bornite and chalcopyrite averaging 10 to 12% copper, in a 6 to 10′ vein of cupriferous pyrrhotite. Idle for several years.

SOUTH AMERICA

ARGENTINA

FAMATINA CO., LTD. **ARGENTINA**

The company's property is operated by a receiver and manager, appointed June 27, 1913, on behalf of the prior lien and other debenture holders.

Office: 638 Salisbury House, London, E. C., England. **Directors:** Wm. Parker, D. H. Bayldon, and G. E. Stephenson. F. F. Fuller, sec.

Company is a reconstruction of the Famatina Development Corporation, Ltd. **Inc.** June, 1912. **Cap.,** £800,000 shares 10s. par; 1,523,489 issued and fully paid, of which 1,126,165 are credited 7s. paid. Bonds authorized, £200,000 5%, of which £151,500 are issued.

Property: 850 acres, in 4 groups, in the Mexicana district of the Sierra Famatina range, province of Rioja, Argentine Republic, including the 6 principal mines of the district, the Upulungos group, Mellizas group, Compania group and San Pedro group. These lands lie at an elevation of 15,000' and are very difficult of access and transport.

The company has inherited a troublesome problem and a variety of financial as well as mining troubles. Fresh capital was put into the company in 1912, with the understanding that the property would be profitable as soon as smelting was resumed. The then manager, Mr. Parker, stated, May, 1913, that the assay-value of the ore had been overestimated, and that the ore extracted is lower grade than previously reported. The smelter is not yet complete nor running smoothly, and the finances of the company are in a bad way, the £20,000 guaranteed by the big stockholders having been spent and the directors seeking further funds. Mines regarded as good, but company overcapitalized.

No recent information is available, save that the property was examined in 1919 by Bancroft Gore, of New York. Operations are to be resumed 1920, the new machinery ordered including a 7,000 cu. ft. blower.

NATIONAL LEAD CO. OF ARGENTINA **ARGENTINA**

Subsidiary of National Lead Co. of 111 Broadway, New York, organized to manufacture mixed metals in the republic.

BOLIVIA

ARACA; COMPANIA MINERA DE **BOLIVIA**

Office: Oruro or Santiago, Bolivia. Mine at Araca, Bolivia.

ARAMAYO FRANCKE MINES, LTD. **BOLIVIA**

Office: H. F. Ings, sec., 148½ Fenchurch St., London, E. C. 3, England. **Mine office:** Quechisla, Bolivia.

Directors in England: F. A. Aramayo, chairman; Bernard Dale, L. A. Pensington, Robt. G. Ribon, and F. J. Torromé.

Directors in Bolivia: F. A. Aramayo, chairman and managing; C. V. Aramayo, C. Navarro, and M. Roberts (gen. mgr.).

Inc. Oct. 17, 1906, as Aramayo Francke & Co., Ltd. **Cap.,** £600,000; shares £1 par; £597,090 outstanding. Name of company changed to present title, January, 1911.

Profits have been as follows: £135,764 in 1914; £3,504 in 1915; £167,559 in 1916; £[illegible]8,314 in 1917.

Dividends: 6d in 1909; 1s 6d in 1910; 2s in 1911; 3s in 1911-12; 3s 6d in

1912-'13; 2s. in 1913-'14; 1s. 6d. in 1914-'15; 3s. in 1915-'16; 3s. in 1916-'17; 6s. in 1917-'18; and 3 s in 1918-'19 to February, 1919.

Property: consists of the consolidated mining rights over the mountain group of Chorolque, 817 hectares, containing tin, bismuth and wolfram, the concentration works of Santa Barbara, Santa Elena and Sala-Sala; the establishments of Cotani, with its mines; the Quechisla smelter; the mines at Tasna, covering 1,460 hectares, with concentrator and smelter at Buen-Retiro; the mines at Churquini, Chocaya, 81½ hectares, the estates of Quechisla and Atocha and the concentrating plant at Asllani, besides other mining rights of lesser importance.

At Chorolque the company operates 2 groups of mines, the Chorolque at 18,000', with veins averaging 3' wide cutting andesite near limestone contact. Company operations at Chocaya yield silver-tin ores from narrow (1'-3') veins in dacite intrusive in slate. At Tasna, bismuth ores are mined.

Production—the products are varied, as shown below:

Year	Black Tin, Tons	Copper Matte, Tons	Silver, Oz.	Wolfram, Tons
1916-'17.....	2,059	118	523,284	227
1915-'16.....	2,095	19	110,000	148
1914-'15.....	2,060	111	.....	...
1913-'14.....	3,442	342	.....	...

Company is one of the largest operators in Bolivia.

BERENGUELA TIN MINES, LTD. BOLIVIA

Office: G. E. Elgee, sec., Leadenhall Bldg., London, E. C. 3, England

Directors: J. Macandrew, chairman; J. L. Barber, J. D. Campbell, C. M. Read, and J. W. Read. C. L. Price, mgr.

Inc. April 20, 1905, in Great Britain. **Cap.**, £20,000; £1 par; £ issued.

Profit in 1917 was £9,083, of which £4,000 was distributed; £9,038 was carried forward.

Dividends: 20% in 1916 and 1917.

Property: 123 acres of tin claims at Berenguela in Bolivia, equipped with a concentrating mill.

Production: 202 tons of tin concentrate (71% metal) in 1914; 193 tons in 1915; 324 tons in 1916; and 348 tons in 1917.

CASA BELIN HERMANOS BOLIVIA

Office and mine at Potosi, Bolivia.

COROCORO DE BOLIVIA, COMPANIA BOLIVIA

Mine office: Coro Coro, La Paz, Bolivia. G. B. Lott, mine supt.

Inc. April 23, 1873, in Bolivia. **Cap.**, 1,025,000 bolivianos.

Property: 500 hectares; is the largest copper mine in Bolivia, employing, at last accounts, about 1,000 men. Mine 530 meters deep, is opened on steeply inclined sandstone and conglomerate strata carrying native copper, all rarely native silver, with occasional cuprite and chalcocite.

Development: by six vertical shafts timbered with 8x10" Oregon pine and equipped with electric hoists ranging from 50 to 180 h. p. The ore when mined is soft, and even when dry disintegrates in the hand. The copper is between the grains of sand so that grinding in the usual sense is not necessary. Two 12x18" jaw crushers will disintegrate 1,000 tons in 10 hours. Jigs save 95% of the total mill recovery. Capacity of mill is 200 to 250 tons of ore per day with heads assaying 2 to 3% copper.

Equipment: includes a narrow-gauge line between shafts and mill, operated by gasoline locomotive, 1,500-h. p. Diesel engines and a mill. The product is exported as "copper mineral," production ranging from 800 to 1,000 quintals of 46 kilos, monthly, of "barillas de cobre" of about 85% average copper tenor. Copper sulphide, as chalcocite, is exported as crude ore at the rate of 1,500 metric tons monthly of 18% copper.

COROCORO UNITED COPPER MINES, LTD. BOLIVIA

Registered office: 5 Lothbury, London E. C., England. Main office

7 Rue des Italiens, Paris, France. **Mine office:** Corocoro, La Paz. Bolivia.

Officers: Baron René de Batz, chairman; J. L. Barber, P. Bebin, A. Berthin, N. Berthin, G. Charbonnel, F. Harrington, L. Monnier, Baron C. Portalis, and Baron F. Portalis, directors; G. Bryans Wolfe, sec. in London; Roger Leo, sec. in Paris; F. J. Dorrian, gen. mgr.

Inc. Aug. 6, 1909, in Great Britain. **Cap.**, F700,000; shares Ff par; 673,607 issued, fully paid. Company took over the properties of J. K. Child & Co., Ltd.; Sucesión Noël Berthin; Compañia Sud Americana de Cobre de Corocoro, and Carreras Hermanos.

Profit for year ended June 30, 1918, was £168,128, of which £155,448 was paid in dividends. Balance earned to 1919, was £41,547. Reserves total £170,000.

Dividends: 120 francs in 1912-'13; 60 centimes in 1913-'14; 1 franc in 1914-'15; 3 francs in 1915-'16; 6 francs in 1916-'17; and 6 francs in 1917-'18.

Property: 515 hectares at 12,000′ elevation, in the Corocoro district of central Bolivia. The principal mines are the Vizcachani, Santa Rosa and Gualatiri. The first was formerly owned by J. K. Child & Co; the second, by Carreras Bros., and the third by the Noël Berthin estate.

Geology: the copper is found native in several beds of sandstone inter-stratified with reddish and brownish shale. The ore-bearing beds occur in 2 series, separated by a strong fault. Beds to the east of this fault are known as "ramos" and dip east, the copper-bearing strata being succeeded by a considerable thickness of red slates capped by green slates and limestone, overlain in turn by red clay and brown sandstone. Beds west of the fault are known as "vetas," or veins, and are much harder than the copper-bearing ramos. The mineralization is not uniform and the native copper occurs in particles scarcely visible to the naked eye, as well as in grains, plates, threads and, sometimes flat masses weighing several hundred pounds. The main fault, known as Dorado vein, is also mineralized, and was once the main producer of the company, yielding sulphides and arsenides of copper. It is supposed that this fault was the feeding fissure whose solutions spread into the sandstone and were precipitated by organic matter; but there are also other geological theories.

The mine workings have not yet crosscut very far into the series, but show at least 4 ramos and 6 vetas, the four former are divided into 7 cuerpos, or beds, and the 6 veins into 10 to 14 beds. Some of these beds have 7 to 8 meters of homogeneous ore, the white ramos being 30 metres wide on the 10th level of the Vizcachani shaft, of which 8 meters are mined as ores. The beds average 10 meters workable thickness with an average content of 3½%.

The district is extremely arid, without timber, and almost without shrubs, and extensive use is made of a local fuel, called taquia, which is currently used for firing boilers and also for drying ores, and in the past was even used for smelting.

Work was recently started on the croppings of several beds where the mineralization appears in the shape of sulphides. These sulphides, after hand-sorting, are bagged and shipped. Company has erected a flotation plant for the concentration of the ores; the starting capacity being 125 tons daily.

Development: the mine openings in the conglomerate strata stand fairly well, though with some crushing, and levels average 25 metres apart. Winzes are inclined, with steps cut. Little timbering is used, except for shafts, owing to its great cost, timber being imported mainly from North America, and the workings are secured principally by the poteo or dry-walling system. Steel is used for arching lateral workings.

The property is divided into 4 operating units, the principal and active sections being the Corocoro and the Guallatiri. The former has a vertical shaft 300 meters deep, equipped with a steam plant, and ore-sorting and crushing plant. The Guallatiri has shafts of 180 and 350 meters.

Equipment: ore is treated in 3 mills of 10 to 100 tons daily capacity, making a product known as "barilla," or crude copper mineral, of 80 to 88% copper tenor, which is shipped to Europe for refining. An electric power plant of 500-k. w., in which alternators are driven by semi-Diesel engines, has been erected, and a further increase of 300-k. w. is contemplated.

Production: in 1912 was 4,100,000 lb. fine copper; in 1913, 3,784,000 lb.; in 1914, 4,150,000; in 1915, 7,166,000; in 1916, 11,300,000 lb. During 1917-18, there was mined 169,561 tons of ore, averaging 3.83% copper. This was sorted to 118,209 tons containing 5.49%; while mill products, etc., amounted to 22,633 tons, averaging 2.87%. Total copper output was 14,311,360 lb.

Owing to the remote and almost inaccessible location of these mines, past production has been small, compared with possibilities, but the company is making progress and output is steadily increasing since rail communication has been established. The property is considered decidedly promising.

EMPRESA AVICAYA BOLIVIA

Mine address: Aricaya, via Pazña, Bolivia.

EMPRESA NUEVA PENNY & DUNCAN BOLIVIA

Office: Oruro, Bolivia. Mine at Morococola, Bolivia.

EMPRESA SOUX HERNANDEZ BOLIVIA

Office and mine at Potosi, Bolivia.

HUANCHACA DE BOLIVIA, COMPANIA BOLIVIA

Offices: C. Fresno, Calle Pratt 141, Valparaiso, Chile; and J. del Rio, 22 Rue de la Pepinière, Paris, France.

Directors: A. Alessandri, pres.; R. Couzinier, v. p.; C. E. Devincour, M. Edwards, and R. Wedeles; J. C. Tonkin and T. E. Allen, min. engrs.

Inc. 1873, in Bolivia. Cap., 40,000,000 francs; shares f. 125 par, all issued. Listed on Paris Bourse.

The year 1917 resulted in a loss of £27,989 with debit balance of £58,607, and £64,583 in reserve fund.

Dividends: £2,112,000 from 1899 to 1908, inclusive; nothing since.

Property: 3,300 acres, including silver mines at Pulacayo (or Huanchuca), Potosi, Bolivia. **Equipment:** includes 25-mile railway, and 2 smelting works.

Production: 1,168,000 oz. of silver in 1917.

HUAYUA-POTOSI y MILLUNI, COMPANIA BOLIVIA

Office: Huet Hnos, La Paz, Bolivia. Mines at Milluni, Bolivia.

INTERNATIONAL MINING CO. BOLIVIA

Offices: W. R. Grace & Co., 7 Hanover Square, New York; and La Paz, Bolivia.

Officers: D. S. Inglehart, J. Louis Schafer, J. E. Zallas, and J. M. Connal, manager, directors.

Inc. July 1, 1918. Owns tin and wolfram mines in Bolivia.

LLALLAGUA TIN CO. CHILE AND BOLIVIA

Address: Oruro, Bolivia, and Arica, Chile.

Cap., £425,000. Financial statement for 1917 showed a profit of £1,407,048, of which £637,500 was distributed in dividends. Reserve fund totaled £1,316,000, including £850,000 for dividends and interest; £153,000 for new works and £93,000 for exploitation.

Development: by a main haulage tunnel called Siglo XX, which is 8,420 meters long, and cost 1,394,365 bolivianos. At the beginning of 1918 ore reserves were 261,902 tons, averaging 14.33% tin, equal to 37,544 tons of metal.

Production: 7,460 tons of "barilla" (tin concentrate) in 1916, compared with 11,250 tons in 1917. Costs averaged $172.80 in 1916, and $156.80 per ton of concentrate in 1917.

At Arica, Chile, company operates a smelter of 1,500 tons monthly capacity of concentrate. Is one of the greatest tin producers in the world.

OLLA DE ORO (BOLIVIA) GOLD MINE, LTD. BOLIVIA

Office: 33 St. Swithin's Lane, London, E. C., Eng. **Directors:** A. F. Martin, chairman; R. R. Harris and W. E. Hall. E. T. Roe, sec. J. G. Prentice, mgr., La Paz, Bolivia.

Inc. Aug. 18, 1909, in England. Cap., £40,000; shares £1 par; all issued.

Dividends: 5% in 1913; 6¼% in 1914.

Property: 5 groups, 302 pertenencias, 720 acres, on the Umahamba vein.

La Paz, Bolivia, carrying gold ore in quartz veins in slate and quartzite. Vein s 2-6′ wide and ore averages about ½ oz. gold per ton with a little silver.

Development: by several tunnels, longest 800′.

Ore reserves: estimated at 35,000 tons in sight with 9,600 tons broken ore in stopes.

Equipment: includes mining plant and a mill with 140-h. p. turbine, Hardinge ball and 2 pebble mills, compressor, electric power and tram lines. Plant capable of treating over 100 tons daily. Over 85% of the values are saved by amalgamation.

Production: owing to loss of mill was but 9,920 tons in 1914; 21,426 ons in 1915; yielding 4,949 oz. gold. In 1916 various lawsuits involving title to ompany's claims were decided in its favor.

Company has had severe hardships to combat, cloudbursts wrecking the mill n December, 1912, and again in March, 1914, so that both mining and milling perations were transferred to a new site. Ore value had decreased to 0.3 of n ounce gold for 5′ width, at last reports.

)PLOCA DE BOLIVIA; CIA MINERA y AGRICOLA **BOLIVIA**

Office: Santiago, Chile. Mines at Chocaya, Bolivia.

)RURO; COMPANIA MINERA DE **BOLIVIA**

Main office: Huerfanos 1326, Santiago, Chile. Mine at Oruro, Bolivia.

Officers: Don Leonidas Vial, pres.; Don C. A. Solar, L. B. Borgono, arlos Besa, A. G. Errazuriz, J. A. Orrego, directors. H. F. Grondijs, cons. engr.; . F. Bliek, mgr.; M. G. Sohnlein, mill supt.

Cap., Bolivianos, 4,000,000. outstanding 300,000 shares. Financial statement for 1918 shows net profit of Bs, 664,910, bringing reserve fund up to s. 3,532,497. **Dividends:** has paid 15 dividends of Bs 2. per share.

Property: at Oruro, includes the Mina Socovan, Itos, La Colorado, tocho, and Escuelas, in which are several veins, the principal ones being the olores and the Purisima.

Development: at Mina Itos by 420 m. shaft on a vein 0.40 m. wide, hich, in 1918, produced 7,246 tons of ore that averaged 16.5 kilos silver and 30% tin per ton. The Mina Socovan has 270 meter shaft from which 10,360 ns of ore was mined in 1918 that averaged 7.17 kilos silver and 1.69% tin.

Reserves: at Mina Socovan, about 23,900 tons that average 5.5 kilos ver per metric ton, and 1.15% tin. Mina Itos reserves total 3,700 tons, and erage 28 kilos silver and 3.0% tin.

Equipment: includes hoists, 100-h. p. compressor. Diesel engine, elec- c power, buildings, etc. Mill at Machamarca includes McDougall and Merton asters, Hardinge mill, tables, jigs, etc.

Production: in 1918 was 1,110 tons of barilla (concentrate) carrying 41% tin.

Company has a good property, ably managed.

For geology of district, see Miller-Singewald Min. Deposits of So. America, 110.

.TINO; SIMON I. **BOLIVIA**

The largest tin operator in Bolivia, owning the Huanuni mines.

)RCO TIN MINES LTD. **BOLIVIA**

Office: H. F. Ings, 148½ Fenchurch St., London, E. C. 3, England.

Directors: E. Hooper, chairman; L. A. Kensington, R. G. Ribon, and Macandrew. A. B. Reece, gen. mgr.; M. Roberts, cons. engr. Avelino Araayo & Co., general agents in England.

Inc. Sept. 27, 1912, in England. **Cap.,** £140,000; shares £1 par; 120,075 ted. Debentures: £19,900, 6%.

The year 1917 ended with a loss of £272. Current assets were £11,381, and ilities, £58,003. Profit in 1918 was £777, and indebtedness to Avelino Aramayo ounted to £57,202.

Property: 400 acres, 25 miles from Potosi, Bolivia. Mines were worked he 16th century for silver, but are now worked for tin. The district is mounous, up to 17,000′ at one point. (See Eng. & Mng. Journal, February 24, 1917).

Geology: the Porco company is working tin deposits in igneous agglo-

merate, tuff and quartz porphyry. The San Jose vein is a shattered zone with orebodies of massive pyrite, low in tin, but with 8 oz. silver per ton. One shoot is 500' long and 6½' wide. Another is 170' long and 8' wide, assaying 3% tin.

Development: by tunnels, open cuts and drifts. Reserves in 1918 were 315,000 tons of 1.67% tin content.

Equipment: includes 2½-mile aerial tram and a 100-ton mill, 2 ball mills, screens, jigs, Wilfley tables, Huntington mill, classifiers, Humboldt tables, buddles, etc. The tailing is cyanided for the silver. Mill at Agua Castillo recovers only about 60%.

Production: in 1915, 168,000 lb. tin; in 1916, 443,500 lb.; in 1917, 20,404 tons of ore yielding 307 tons of tin oxide; in 1918, 274 tons of tin. Mill ore averages 2½% tin and 12 oz. silver per ton; 20,404 tons of ore yielding 307 tons of tin oxide, compared with 17,320 tons of ore and 274 tons of tin in 1918.

ROYAL SILVER MINES, LTD. BOLIVIA

Operates silver-tin mines at Potosi, mining through the Socovan Real. This company, together with Bebin Hermanos and Louis Soux, control operations at this famous camp.

SAN JOSÉ; CIA. MINERA DE BOLIVIA

Is a Chilian company operating tin mines at Oruro. See Cia. Min. de Oruro.

TOTORAL; SOCIEDAD ESTANIFERA BOLIVIA

Office: Santiago, Chile. Mine at Totoral, 7 miles from Pazna, Bolivia.

UNCIA; COMPANIA MINERA DE BOLIVIA

Office: Oruro, Bolivia. Company owns mines at Uncia, and the Huanuni mine.

BRAZIL

The mineral deposits of Brazil include two important gold mines and the remarkable diamond bearing conglomerates and gravels near Diamantina, in Minas Geraes, about 360 miles due north of Rio de Janeiro. It is also the world's largest producer of monazite sand. Manganese is at present the most important mineral product of Brazil, though the great deposits of iron ore are without doubt the most extensive undeveloped deposits of any country in the world.

BRACUHY FALLS CO. BRAZIL

Address: Joaquin de Almeida Lustoza, Ouro Preto, Brazil.

Property: the Serra do Mascate, Mendonca, and Inhotin iron deposits containing over 29,000,000 tons of iron ore.

BRAZIL; CIA. de MIN. y MET. do BRAZIL

(Brazilian Mining and Metallurgical Co.)

Address: Rio de Janeiro, Brazil.

Property: iron mines acquired from Antonio da Costa Lage of Rio.

BRAZILEVIA, COMPANHIA METALLURGICA BRAZIL

Address: Rio de Janeiro, Brazil.

Property: 8 manganese mines in State of Minas Geraes, estimated to contain 100,000,000 tons of ore.

BRAZILIAN IRON STEEL CO. BRAZIL

Address: M. Harder, Rio de Janeiro, Brazil.

Property: the Cana and Santa Anna iron ore deposits containing 10,000,000 tons, and the Algeria and Cota deposits of 10,000,000 tons. A concession is held for construction of a railway.

ITABIRA IRON ORE CO., LTD. BRAZIL

Office: R. S. Long, 81 Gracechurch St., London, E. C. 3, England.

Directors: G. W. B. Pease, chairman; Sir A. J. Dorman, F. W. Lee, J. Whishaw, I. H. Benn, P. M. Gotto, and F. A. E. Samuelson. G. H. Robinson, engr., Itabira, Brazil.

Inc. March 31, 1911, in England. **Cap.,** £2,000,000, in 500,000 shares, 359,438 issued; and 1,500,000 ord. £1 shares, all issued.

Notes: £345,000, holders having the right to form a new company to take over the property in 1921.

Property. 18,271 acres in the Province of Minas Geraes, Brazil. Ore reserves are estimated at 140,000,000 tons of hematite, assaying 69% iron; also 20,000,000 tons of second grade, and 330,000,000 tons of soft ore. A royalty of 6d. (12c.) per ton is payable to the B. H. Syndicate, Ltd., the previous owners.

OURO PRETO GOLD MINES OF BRAZIL, LTD. **BRAZIL**

Office: G. H. Wells, 6 Queen St. Place, London, E. C. 4, England.

Directors: J. Taylor, chairman; E. Beer, M. Paisant, R. Taylor and E. F. H. de Wael. A. J. Bensusan, mgr.; John Taylor & Sons, mgrs.

Inc. July 10, 1914 (originally Jan. 31, 1884), in England. **Cap.**, £100,000 in 60,000 10% non-cumulative pfd. and 40,000 ordinary £1 shares, of which 12,212 and 39,422 are issued respectively. Recent profits have been £7,402 in 1914; £9,545 in 1915; £7,243 in 1916; and £4,834 in 1917. Working capital at end of 1917 was £35,692.

Property: a concession of 3½ sq. miles in the province of Minas Geraes, Brazil, including the Passagem mine, which had reserves estimated at 74,700 tons at the end of 1915, and 61,230 tons at end of 1917. It is second only to the Morro Velho in importance and worked since 1817.

Equipment: includes 80-stamp mill and cyanide plant, extracting 92% of the gold. The Santa Anna section of property contains workable manganese, which is being shipped. Ore is somewhat refractory, containing arsenic.

Production:	Tons	Gold, Oz.	Value
1918	63,400	22,532	£90,130
1917	82,500	28,840	115,432
1916	87,600	30,244	121,233
1915	85,400	30,203	120,591

In Nov., 1919, the mine yielded 7,200 tons, from which £13,280 was recovered. The geology of the district and mine are described by Miller & Singewald, in Mineral Deposits of South America, 1919.

ST. JOHN DEL REY MINING CO., LTD. **BRAZIL**

Office: S. E. Berry, Finsbury House, Bloomfield St., London, E. C. 2, England. **Mine office:** G. Chalmers, supt.; A. G. W. Chalmers, asst. supt., Morro Velho, Minas Geraes, Brazil.

Officers: Sir H. P. Harris, chairman; J. R. Remnant, E A. Goulding, H. LeRoy Lewis and C. F. W. Kup, managing directors.

Inc. 1830, in England. **Cap.**, authorized, £800,000, in 600,000 ordinary, 100,000 preference, and 100,000 second preference shares of £1. Issued, £646,265, in 546,265 ordinary and 100,000 preference shares, fully paid. In 1891 capital was increased from £252,000 to £432,000; in 1893 to £462,000; in 1895 to £500,000; in 1895 to £600,000, in 1904 to £700,000, and in 1910 to £800,000. Preference shares are entitled to a non-cumulative dividend of 10% (paid free of income tax in December and June), and to priority for capital, without further participation. Second preference shares will be entitled to a non-cumulative dividend of 10%, and to priority for capital over ordinary shares, without further participation. Net profit for year ended February 28, 1917, was £132,637; £157,736 in 1918; and £119,000 in 1919. Reserve fund is £100,000.

Dividends: from 1842 to 1867, £896,500 on ordinary shares; since then these shares received a total of 320% to 1910, after which 10% per annum to 1917, and 3¼% in 1918.

Property: the Morro Velho and Cuba gold mines and iron deposits in State of Minas Geraes, Brazil. Considered the oldest and deepest modern mine in the world, as work has been continued since 1830, and workings are 6,126′ deep vertical. The iron deposits contain 300,000,000 tons of ore, carrying 60% metal. There is also a manganese deposit assaying 47 to 51% Mn, and 8 to 11% Fe.

Development: amounts to about 4,000′ yearly. Below No. 20 level, 5,900′ deep, there has been opened 844′ of lode. Temperature on the 6,100′ level is 99° for the air and 108° for the rock. Reserves are estimated at 1,209,104 tons.

Equipment: complete mine, mill, and power plants. Treatment is by 30 stamps, 7 tube-mills, concentrators, roasting furnaces, cyanidation and filters. Aerial trams are used to advantage. Company operates a store, hotel, medical

Owns entire capital stock and bond issue of the Braden Copper Co. Farmers Loan & Trust Co., New York, registrar. D. A. Crockett, 149 Broadway, New York, transfer agent. Annual meeting, fourth Monday in June.

In December, 1915, offer was made by the Kennecott Copper Corp. to purchase the stock of the company, payment to be made in Kennecott Copper Corp. stock. As an alternative stockholders had the privilege of receiving $15 in cash for each share of the Braden Copper Mines Co. As a result of this offer the Kennecott now owns 99% of the stock of the company, which, based on the market value of stock at the time the offer was made, cost $42,281,300.

Combined Income and Surplus Accounts, years ended December 31:

	1919*	1918	1917	1916
Operating revenue	$977,848	$19,247,230	$13,041,925	$12,648,111
Operating charges	1,222,789	11,689,308	6,699,726	5,057,656
Operating profit	$244,941†	$7,557,921	$6,342,199	$7,590,455
Other income	1,124,687‡	226,241	876,937	385,095
Total income	$879,746	$7,784,162	$7,219,136	$7,975,550
Taxes, interest, etc	1,418,329	1,547,141	1,110,749	1,029,786
Balance to surplus	$538,583§	$6,237,021	$6,108,387	$6,945,764
Charges against surplus	.....	2,540,141	3,245,276	1,865,089
Net surplus	.....	$3,696,800	$2,863,111	$5,080,675
Net balance from previous year	$5,036,540	2,881,198	2,193,628	1,658,629
Total balance	.....	$6,578,079	$5,056,739	$6,738,704
Less unamortized bond discount	.....	1,541,438	1,170,000	1,260,000
Net earned surplus	$4,497,957	$5,036,540	$3,886,739	$5,478,704

*6 months. †Loss. ‡Includes interest, $822,234. §Deficit.

Current Assets and Liabilities, Braden Copper Co., years ended December 31:

Assets.	1918	1917	1916
Invest. in steamers	$426,665	$426,665	$811,200
Supplies and stores	8,921,180	6,135,896	3,619,143
Items in transit	1,379,396	1,706,505	1,208,398
Deferred accounts	191,731	105,869	319,079
Accounts, etc., receivable	1,796,379	337,552	73,468
Ore and copper in process	207,334	195,005	87,697
Copper on hand, etc	4,083,962	3,274,694	4,558,847
Cash	1,618,645	2,292,669	666,852
Total current	$18,625,292	$14,476,855	$11,329,178
Liabilities.	**1918**	**1917**	**1916**
Accounts payable	$962,551	$2,058,185	$2,519,579
Unpaid on copper	188,856	.....	412,777
Drafts payable	4,100,407	3,384,002	1,895,225
Accrued interest	322,892	375,429	297,500
Credits in suspense	125,433	178,202	431,824
Reserve for taxes	526,353	170,828	
Reserve for employees' bonus	197,259	.....	200,000
Reserve for employer's liability	252,697	.....	
Welfare reserve	58,153	38,768	
Surplus from property	3,667,970	3,667,970	3,667,970
Total current	$10,402,571	$9,875,384	$9,474,875
First mortgage bonds	$4,000,000	$4,000,000	$4,000,000
Notes and loans (Braden Copper Mines Co.)	21,069,000	14,175,000	9,000,000

Braden Copper Co.

Office: 120 Broadway, New York. **Mine office:** Sewell, Chile.

General officers: same as Braden Copper Mines Co. G. G. Thomson, purch. agent; Fred Hellman, cons. min. eng.; E. A. Cappelen Smith, cons. met. eng.; H. A. Guess, cons. mill eng.; T. H. Thomas, cons. elect. eng.; S. B. Williamson, constr. eng.; B. T. Colley, mgr. welfare dept.

Operating officials in Chile: S. S. Sorenson, gen. mgr.; L. E. Grant, asst. gen. mgr.; F. D. Helmerich, gen. mine supt.; R. E. Douglass, gen. mill supt.; W. L. Stevens, smelter supt.; J. Chambers, railroad supt.; H. W. Jones, plant comptroller.

Inc. June 18, 1904, in Maine, and name changed to present title, Aug. 9, 1904. **Cap.**, $2,332,030 shares; $10 par; non-assessable; fully issued. Company is protocolized in Chile. Is controlled, through ownership of entire stock issue, by Braden Copper Mines Co. Has a $4,000,000 issue of 6% first-mortgage convertible bonds. Annual meeting, fourth Tuesday in July.

In June, 1919, the floating debt was $21,626,569, compared with $22,031,550 on December 31, 1918. Practically all of this amount has been advanced by the Kennecott Copper Corporation.

Property: the Teniente mines, 606 claims, 7,580 acres, including 16 acres at Rancagua. Mines are reached from Valparaiso by the Chilean State railroad, 158 miles to Rancagua, and from that point by company's narrow-gauge railway, 43 miles to the smelter and mill at Sewell, and 1½ miles farther to the mines. The elevation is 7,700 to 9,000', the mine being in a very rugged region on a part of the main range of the Andes.

Company has purchased 10,000 acres of mountain land, for a tailings site, which will hold 200 million tons of tailings. It is 8 miles from the mill and together with the dam, will cost $1,200,000.

Another purchase of 40,000 acres surrounding the mine put all the company's works, including the new smelter under construction at Caletones, on the company's own land and carries smoke easements on adjacent tracts.

A third purchase included sundry lots of land and water rights needed for the new power plant on the Pangal river and a right of way for the power line. Large additions were made to the mining property during 1917 and 1918.

Geology: all the rocks are igneous and the rock at the mine is an andesite surrounding a plug of tuff, which fills the throat and crater of a volcano. This light gray tuff is no longer loose and friable, but cemented into a hard concrete-like mass. The ore deposit is unique, being a series of irregular lenses of ore formed about the border of the old plug, slightly tilted to one side. (Graham.) On one edge erosion has removed the mineral deposit. The volcanic vent is of nearly circular section 4,000' across, and filled by tuff and an agglomerate of rounded boulders of all sizes. The crater rim is surrounded by highly fractured and brecciated andesite, the fractures being mineralized around the circumference. The ore zone has been further fractured by porphyry dikes, which occasionally cut into the tuff.

The orebodies occur around, but outside the rim of the crater, in the andesite near its contact with the tuff. The ore consists of shattered andesite, often finely brecciated near the tuff contact, copper minerals filling the cracks and openings. The ore bodies are limited on one side by the tuff, but in the andesite the grade becomes lower, passing from breccia to fractured rock and fading out in the more blocky country rock. The fractures in the rock range from a mere film of sulphide up to seams 3 to 4" thick of mixed bornite and chalcopyrite, mainly the latter. The orebodies dip at 70° toward the center of the crater.

Five distinct orebodies have been proven, and four, the Fortuna, Teniente, Centinela and Bornite, are worked. All are marked by strong outcrops stained with copper minerals. The zone of oxidation is shallow, ranging from a few feet to 150' in depth, and as the deposit consists of disseminated ore, it is believed that values will persist to great depth.

The Fortuna orebody is typical of all the deposits. It is lens-shaped in [illegible] section, is developed for 3,000' in length and has a maximum width of [illegible] the 4th level, 1,425' beneath the outcrop, little increase in size can

be expected, as the rock is denser and ore is lower grade. The copper occurs as bornite and chalcopyrite, associated with ankerite and quartz. The Fortuna orebody is developed and ready for ore extraction. The shrinkage stoping system, similar to that employed at the Ray Cons., is used. Stopes are carried up 7 metres wide, with 5-metre pillars. The topography of the country is such that shafts are practically unnecessary; all ore can be taken out through tunnels, and, even though parts of the mine are very wet, pumps are not required.

The mine was gophered by former owners for high-grade ore, which was followed and extracted wherever found. Average grade of Fortuna ore is lower than in El Teniente mine, but workings show copper sulphides and occasional metallic copper throughout the brecciated material for depth of 2,000'.

The **Teniente** orebody, which is supposed to be in the crater of the old volcano, is the largest and most important orebody of the property, having a length, on No. 1 level, of 4,800', an average width of 300', and depth of 840'. It is in this orebody that the greatest increase of tonnage is to be expected. It is much the largest of the various orebodies and, with the exception of the small Bornite orebody, the richest.

No. 1 Teniente level and No. 2 Fortuna level have been extended along the tuff contact entirely around the crater, 2½ miles. The Teniente is the oldest mine of the district, having been worked by the Spaniards for the high-grade ore in the small veins.

The **Centinela** orebody is being mined above Teniente No. 3 level and will probably extend below it. The Bornite orebody worked out above the 4th level, is rich, but small, and no great extension in depth is looked for. Reginiento No. 2 orebody lies beyond the Fortuna, is lower grade and its size has not yet been determined.

New work from 1916 to 1918 inclusive aggregates 276,728'.

In 1918-19, development was mainly on the Teniente side, where large quantities of good ore was disclosed. The new ore-pass gathering system has been completed and ore caved down on the Teniente side will be sent to C level through passes, where it will be handled by motors to other passes, thence by the main electric railroad haulage-level, to the crushing plant at the mill. This new railway, completed April, 1918, is entirely underground; its grade being but 0.5% trains of fourteen 22-ton cars are used. The two-unit (5,000 cu. ft. each) compressor station is underground. Mining methods were described by Frank Cameron in the "Min. & Sci. Press" of September 20, 1919.

The main 3-compartment 9'x20' shaft, between C level and Fortuna known as shaft A, is to be 1,650' deep.

Ore reserves: calculated by Fred Hellmann, are as follows:

Year	Positive	Copper, %	Probable	Copper, %
1918.....	173,506,356	2.45	90,000,000	1.88
1917.....	149,192,000	2.42	90,000,000	1.88
1916.....	131,680,000	2.40	88,000,000	1.89

Electric power is used throughout. It is generated at the Coya hydro-electric plant on the Cachapoal river by four 2,000 k. w. Pelton wheels and generators and a 4,000 k. w. vertical Francis turbine with generator, a total capacity of 15,000 k. w. Power is delivered to mine and mill at Sewell over a 16-mile 33,000-volt transmission line.

To handle 10,000 tons of ore per day, an additional hydro-electric power plant on the Pangal river, 6 miles from the Cachapoal power plant, will develop a total of 15,000 k. w. by three Pelton impulse wheels and generators. A new transmission line has been erected between these two power stations; a new and second transmission line having already been installed between Cachapoal and Sewell, carrying current at 66,000 volts for the new smelter at Caletones and mill and mine at Sewell. The new power plant was expected to be ready early in 1920.

The motor-driven aerial tram, 2,630 meters long, with 550 meters drop and 1,000 tons daily capacity connecting the mine and mill, at Sewell, is used as a store delivery system. The main line, of 2,000 meters length, runs from the mill

to the central transfer station, where connection is made with a 1,000-meter line to El Teniente mine and a 500-meter line to La Fortuna mine. The 5-mile aerial tram from the mill at Sewell to the new smelter at Caletones will be ready at latter part of 1920.

Ore treatment: at the Sewell smelter there will be a 12,500-ton coarse-ore bin and a 10,000-ton crushing plant finished in 1921. The treatment plant is being enlarged from 7,400 to 10,000 tons daily capacity. The flow-sheet includes coarse-ore bin, gyratory crusher, rolls, Symons disc crushers, fine-ore bin, 16 Marcy mills, impact screens, trommels, Wilfley tables, 30 Hardinge mills, classifiers, two 60′ Dorr thickeners, 11 gear-driven Minerals Separation flotations units of 20 cells each, Callow flotation units and Rateau-Battu-Smoot turbo-blowers of 20,000 cu. ft. of air per minute at 7 lb. pressure for the Callow plant; also a concentrate mixing and loading plant.

An experimental leaching plant was in operation during 1915, testing the process for extraction of copper from concentrate; it is believed that process can be successfully carried out on a commercial scale, but cost of plant would be large and inadvisable at the present time.

A sulphuric acid plant provides the acid required in the flotation cell. Wilfley table concentrates are roasted in two Wedge 7-hearth furnaces. The feed carries from 6 to 7% moisture, 16% copper, 13.6% silica, 28.6% iron, and 33.3% sulphur. Hearth temperatures, from 1 to 7, respectively, are 380, 460, 600, 750, 790, 680, 630°C. The furnace shaft makes one revolution in 3 min. 20 sec. and 12 h. p. is required to operate the furnace when treating 35 tons of concentrates per 24 hours. The calcine contains 2% sulphur.

The lead chambers are four in number (being added to), each with a volume of 46,750 cu. ft. and constructed of timber framing and ⅛-inch lead sheets.

Since the smelter at Sewell was completed, several improvements have been made, the most important being the addition of nodulizing kilns. These are similar to the kilns used in the manufacture of Portland cement. In 1918, 76% of the concentrate was reduced to nodule form. The 4th and 5th nodulizers are largest ones ever built, being 8′ in diameter and 100′ long. Heat is applied by an oil burner at discharge end. By feeding nodules instead of raw concentrates, the blast furnace capacity has been almost doubled, and coke consumption was practically cut in two.

On account of an irregular oil supply, a coal pulverizing plant was added to the nodulizers.

The smelter equipment consists of 14 storage bins for concentrates, lime, coke, etc.; 4 sinter grates, with a daily capacity of 50 tons concentrates, roasted to 40 tons; 5 nodulizing kilns; 2 blast furnaces, whose daily capacity is 300 tons raw concentrates, or 600 tons nodulized concentrates; 3 Pierce-Smith basic-lined converters, two having 33 tuyères, and the other 17 tuyères; 1 copper casting apparatus.

The new smelter at Caletones, 5 miles from Sewell, will be completed and in operation in 1921.

The complete works, including the concentrators and smelter, are planned to eventually treat 10,000 tons of 2% ore daily, at an estimated cost of 7½c. per lb. laid down in New York. Work was stopped during the war, but resumed late in 1919, and is now being carried on in accordance with the original plans prepared under direction of H. E. Skougor.

Production:

Year	Milled, tons	Copper, %	Concentrate, tons	Copper, %	Mill recovery, %	Blister output, lb.	Price received, cts.	Cost per lb., cts.
1919.....	.....	.....	.....	.....	.....	47,000,000	.....	.....
1918.....	1,962,955	2.477	192,274	21.20	83.76	77,152,000	26.88	16.52
1917.....	1,799,694	2.819	158,546	21.44	81.61	63,774,000	31.80	16.38
1916.....	1,362,629	2.127	117,984	.....	79.00	42,153,270	26.36	8.03
1915.....	1,106,420	2.690	.....	.....	74.92	32,732,576	.....	8.78
1914.....	900,299	2.120	.....	.....	.....	28,304,092	.....	.....
1913.....	.....	.....	.....	.....	.....	18,098,000	.....	.....
1912.....	.....	.....	.....	.....	.....	9,500,000	.....	.....

Although operations at the Braden property have not yet fulfilled the expectations of its sponsors, it is believed that the treatment problems are solved, and with the completion of plant extensions and of the new smelter at Caletones, the profits will be large, though no prediction is ventured as to the date of dividends. Known ore reserves will last 35 years on a 10,000-ton a day basis, and extent of the orebodies is as yet only partly known.

CALAMA: COMPANIA DE MINAS y FUNDICION De CHILE

Reorganized 1913 as Compania Miñera de Calama. In August, 1916, property was sold to the Chile Copper Co., which see.

CARRIZAL; SOC. DE MINAS y FUNDICIONES DE CHILE

Owned by the American Smelting & Refining Co. Company operates two smelting plants running throughout the year.

Caldera: this smelting plant contains 3 copper blast-furnaces and converters, reducing 5,000 to 7,000 tons of charge monthly, mainly copper ore purchased from local mines. The plant ships from 400 to 600 tons a month of converter copper, which goes to Tacoma, Wash., for refining.

Carrizal: this copper smelter, at Chanarcitos, contains but one blast-furnace, handling from 1,300 to 1,800 tons of charge monthly, the ore coming largely from the Astillas mine, which the company owns. The 300 tons a month of copper matte which the furnace produces is shipped to Tacoma.

At Carrizal Bajo a new concentrating mill started in 1919, treats about 500 tons daily of dump ore from the Carrizal Alto district.

The copper mining industry of both the Caldera and Carrizal districts was practically suspended in the early part of 1919 on account of the low price of copper, but operations were resumed late in the year.

CATEMOU: SOCIETE DES MINES DE CUIVRE DE CHILE

Main office: 50 Boulevard, Emil Jacquemin, Brussels, Belgium. **Office:** 5 Rue du Helder, Paris, France. **Operating and works office:** Estacion Chagres, Aconcagua, Chile. A. W. Lehman, gen. mgr.

Officers: Eugene Renevey, chairman; Max Lyon, managing director; Georges Renevey, Jean Renevey, Robert de la Bouglise and Robert Franklin, directors; Joseph Wouters, sec. in Brussels; Henry Saloman, in Paris.

Inc. June 2, 1899, in Belgium. **Cap.,** f. 5,000,000; shares f. 500 par, divided into 10,000 preference shares at 8%, and 35,000 ordinary shares; non-assessable. Debentures f. 1,500,000 5% bonds. Annual meeting, last Friday in June.

Dividends: 4% in 1910, 5% in 1911, 6% in 1912, 6% in 1914, 8% in 1915, 12% in 1916; 8% in 1917.

Lands: 155 claims, with sundry miscellaneous tracts held in fee and under government concessions, including the Finca de Nilhue, total holdings of 30,000 acres, in the districts of Putaendo, Los Andes, Melipilla, La Ligua, Quillota and El Nilhue. Property includes numerous mines in Catemou, Melon, San Felippe de Caracoles and elsewhere, with quarries of fluxing material. The company's cattle ranch, Finca de Nilhue, maintains a herd of 1,200 cattle, for transport and food, and is a valuable factor in reducing costs.

The local management reports that ores average 4% copper, and 2 oz. silver per ton. Veins carry the usual oxidized ores in a comparatively shallow surface zone, changing downward into chalcocite, bornite and chalcopyrite.

Los Mantos, or Mantos Rojos, mine opened in 1820, shows sandstone and limestone, cut by eruptive dikes, there being 2 blanket veins, of 5 to 7 thickness, composed of calcareous matter impregnated mainly with bornite, with accessory chalcopyrite and occasional gray copper, ore ranging 3 to 4.5% copper, 1% lead, 2% zinc and 30 grams silver per metric ton. The oxidation zone has been eroded, leaving only sulphide ores. These blanket veins have been worked since 1835, and the ore, while low in grade, is particularly desirable for fluxing purposes.

Mining is done entirely by tunnels, at vertical intervals of about 50 meters and averaging about 1,200 meters in length with ore reserves developed ahead for 3 to 4 years extraction. Work is by contract, miners being paid 5 to 7 pesos per metric ton for ore won. Only about 8% of the ore broken is discarded as

waste, and ore is concentrated by flotation or smelted direct. Ore is taken to smelters by a 1,580-meter aerial tram, with drop of 750 meters, having 500-kg. buckets. Cables last 2 years and guide cables last 5 years.

In 1918, Los Mantos mine employed 600 men, producing 5,000 tons of ore of 4% copper tenor monthly.

El Soldado mine, one of the Nogales group, and farthest from the smelter, being in the Commune of Melon, on the Calera é Cabildo railway, was opened 1841. This property has 15 known veins, of 5' to 7' average width, carrying copper sulphides, with quartz gangue. The veins have a N. S. strike, with dip of 45° east, and lie on a fault contact between trachyte and feldspar-porphyry. The veins are faulted with throws of 1 to 2 meters. A second but parallel series of dikes and veins, but with reverse dip, intersect the other veins. Dikes of decomposed porphyry running with and alongside these cross veins, show occasional oxidized ores and aluminous silicates. The veins show many antigua openings and ore averages 5 to 6% copper.

Development: by tunnels, greatest vertical depth obtained being 80 meters; old workings are about 150 meters in length. The mine shows some immense chambers, one being called the Cathedral, in recognition of its vast size. In 1916 production was about 600 metric tons of high-grade ore monthly. Transportation by wagon cost 3 to 4 pesos per ton. An aerial tram is planned.

La Union group includes the Restauradora, San José and Vieja mines, producing about 40 metric tons daily of 3 to 4% copper ore, mainly used for fluxing and secured with an average force of 150 men.

Miscellaneous mines include El Nilhue mine, in the department of Putaendo, opened 1886; Las Maquinas de Catemu mine, in the department of Putaendo, opened in 1870; La Esmeralda mine, opened 1860; La Constancia and La Democracia mines, 10 kilometers from the smelter, carrying blanket veins, and La Marquesa, Malva, Tabourina, Caracoles (with 6% ore), Almendro y Pleito and other properties, in various stages of development, some of considerable promise.

The mines and works have telegraph and telephone communication. Forces, 1916, averaged 1,200 men, with the high average wages of 5 pesos for underground workmen, and 4 pesos for surface labor.

Reduction works: include 2 smelters, each with converter plant, with aggregate capacity of 650 to 750 metric tons of ore daily, and 2 concentrating plants employing flotation, one situated at La Poza, 12 kilometers from the second, near Chagres Station on the Andes railroad, and at Chagres smelter.

La Poza smelter, of 300-tons daily capacity, has 2 blast furnaces turning out 50% matte. The converter department has five 57x77" shells, with 12 tuyéres each, of the Copper Queen type, turning out cakes carrying 99.7% copper and 40 oz. silver per ton. There is a 40-ton briquetting plant and the converter department has a quartz mill. Power is furnished by a 165-h. p. Pelton water wheel and a 175-h. p. engine. Furnace blast is supplied by No. 6 Connersville blowers and converter blast is furnished by a Riedler air-compressor, with capacity to reduce 20,000 cu. ft. of free air per minute to 15 lbs. pressure. Fuel is coke, one ton of coke smelting 6 tons of ore, ores treated being highly silicious, with slags averaging 0.4 to 0.5% copper. In 1918 La Poza and Chagres smelters treated 80,000 metric tons of ore, of 6% average tenor, yielding 4,000 metric tons fine copper. Employs 100 men at average wages of 4 pesos daily.

The converting plant at Chagres smelter contains a large horizontal Pierce-Smith machine.

Chagres smelter has 36x84" and 36x120" Allis-Chalmers cylindrical water-jacket blast-furnaces. Ores smelted at this plant carry excess of silica and alumina and are deficient in sulphur, necessitating the free use of low grade auriferous pyrite and limestone, for fluxing. Reverberatory furnaces are 17x55' and 17x85'. A 2,000-h. p. hydro-electric plant has been erected.

Production: was 3,379,947 lb. fine copper in 1907; 4,060,873 lb. in 1908; 4,073,761 lb. in 1909; 4,920,500 lb. in 1910; 4,660,000 lb. in 1911; 6,960,000 lb. in 1912; 5,843,250 lb. in 1913; 7,878,465 lb. in 1914; 7,210,350 lb. in 1915; 11,082,330 lb. in 1916; 9,200,000 lb. in 1917, and 9,100,000 lb. in 1918.

Property is estimated by company to have, with further improvement, a productive capacity of 20,000,000 lb. fine copper yearly.

CENTRAL CHILI COPPER CO., LTD. CHILE

Address: W. A. Habberfield, sec., 15 Angel Court, London, E. C., England. **Mine and works office:** Panulcillo, Ovalle, Coquimbo, Chile. S. Schiff, gen. mgr. at mines; A. J. Goldschmid, chairman and managing director; H. L. Bromhead, Andre Goldschmid and W. H. Patchell, directors.

Inc. June, 1894, as a reconstruction of the Panulcillo Copper Co., Ltd., and reorganized January 1898. **Cap.,** increased November, 1905, to £400,000 shares £1 par; issued £312,468.

Inc. Jan. 11, 1898, and is second reconstruction of the Panulcillo Copper Co., Ltd., registered Jan. 5, 1864, and first reconstructed as the Central Chile Copper Co., Ltd., in June, 1894. **Cap.,** £400,000; shares £1 par; 312,468 shares issued and fully paid. Increased from £300,000 to present amount in November, 1905, 30,000 new shares being offered to shareholders at par.

Financial statement showed a profit of £37,086 in 1915, and a loss of £4190 in 1917. At end of latter year current assets were £94,122, and liabilities £9477. Profits up to 1915 were small.

Dividends: 6 pence per share in 1900, 6 pence in 1901, and 1 shilling in 1907; none since.

Property: 72 acres, including mines at Panulcillo, 25 kilometers N. E. of Ovalle, and mines in the vicinity of Nisñile. The Panulcillo group includes the Panulcillo Alto and San Gregorio mines.

Development: principally by the 1,000-meter San Gregorio tunnel. Ore is mainly chalcopyrite, associated with pyrite, in limestone gangue, with some commercial production of malachite, azurite and chalcocite. During the year 477.5 meters of development work and 266 meters of diamond drilling were done.

The Cocinera and Inagotable mines, are at Ferro Negro.

Equipment: the 400-ton smelter, connected with the Panulcillo mine by tram, is 76 kilometers from Coquimbo. It is equipped with 3 calciners, 2 reverberatory furnaces, and one 46x180" and three 42x84" blast-furnaces. The smelter treats silicious custom ores, company's sulphides furnishing flux. Matte is crushed and exported to New York for smelting.

Production: fine copper, 1913, 2,274 tons; 1914, 2,491 tons; 1915, 2,77[illegible] tons; 1916, 2,721 tons; 1917, 2,817 tons of copper, smelted from 56,869 tons of ore; 1918, 1,821 tons, from 32,063 tons of company and 27,826 tons of purchased ore.

CHANARAL: SOCIÉTÉ des MINES et USINES de CUIVRE de

Office: 94 Rue de la Victoire, Paris, France. **Mine and works office:** Chañaral, Atacama, Chile.

Officers: Eugène Renevey, chairman; preceding officer, D. Bethmont; A. DuBois, A. Delattre, Georges Renevey and R. de La Bouglise, directors.

Inc. July 17, 1906, in France. **Cap.,** 6,000,000 frs.; increased 1910, to 7,000,000 frs.; shares, 500 frs. par.

Property: 925 hectares, including 244 mining claims, the more important being Los Pozos, Las Animas, Cerro Negro at distances of 25 to 35 kilometers from the smelter at Chañaral, with which the mines are connected by rail. Property includes that bought, 1906, of Besa y Ca., and of Las Animas Copper Mining & Smelting Co., Ltd., 1909. Lands are a desert and water is scarce.

Las Animas deposit consists of a lode of 3 veins with parallel strike and dip of 70°, in wall rock of syenite, traceable 2 kilometers. Average width of the 3 veins is about 5', with ore occurring mainly in vertical shoots some over 100' in depth. Oxidized ores, to depth of 150 meters, are succeeded by sulphides, mainly with chalcopyrite, and some cupriferous pyrite. Gangue is silicious or calcareous, or both. Ore shipped to smelter averages 4 to 5% copper.

The mine is opened by 4 shafts, three of which are used for hoisting. The fourth shaft is used at present for pumping. Depths of shafts vary up to 250 meters. The shafts are equipped with two steam hoists and a Diesel engine hoist. Compressed air is used for drilling, pumping and sub-hoisting.

The **Los Pozos** deposit has 2 parallel orebodies in porphyry and syee, one having a silicious and the other a ferruginous gangue. Width of oredies has not been determined; cross-cuts, 70 meters long, still show mineral-d headings and indicate large deposits of the porphyry type. The mine has :n opened by a tunnel 300 meters long and 90 meters below the outcrop, by a 600-:ter drift and by numerous cross-cuts. The mine is being developed by a :tem of raises, winzes and sub-levels, leaving the pillars to be mined later if ing can be done.

The mine is equipped with a compressed air plant, using a Diesel engine.

El Manto Verde mine at Los Pozos, 25 kilometers from Las Animas, s 2 parallel orebodies in porphyry and syenite, one carrying oxidized ores of)ut 6% average copper tenor, there being no sulphides, though chalcopyrite found in the Laura mine, nearby. There are shafts of 80 meters and 195 :ters depth. The mine has extensive and erratic old workings and shows ge bodies of low-grade ore, somewhat refractory.

In addition to the foregoing mines, which are the principal properties, :re is **La Descubridora** mine, formerly an important producer, abandoned depth of 650 meters; the Andacollo mine, with ore averaging about 12.6%; the n Augustin, with 3.5% ore, and the Manto Atacama, with 3% ore. With :ther development the properties of this company can furnish a sufficient riety of ores to permit proper furnace mixtures.

The **Cerro-Negro** deposit has one orebody with ferruginous gangue, t in other respects it is similar to that of the Los Posos. Rich ores only, 10% better, are mined because of heavy cost of transportation due to the distance 50 kilometers from mine to smelter.

The company owns numerous other claims in the districts of Sierra-Aspera, Salado and Pueblo Hundido, some of which are valuable.

The smelter is located at the harbor of Chañaral. It has four water-:ket furnaces, one of 100, one of 80 and two of 50 tons. There are two con-:ter stands. Converter shells are 1.68 meters in diameter and 2 meters in gth. The basic process is used with excellent results in spite of small size converters. Air at 10 lbs., is delivered to the converters by a two-cylinder ect connected double expansion, Walker compressor.

The product of the smelter is bar copper averaging 99 to 99½% copper and ıtaining about 60 grams gold and 150 grams silver per metric ton.

The company owns a shipping pier and lighters. Property is considered uable and management good. No recent data obtainable.

IILE COPPER CO. **CHILE**

Office: 120 Broadway, New York.

Officers: Daniel Guggenheim, pres., Albert C. Burrage, v. p.; Murry ggenheim, v. p.; H. F. Guggenheim, v. p.; W. C. Potter, v. p.; W. E. Bennett, ., with Isaac Guggenheim, S. R. Guggenheim, William Loeb, Jr., John N. :ele, Albert C. Burrage, Jr., Russell Burrage, Chas. D. Burrage, E. A. Guggen-m, H. R. Wagner, and E. A. Cappelen Smith, directors. L. Fredrick, treas.; A. Crockett, transfer agent, 149 Broadway, New York; Judd Stewart, gen. litor and comptroller.

Inc. April 16, 1913, in Delaware. **Cap.,** $135,000,000; shares $25 par; is-:d, 3,800,000; 600,000 shares held in treasury for conversion of $15,000,000 , 10-year and $35,000,000, 6%, 15-year gold bonds. Shares are listed on the w York and Boston Stock Exchange. Company owns entire issued capital ck of the Chile Exploration Co. of New York.

Funded debt:

(1) Collateral trust convertible 7%, 10-year gold bonds, due May 1, 1923, ,000,000 outstanding; convertible into stock at $25 per share; bonds are a ect obligation of the company and are secured by deposit of the entire capital ck of the Chile Exploration Co., the operating subsidiary of the Chile Copper . This is a closed mortgage.

(2) Collateral trust convertible 6%, 15-year gold bonds, series A, due April 1932. This issue of $35,000,000 is convertible into Chile Copper Co. stock at

$35 per share and secured, subject to the convertible 7s, by the capital stock of the Chile Exploration Co..

Financial Statement, years ending December 31:

Assets.

Year	Investment in Chile Ex. Co.	Notes & loans, Chile Ex. Co.	Liberty bonds	Call loans	Cash, etc.	Total
1918.....	$111,878,446	$18,523,239	$1,008,050	$5,000,000	$1,282,741	$137,692,476
1917.....	111,853,956	15,522,003	.....	.....	22,338	127,394,29
1916.....	109,984,065	11,405,733	.....	.....	16,956	121,406,75

Liabilities.

	Capital	Bonds	Accounts and notes payable	Interest accrued, etc.	Total
1918.....	$95,000,000	$42,353,250	$5,474	$333,752	$137,692,476
1917.....	95,000,000	32,085,000	.....	269,220	127,394,22
1916.....	95,000,000	15,000,000	11,220,000	186,754	121,406,75

Chile Exploration Co.

Controlled by Chile Copper Co. Same officers. G. G. Thomson, purchasing agent.

Officials in Chile: H. C. Bellinger, gen. mgr.; Burr Wheeler, asst. gen. mgr.; B. Middlemiss, mine supt.; B. T. Colley, mgr. welfare dept.; Alfred Houston, gen. rep. at Santiago; W. F. Baseden, port agent, Antofagasta; Harvey Diamond, res. eng. at Tocopilla.

Consulting engineers: Fred Hellman, mining; E. A. C. Smith, metallurgical; H. A. Guess, milling; S. B. Williamson, mill mgr.; M. R. Hull, designing; and P. H. Thomas, power and electricity.

Inc. Jan. 11, 1912, in New Jersey. **Cap.,** $1,000,000; shares $100 par; entire issue owned by Chile Copper Co.

Financial Statement, years ending December 31:

Assets.

Year	Property	Construction equipment, etc.	Investment in steamers	Current	Total
1918.....	$4,992,810	$21,916,986	$426,665	$21,220,713	$48,557,175
1917.....	4,983,117	16,435,795	426,665	19,669,952	41,515,529
1916.....	4,944,300	18,183,818	811,280	10,913,612	34,852,990

Liabilities.

	Capital	Capital surplus	Notes payable and loan Chile Copper Co.	Current	Earned surplus	Total
1918.....	$1,000,000	$13,684,000	$18,523,239	$5,684,885	$9,674,051	$48,566,175
1917.....	1,000,000	13,084,000	15,522,003	6,118,311	5,191,215	41,515,529
1916.....	1,000,000	15,000,000	11,405,733	5,656,449	1,790,218	34,852,990

Profit and Loss.

	Copper Sold	Sundry income	Operating charges	Charges against income and surplus	Surplus	Net Deductions Previous surplus and additions	Net
1918	$20,931,071	$437,263	$12,414,607	$5,513,437	$3,440,229	$602,118	$1,254,486
1917	18,908,855	649,294	11,751,778	5,207,360	2,598,411	1,790,218	3,786,511
1916	10,558,724	39,346	6,425,022	2,236,057	1,936,392	.....	.....

The first half of 1919 showed a loss of $1,174,367, after paying bond interest of Chile Copper Co.; while the third period returned a net profit of $45,114.

Property: the copper deposits of Chuquicamata, province of Antofagasta, Chile, the largest known in the world, form the crest of a low ridge some distance from the main range of the Andes, 9,600' elevation above sea level. Chuquicamata is about 85 miles E. of the Pacific Ocean on a branch of the Antofagasta & Bolivia Railway, 163 miles from Antofagasta. The company owns 687 mining claims, about 6,700 acres, including 2,075 acres mineral land, plus site, waste dump and [illegible] limestone, iron ore, salt, and sulphur deposits.

Geology: the orebody is 8,000' long, with an average width of 554'. [illegible] length of orebody, as proved up to present time

s about 7,000′ with a maximum width of 1,800′. Since starting operations to nd of 1918, 142 holes were drilled, totaling 60,786′. Small veins of rich ore ut through the mass, but the average of the entire deposit is esimated at 2.12% opper. The copper in the oxidized area occurs in the form of brochantite, with small amount of atacamite and chalcanthite, or natural blue vitriol.

The drill holes show that the oxidized minerals change in depth to sulphides, otably chalcocite, bornite, and chalcopyrite. About two-thirds of the ore deeloped carries brochantite (a basic copper sulphate containing 56% copper) nd the balance copper sulphides. The underlying sulphide ore, practically all re below 400′ from surface, can be treated in the customary way by water conentration and direct smelting. At present the company is devoting its entire ttention to the sulphate part of the orebody, the mining of which is done by team and electric shovels.

In August, 1916, company acquired the holdings of the Compañia Minera le Calama for $1,508,368. The property included an important adjacent group f mines; an antiquated smelter at Calama, 14 miles from Chuquicamata; conderable amount of land at Calama, some with water rights; a water-power oncession near Calama; a group of copper claims near El Abra, 28 miles from huquicamata on a branch of the A. & B. railroad. The mines are located on wo vein systems known as the Panizo-Rosario del Llamo and the Poderosa-San Felipe systems. These have produced much ore carrying 16% to 18% opper. The veins, up to 45′ wide, are strong and persistent, and the ores in the pper levels are oxides of copper, brochantite principally, mixed with chalcocite. n the lower levels the ore is chalcocite and enargite. The dumps of the propty are reported to have sufficient copper content to repay purchase price.

Development: is by open-cut work, like that of the Utah Copper Co., t Bingham, Utah. During 1918, overburden moved from all benches totaled 57,800 cu. yd. averaging 0.37% copper. Bench B was extended to a length of 00′ in ore, averaging 50′ in height; bench C is 3,000′ long and 95′ high. The eduction cut on bench C is 2,300′ long and 32′ high; and bench D has ore 700′ ong by 35′ high.

A notable feature of mining practice at Chuquicamata is tunnel-blasting, vhich supersedes churn-drill blasting, described by Barker in "Min. & Sci. Press" f August 17, 1918. This is so successful and efficient that 70,950′ of tunnels ave been driven for this purpose, 23,739′ being blasted to end of 1918.

Ore reserves: estimated as follows (by tons):

	Oxidized	Per ct.	Mixed	Per ct.	Sulphide	Per ct.	Total	Av. %
918...	336,510,349	1.91	151,000,000	2.98	210,000,000	1.84	697,510,349	2.12
917...	359,000,000	1.91	131,000,000	2.98	210,000,000	1.84	700,000,000	2.12
916...	339,000,000	1.91	151,000,000	2.98	210,000,000	1.84	700,000,000	2.12

Equipment: at mine includes 14 No. 103-C Bucyrus electric shovels, nd one No. 225-B, which are more economical than steam-shovels; 1 Baldwin, Porter, and 13 Panama locomotives; air-compressors, ore cars, railway, shops, nd everything necessary for moving over 10,000 tons daily.

Treatment: the reduction plant 2½ miles from the mine, which started perations May 18, 1915, has a capacity of 10,000 tons a day. The extension of he plant to 15,000 tons per day was finished in 1919, and it is estimated that the lant will be operating on the increased capacity in 1921. Copper is recovered y leaching process, the ore being peculiarly amenable to treatment by this nethod. Careful study of the problem by E. A. Cappelen Smith showed that the re gives little or no slime, and is readily soluble in an 8 or 9% solution of cold ulphuric acid, made at the works. As it contains no arsenic, antimony or bismuth, the solution is not fouled by repeated use.

The ore is broken by two 84″x60″ jaw crushers, 3 No. 10 gyratory crushers, ix 48″ horizontal and twenty-four 48″ vertical Symons disc crushers, to ⅜″ ize. It is then distributed to mastic-lined, concrete vats, of which there are [illegible] wide, 150′ long and 17.5′ high, each with a capacity of 10,000 tons of [illegible] are built of reinforced concrete, lined with mastic 1½″ thick.

[illegible] leaching process requires approximately 6 days for the complete cycle,

par value F. 100; increased to F. 14,000,000 in 1918 by subscription of 40,000 8% preference shares of F. 100 each. Debentures authorized F. 3,000,000, with 5% interest. Total assessments to date F. 3,000,000. Fiscal year ends June 30.

Net profits: were F. 36,000 in 1909-10; F. 195,000 in 1910-11; F. 595,000 in 1911-12; F. 603,000 in 1912-13; F. 318,000 in 1913-14; F. 716,000 in 1914-15; F. 2,043,000 in 1915-16; and F. 1,568,000 in 1916-17.

The fiscal year 1917-'18 left a loss of F. 745,000. Interest on bonds was paid and drawn bonds were repaid.

Dividends: f. 300,000 in 1913-'14; f. 500,000 in 1915-'16; none since.

Property: formerly held by the Compañia Minera de Naltagua, comprises 195 pertenencias of mineral lands and the Naltagua farm with a total of nearly 2,000 acres near El Monte, dept. of Melipilla.

Copper deposits include 3 parallel blanket veins, striking north-south, and dipping about 30° east, with a width of 3 to 30'. They are opened for a length of 5 kilometers, and principally worked in the Trinidad, Las Vacas, San Ramon, Suerte, Venus, Brillante, El Gato, and Esperanza mines. These veins carry oxidized ores, changing at 65' depth to chalcopyrite, bornite and chalcopyrite in disseminated form, averaging 4% copper, and nearly self-fluxing. (2) A blanket vein with 2% copper in a calcareous gangue, used as a flux; the vein has the same strike and dip as the others. (3) A porphyritic formation with low grade values.

Equipment: mine is worked by tunnel only, having no hoists. There are several compressors. The company plans a 2,000-h. p. hydro-electric plant on the Rio Maipo. There is abundant wood on the Naltagua ranch.

Transportation equipment includes several aerial trams and a private railway. The aerial tram from El Monte to San Antonio, where the tower station is located, is 5,600 meters in length, with 22 towers, of 22 meters maximum height, on concrete foundations, having greatest span of 386 meters. An incline tram, at San Antonio, connecting with the lower station of the aerial tram, is 300 meters long, at an incline of 30°, having a double line of rails. A 2½-kilometer railway connects the incline tram with the private rail system, which has a total length of 25 kilometers. Equipment includes 6 locomotives, with 2, 3 and 5-ton ore cars.

An experimental concentration plant to treat 100 tons per day has been erected in order to determine the best method to concentrate these ores.

The 300-ton smelter is at Naltagua, in the valley of the Rio Maipo, adjacent to the Rio Mapocho, 70 kilometers by river to the coast, and 225 kilometers to Valparaiso, with a freight rate of 6 pesos per ton to the latter point. The smelter was blown in 1909. Equipment includes two 40"x160" blast-furnaces. Slags, assaying about 0.4% copper, are granulated, and sluiced to the dump by water.

There are two 17'x55' reverberatory furnaces of the Anaconda type, fired by pulverized coal, the plant being in full operation in 1918.

The converter department has 3 stands, with 9 shells of the Copper Queen barrel type, an electric traveling crane with an hydraulic accumulator for handling the shells and a large Pierce-Smith basic converter.

The smelter power plant includes 770-kw. engines, 4 Connersville blowers and a 200-h. p. air-compressor for converter blast. The boiler plant has two 200-h. p. boilers, three 300-h. p. boilers and a 30-meter steel stack.

Works were described by F. A. Sundt in "Mexican Mining Journal" of October, 1914, and by Mark R. Lamb in "Engineering and Mining Journal" of October 28, 1916.

About 1,500 men are employed at the mines and works, with average wages of 5 pesos at the mines and 6 pesos at the smelter.

Production: has been as follows: 293,209 lb. in 1908-'09; 2,253,000 lb. in 1909-'10; 2,486,772 lb. in 1910-'11; 4,082,892 lb. in 1911-'12; 4,703,005 lb. in 1912-'13; 5,659,356 lb. in 1913-'14; 6,504,004 lb. in 1914-'15; 9,417,692 lb. in 1915-'16; 9,2[illegible] lb. in 1916-'17; and 8,054,497 lb. in 1917-'18. Above figures are for Chile bar assaying 99.1% copper.

PODEROSA MINING CO., LTD. **CHILE**

Office: F. W. Bishop, sec., 145 Dashwood House, New Broad St., London, E. C., Eng. **Operating office:** Casilla 855, Antofagasta, Chile, **Mine office:** Collahuasi, Tarapacá, Chile.

Directors: Chas. Fearn, chairman; L. W. Harris, V. Echeverria and W. J. Barnett. J. H. Ivey, mgr.

Inc. Nov. 27, 1908, in Great Britain. **Cap.,** £500,000; shares £5 par; fully issued and fully paid.

Financial Statement shows:

Year	Revenue	Total Charges	Profit	Current Assets	Current Liabilities
1918.....	£60,100	.....	£18,662*	.....	.....
1917.....	199,370	103,361	£96,009	£244,507	£52,640
1916.....	119,738	52,039	67,699	114,702	.....

* Debit.

Dividends: 5% in 1909; 10% in 1916; 12½% in 1917.

Property: 37 contiguous claims, 185 hectares, or 457 acres, including the Poderosa, which is the principal producer, and the San Carlos, Rosario, and other mines. The lands lie at an extreme elevation of 15,400', among the rounded peaks on the western edge of the Bolivian plateau, a region above the timber line, and barren of vegetation, with the exception of yareta, which constitutes the fuel of the district. Copper mines were worked in this district, during the era of Spanish dominion, and previously by the Indians, as evidenced by remains of ancient furnaces, fragments of matte, scoria and tools left in old workings. Development of the mines was begun 1903, and regular ore shipments were started January, 1906.

Geology: the property shows the Poderosa, or main vein, a fissure without visible outcrop, lying alongside a diorite dike intrusive in dacite. The vein lies under the dike, but in places departs from it. It has numerous branches and parallel fissures. A fault with a horizontal shift of 50' to 100', lessening downward, separates the vein in 3 portions, worked in the Poderosa and San Carlos mines, respectively. The ore occurs in shoots, and carries 8 to 60% copper and 6 to 8 oz. silver.

Development: the Poderosa mine has several shafts, with a winze to 720' depth.

Ore reserves are estimated (1918) at 8,000 tons averaging 22%, and 5,000 tons milling ore averaging 5%.

Equipment: includes power plant, ore-sorting plant, concentrator, etc. There are 175 men on the payroll, 95 being underground.

Production: in 1910 the mine yielded 10,902,080 lb.; in 1911, 6,419,372 lb.; in 1912, 5,077,204 lb.; in 1916; 3,948 tons of 28.7% copper and 9.4 oz. silver ore and concentrate was shipped; in 1917, 6,980 tons assaying 31.55% copper and 13.09 oz. silver; in 1918, 3,309 tons averaging 30.7% copper and 12.45 oz. silver.

Costs in 1917 were £8.44 per ton of ore and £28.86 per ton of copper.

SANTIAGO MINING CO. **CHILE**

Subsidiary of Anaconda Copper Mining Co.

Office: 42 Broadway, New York.

Inc. 1917, in Delaware. **Cap.,** $10,000,000; shares $25 par.

Property: Lo Aguirre mine, situated 20 kilometres W. of the City of Santiago, Chile. The mines consist of five groups, 500 acres, partly acquired by purchase from former owners and partly by denouncement. The Africana mines, also owned by the company, are 3 miles E. of Lo Aguirre; Lo Aguirre and Farfana farms of 17,387 and 980 acres, respectively, were secured for (1) [illegible] rights; (2) control of the intervening space between the two groups of mines; and (3) to avoid liability for damage to farmlands near the proposed [illegible] works.

Development: in Lo Aguirre mine, the ore occurs as a disseminated [illegible]. Work begun in 1914, has developed more than 6,000,000 tons of ore

carrying from 1.75 to 3.5% copper. The average of all tunnel samples was 2.44%. The ore is a mixture of sulphide and oxides. It is believed that the orebody contains a much greater tonnage, estimates showing 16,000,000 tons of probable ore, but a little over 6,000,000 is all that was definitely developed at beginning of 1918.

During 1918, eleven holes, aggregating 4,029', were drilled, in addition to 6,900' of underground work.

In the **Africana** mine the ore occurs in veins. The mine has a 220' shaft, with 350' of workings. Twelve diamond-drill holes, varying in depth from 50' to 388' intersect the vein at undeveloped points. The ore is high grade, running from 4½ to 9%, and is particularly desirable on account of its excess sulphur content, which, manufactured into sulphuric acid, can be used for leaching the oxidized ores of Lo Aguirre mines.

During 1918 the main shaft was sunk 259', while 2,427' of underground work was accomplished.

Equipment: preliminary plans include a 750-ton mill for Lo Aguirre and one of 500 tons for Africana.

SOUTH AMERICAN METAL CO. (THE) CHILE

Subsidiary of American Metal Co., which owns entire capitalization.

Office: 61 Broadway, New York.

Inc. June, 1917. **Cap.,** $250,000.

Company was organized for purpose of conducting a general trading business in South America, especially in Chile, but it also supervises the mining exploration carried on by the A. M. Co. on that Continent.

The copper smelter at Guayacan, province of Coquimbo, Chile, is controlled by the S. A. M. Co.

VACAS; COMPANIA MINERA LAS CHILE

Address: E. David Pope, care El Nilhue, Chagres, Chile.

Property: the Vacas gold mine with 150 hectares, near the Pupio river, at southern end of the Aconcagua goldfield, between latitude 30° 30' and 32° 00' south; and near the Caruto, Magui, Cueca, and Talco mines. Las Vacas is practically the only gold mine now operating in Chile and has been worked for over 100 years.

Geology: the veins are in unaltered and hard granite, and are richest near the contact with andesite dikes that cut and slightly displace them. Pegmatite quartz veins are also common through the granite, sometimes carrying gold which does not persist. The main vein is 3 to 12 meters wide in the upper, and from 5 centimeters to 2 meters in the lower workings. Sulphides exist right from the surface and carry gold in fine-grained friable pyrite, though none is visible to the eye. The ore averages a little less than an ounce per ton.

Development: to a depth of 1,000' or more by incline shaft and cross-cut adit 300 meters long, connecting with shaft at depth of 60 meters. The principal workings are at bottom of the mine.

Equipment: 2 compressors, drills, pumps, geared hoist, and 10-stamp mill with amalgamating plates, classifiers, tube-mill, Dorr thickener, 3 Pachuca agitators, Moore vacuum-filter, and zinc boxes for precipitation of the gold from cyanide solutions. Amalgamation saves 66% of the gold value, but a total recovery of 90% is made.

COLOMBIA

This Republic is best known for its gold and platinum production which comes mainly from alluvial deposits. The emerald mines are quite famous, and deposits of copper, zinc and lead are also known, but practically undeveloped and unworked.

ANGLO-COLOMBIAN DEVELOPMENT CO., LTD. COLOMBIA

Merged with South American Gold & Platinum Co., which see.

BREITUNG MINES CORP. OF DELAWARE COLOMBIA

Office: 11 Pine St., New York City. E. N. Breitung, pres.

Inc. June, 1912, in Delaware, as a holding company to own or control promising or profitable mining properties.

Cap., authorized, $10,000,000; outstanding Dec. 31, 1918, $1,127,790; par, $5. No bonds. Transfer agent, U. S. Corporation Co., New York. Registrar, Bankers' Trust Co., New York. Annual meeting, last Monday in December.

Owns all the capital stock of the Marquette Magdalena Co., a New York corporation protocolized in the Republic of Colombia, S A. Inactive.

BRITISH PLATINUM & GOLD CORPORATION, LTD. COLOMBIA

Office: 73 Basinghall St., London, E. C. 2, England; and Mercado & Co., Buenaventura, Colombia.

Directors and officers: T. J. Ive, chairman; E. Cattanach, Walter Conan, and G. H. Short; C. A. Sack, sec.; Inder, Henderson & Dixon, cons. engrs.; Johnson, Matthey & Co., technical advisors.

Inc. May 2, 1918, in Great Britain. **Cap.**, £250,000; shares £1 par; 150,000 issued; changed 1919 to $1.000,000; $1 par; 600,000 issued in February, 1920.

Property: extensive tracts of placer ground in the Choco district of Colombia, acquired from the Consolidated Colombia Platinum & Gold Mines, Ltd., and from Messrs. Pugliese, Frigerio & Mayolo, the latter holdings said to contain 5,000,000 cu. yds. averaging 2s. per yd.

Lands include: **Bolivar and Colonia,** 2,560 acres of gold-bearing ground, 50 miles S. of Buenaventura, said to contain enough pay-gravel to supply several dredges.

Cimarronas, 7,680 acres, of which 100 acres are prospected and contain 2,904,000 cu. yd. of gravel with 4s. (96c) per yd., recoverable, 25% being gold and 75% platinum. The net value of the proved area is £394,040.

Opogodo, 10 sq. miles, of which 2⅛ miles are estimated to contain 4,181,000 cu. yd. of 25,78d. (61.56c.) to 36.76d. (73.52c.) of dredgable ground, and 60,000,000 yd. of hydraulicking ground worth 10.3d. (20.6c) per yd. Proportions of precious metals are 25% gold and 75% platinum. Net value of proved area is £1,703,145.

Equipment: consists of one dredge of 60,000 yd. monthly capacity. Another dredge is under construction.

CHICAGO; LA MINA COLOMBIA

Address: via Nechi or Zaragoza, Guamoco district, Colombia.

Property: gold-lead-zinc mine in Guamoco district. Ore is a heavy iron sulphide containing gold, the ore varying from $30 to $40 per ton. Plant includes water power, crusher, Hardinge mill, and counter-current decantation system of cyanidation. No figures of production available.

COLOMBIAN CORPORATION, LIMITED COLOMBIA

Office: Henry Richards, sec., 441 Salisbury House, London, E. C. 2, England.

Inc. October, 1919, by the Oroville Dredging Co. to acquire the Constancia mine for $180,000. **Cap.**, £500,000; £1 par. Half of shares are ordinary, and were allotted to Oroville Dredging as the purchase price, the other half are preference shares, entitling holders to half of the profits until a 100% dividend has been paid, and 12½% thereafter.

The mine, worked for 140 years, has 2 parallel quartz lodes of the California type, each about 6' wide and opened for 2,400', out of 16,000' owned. Reserves contain 200,000 tons of $6 ore, with estimated cost of $3.50 per ton. A 100-ton mill is to be erected. The mine is 44 miles S. W. of the Pato mine. Under former ownership production from 1914 to 1918 amounted to 46,000 tons of ore worth $311,000.

COLOMBIAN MINING & EXPLORATION CO., LTD. COLOMBIA

Office: 6 Broad Street Place, London, E. C. 2, England; and Marmato mines, Medellin, Colombia.

Directors and officers: S. H. Jenks, chairman; P. E. Butler, J. H. Iles, N. L. Jenks, mgr.; H. Lovegrave, Sir Newton Moore, and John Morgan; G. V. Hatch, sec.

Inc. Feb. 25, 1908, in Great Britain. **Cap.**, £550,000; shares £1 par; 450,000 issued. **Debentures:** £50,000, 6%, 7 years.

Company has a 40-year lease from the Colombia Government on 900 sq. miles in the Supia and Marmato districts of Colombia. Examined by Charles Olden, L. Parker, H. H. Knox, and A. Wilkinson. Some of the area is leased. Reserves at Marmato contain 400,000 tons of 36s. (8.64 gold-silver ore. Equipment consists of 40 stamps, 3 tube-mills, and cyanide plant. The Mapura property contains large deposits of ore averaging 1os. ($3.84) per ton, which can be mined by open-cut work; a mill of 10,000 tons monthly capacity was ordered in America for this mine early in 1918.

An oil property was being drilled in 1919 and 1920, and work was expected to be finished in July.

CONSOLIDATED COLOMBIA PLATINUM & GOLD MINES, LTD. COLOMBIA

Property acquired in May, 1918, by British Platinum & Gold Corporation, which see.

FRONTINA & BOLIVIA (S. A.) GOLD M. CO., LTD. COLOMBIA

Office: J. J. Truran, sec., 184 Gresham House, London, E. C. 2, England. **Mine office:** La Salado, Colombia.

Directors: S. W. Stephens, chairman; T. H. Alexander, Sir H. P. Harris, R. W. H. O'Neill, and R. C. Lyall. J. Reed, supt.

Inc. July 18, 1911. **Cap.**, £200,000 in 23,390 pfce. shares, all issued, and 176,610 ord. £1 shares, 140,000 issued. Debentures amount to £45,138 10%, redeemable in 1921 and 1926.

Profit in 1917-'18 was £17,354, of which £9,339 was distributed and £4,999 carried forward to 1918-'19, after allowing for interest, etc. Profit for 1918-'19 was £18,309, of which £12,839 was paid in dividends.

Dividends: regular on preference shares and 10% on ordinary in 1911; 10% in 1916; 10% in 1917; 5% in 1918; 7½% in 1919.

Company owns mining rights over 12 sq. miles and surface rights over 40 sq. miles in Colombia, S. A.

Property: the Silencio mine is the main producer. Recent development has been on the 14th and 15th levels. Company also owns an interest in the Marmajito Mines, Ltd., owning adjacent properties.

Ore reserves, June, 1916, were estimated at 42,200 tons; in 1918 a 58,500 tons, worth $18 per ton; and in 1919 at 56,100 tons of $17 ore. In 1919 the Marmajito company was preparing to reopen its properties.

Equipment: includes 10-stamp mill and cyanide plant.

Production, years ending June 30:

Year	Ore, tons	Gold, Oz.	Year	Ore, tons	Gold, Oz.
1919.....	29,020	23,958	1916.....	25,484	22,358
1918.....	27,855	23,895	1915.....	25,971	26,938
1917.....	23,642	20,653			

LIBERTAD, LA MINA COLOMBIA

Address: via Nechi, or Zaragoza, Guamoco district, Colombia.

Property: a gold mine in the Guamoco district, which has been probably operated for over 8 years on a series of rich pockets occurring in quartz vein 2' to 12' wide. Ore is free-milling, and is treated in a 10-stamp mill with concentrator and cyanide plant.

MAMMOTH GOLD, SILVER & PLATINUM MINES COLOMBIA

Controlled by Assets Realizing Corporation of California.

Address: J. V. Priest, 812 Merchants' National Bank Bldg., Los Angeles, Cal.

Property: in Department of Bolivar, Colombia, is a concession of about 48,000 acres with extensive placer holdings as well as quartz veins. Extensive sampling shows that the placer properties carry between $2 and $3 per yd. in gold, with some platinum. This property was carefully examined in 1919, and equipment taken in to work the gravel, using hydraulic

elevators. The quartz mine will be worked later. Other valuable assets on the property include rubber trees, vegetable ivory, mahogany, and peruvian bark. There is also a surface seepage of oil on a part of the property. Management considers this a most valuable asset, and development will be pushed rapidly.

NECHI MINES (COLOMBIA), LTD. **COLOMBIA**

Controlled by Oroville Dredging Co. of California and Pato Mines of Colombia.

Office: 441 Salisbury House, London Wall, E. C. 2, England.

Directors and officers: F. W. Baker, chairman; F. D. Behrend, A. S. Elmore, J. A. Agnew, and H. C. Porter. W. A. Pritchard, mgr.

Inc. Feb. 5, 1914, in Great Britain. **Cap.,** £140,000, in 140,000 pfce. and 140,000 ord. 10s. shares, all issued.

Revenue from gold in 1917 was £98,093, of which £52,267 was profit. Preference dividend absorbed £35,000; and £75,862 was carried forward. Current assets were £144,869, and liabilities, £68,238. Revenue in 1918 was £86,000, of which £25,841 was profit. Dividends amounted to £35,000.

Dividends: 25% on pfd. in 1916; 75% in 1917, and 25% in 1918.

Property: 400 acres of gold-bearing placer gravel land on River Nechi, Department of Antioquia, Colombia. Ninety acres of the tract contain 5,855,900 cu. yds., valued at $4,926,600 gross. The gravel is about 50′ thick.

Production: dredging operations since 1915, are summarized below:

Year	Yardage	Yield	Per Yd.,c.	Cost, c.
1918.....	2,142,929	$437,499	20.40	5.80+
1917.....	1,883,659	489,959	26.00	10.73
1916.....	1,617,975	797,125	49.27	15.20

The output in December 1919, was $39,559 from 84,678 yards.

PATO MINES (COLOMBIA), LTD. **COLOMBIA**

Subsidiary of Oroville Dredging, Ltd.

Office; Henry Richards, sec., 441 Salisbury House, London Wall, London, E. C., England. **Mine office:** Apartado 104, Barranquilla, Colombia.

Directors: Fred W. Baker, chairman; F. D. Behrend, H. S. Derby, A. Stanley Elmore, J. A. Agnew, and H. C. Porter. W. A. Prichard, supt.

Inc. Oct. 5, 1909. **Cap.,** £100,000; shares £1 par; all outstanding.

Financial Statement, years ending September 30:

Year	Gold	Net Profit	Balance	Current Assets	Current Liabilities
1918....	£54,715	£12,832	.....	.....	.....
1917....	130,556	46,822	£183,320	£93,682	£85,543
1916....	144,648	74,894	136,498	144,060	202,087

Property: 40,000 acres of gold-bearing ground on the Nechi river, 6 miles from Zaragoza, Department of Antioquia, Colombia. At last estimates, in 1913, 448 acres contained 19,092,650 cu. yd. averaging 29.1c per yd. to depth of 26.4′.

Geology: the properties lie in an oval basin cut through by the Nechi river and surrounded by crystalline rocks; within the basin are flat tables of bedded gravel with red or blue clay strata that contain beds of peat or brown coal. The gravel deposits grow richer in depth.

Equipment: includes hydro-electric power plant, an 8½ cu. ft. dredge, ice plant, and repair shops.

Production:

Year	Yardage	Yield	Per Yd., c.	Cost, c.
1918.....	1,345,215	$266,062	19.78	11.16
1917.....	1,181,945	650,522	55.40	11.20
1916.....	1,684,721	719,493	48.50	12.46
1915.....	1,308,470	618,884	47.30	11.40

The yield in November, 1919, was $25,342 from 81,413 yards.

SOUTH AMERICAN GOLD & PLATINUM CO. COLOMBIA

Office: 61 Broadway, New York.

Officers: Adolph Lewisohn, pres.; Frederick and Sam A. Lewisohn, v p.'s; F. M. Loper, sec.; E. H. Westlake, treas.; with James McDougall, A F. Keene, J. H. Sussman, and J. Parke Channing, directors.

Inc. Oct. 11, 1916, in Delaware. **Cap.,** $10,000,000; shares $5 par; non-assessable; 1,800,000 issued, of which 1,479,684 are in escrow.

Bonds: $500,000; 7%, 10-year cumulative convertible income notes, due 1926. Listed on New York Curb.

Company is a holding concern for the shares of various corporations owning producing gold and platinum mines in Colombia. Most of the shares are owned or controlled by Lewisohn Brothers, General Development Co., Consolidated Gold Fields of South Africa, Gold Fields American Development Co., and Johnson, Matthey & Co. of London.

Property of Subsidiaries: (1) about 10,000 acres, and (2) 50 miles of river beds and banks in the Intendencia of El Choco, Colombia, accessible from the San Juan river. Exceptional quantities of platinum and gold are said to be available, valued at $70,000,000. The ground carries from 4 cents to $1.60 a yard.

Equipment: includes a dredge with wooden hull capable of digging 40,000 yards per month, and a steel dredge of double that capacity.

Production: in 1917 reported to be worth $700,000.

ECUADOR

Ecuador has only a small gold production, and although deposits of other metals are known, there are no operating mines. The total production of gold varies between $300,000 and $500,000 annually, coming mainly from the veins of the Zaruma district, in the southern part of the country.

SOUTH AMERICAN DEVELOPMENT CO. ECUADOR

Address: Paul C. Schraps, constructing engr., and Lee O. Kellogg, mng. eng., Apartado 655, Guayaquil, Ecuador.

Property: gold mine in the Zaruma district, El Oro province, Ecuador. The nearest town is Portovelo. Transportation of supplies is difficult and expensive, being $85 to $95 per ton from New York. A 90′ headframe costing $10,100 was erected in 1917. This mine contributes nearly all the gold produced in Ecuador. Veins are in fine-grained diorite and are from 15′ wide. Extensive faulting is evident. Ore treated is a mixture of quartz and calcite, with 10% by weight of sulphides.

Equipment: includes water-power, hoist, compressor, stamp mill, and counter current decantation cyanide plant. Reconstruction of the power canal was described by Paul C. Schraps in the "Engineering and Mining Journal" of November 10, 1917.

ZARUMA MINING CORPORATION, LTD. ECUADOR

Office: J. C. Stamfer, 156 Palace Chambers, London, S. W., England.

Directors: J. Rey, chairman; C. Brault, P. J. E. E. Chambost, A. Lund, E. Saladin and J. Vielle.

Inc. Jan. 31, 1913, in England. **Cap.,** £120,000, in 110,000 pfd. £1, 200,000 dfd. 1s. shares; 90,000 of former and all of latter issued.

Property: 1,838 acres in the Zaruma district, Ecuador. The Cruz lode contains reserves of 90,000 tons of £12 gold-silver-copper-lead ore; the Christina 61,000 tons of £10 ore.

PERU

The mineral wealth of Peru has been famous since the days of the Incas, but the principal mineral products of today, copper, silver and lead are produced by the aid of outside capital. The precious metal output

erived chiefly from copper ores, with a smaller amount from lead ores. he vanadium deposits are widespread, but production is mainly from the inasragra mine, owned by the Vanadium Corporation of America, which elds 80% of the world's supply of vanadium.

MERICAN VANADIUM CO. PERU

Merged 1919 into Vanadium Corp'n of America, which see.

NGLO-FRENCH TICAPAMPA SILVER MINING CO., LTD. PERU

Offices: A. Dangerfield, 56 Cannon St., London, E. C. 4, England; F. J. uffner, 27 Rue Laffitte, Paris, France; and Ticapampa, Hwaras (Huuraz), eru.

Directors: E. Quellennec, pres.; Baron J. de Catelin, managing; W. J. usins, M. Hentsch, L. Jumentier, C. Ledoux, P. G. Reumaux and R. de ezillat. P. Fontenay, eng.

Inc. Dec. 10, 1903, in Great Britain. **Cap.**, £140,000; £1 par; 117,171 ued.

Profit: in 1917 was 1,516,042 francs, of which f 790,904 was distributed. eserve funds are f 330,618 for ordinary, and f 457,731 for projected railway nstruction.

Dividends: 169% from 1905 to 1917, inclusive, 27% being paid in 1917.

Property: a silver mine at Ticapampa, province of Hwaras, Peru.

Equipment: mining and milling machinery, and 100 km. railway pro- ted.

Production: 374,400 oz. silver in 1916; 591,100 oz. in 1917.

ACKUS Y JOHNSTON DEL PERU; SOC. MIN. PERU

Main office: 134 Plateros de San Pedro, Lima, Peru.

Officers: A. J. Bennett, pres.; B. A. Simpson, v. p.; with D. C. Babbitt, S. Hunter, and T. P. Jones, directors. N. B. Roper, gen. mgr.; Wm. mpbell, supt. of Morococha mines; S. Herz, supt. of Casapalca mines.

Inc. May 1, 1917, in Peru. **Cap.**, £300,000; shares £1 par, fully paid. mpany purchased practically entire holdings of the Backus & Johnston ., a New Jersey corporation, fully described Vol. XI.

Property: consists of several large groups of copper-silver mines in the orococha district, Peru.

Casapalca Mines: the principal mines in this district are the Carlos ancisco, Upper and Lower, the Cuarenta, Corina and Chuquichuccho. e first named is developed by an adit, equipped with electric haulage, out 5,000′ long, which cuts the vein at a depth of about 2,500′ below the crop. The vein is being worked along a length of 7,500′ from the adit el, and from adits about 1,200′ and higher above the main adit. Ore m the upper workings is sent to smelter over a 4,500′ aerial tramway.

Morococha Mines: the company relies principally upon the Morococha trict for its copper ores, the chief sources of supply being the Huillca, tividad, Churruca, Isabel, Alicia, Favorita, Alapampa, Ombla, San Luis, cchapata, La Vieja, Manuelita, and the mines of the Cia. Santa Clara, . Minera de Pesares and of the Cia. Blanc. All of these mines are oper- d by the company either on account of ownership, by partnership ar- gement or on lease. The completion of the power plant at Bellavista 1913, the arrangement for the rental of further power, with a conse- ntly more complete installation of compressors and machine-drills, and driving of three drainage tunnels have resulted in much lower mining ts and in a much more extensive exploitation of the properties.

The Natividad, the deepest shaft of the district, is 500′ below the drain- tunnel level—a total of 1,000′. To provide for the deeper development his and other mines of the district, a large central shaft is being sunk depth of 500′ below the level of the drainage tunnels and a pumping t capable of handling 10,000 gallons per minute will be installed. The from the Morococha district is transported to the smelter, 32 kilo- ers distant, over the Peruvian Central Railway, which has a branch 14 kilometers long running from Ticlio on the main line to Morococha.

The output of the Morococha is about 4,000 tons a month, averaging 2% copper and 40 oz. silver per ton, including concentrates.

Smelter: the smelter and concentrating plants are situated at Casapalca on the main line of the Peruvian Central Railway, 154 kilometers from the port of Callao, at an altitude of 13,700'. The company is operating at present two of its three furnaces and four 96"x150" horizontal barrel type basic converters. The sintering plant consists of 20 roasting pots of 10 tons daily capacity each, and of two Dwight-Lloyd sintering machines. Flue dust is briquetted and returned to furnaces. The smelter handles a considerable quantity of custom ore.

Concentrating plant: low-grade ores from the Casapalca mines are concentrated in a 200-ton mill adjoining the smelter, equipped with a No 5 gyratory crusher, 2 primary ball mills, one regrinding ball mill; 2 Hancock jigs, 4 Overstrom tables and 5 single-deck and 2 double-deck Deister tables. Product is dewatered in a 30' Dorr thickener and filter-pressed.

The main power plant, situated on the Rio Rimac, 4 miles below the smelter, contains two 800-kw. generators driven by Pelton wheels, transmission being at 10,000 volts. At the smelter there are two 150-kw. and one 125-kw. generators, also driven by Pelton wheels. Air is furnished as follows: for the furnaces, by one 118-cu. ft. and two 200-cu. ft. Connersville blowers, both driven by Pelton wheels, and by one motor-driven turbo-blower of 24,000 cu. ft. capacity; for the sintering pots, by 3 small rotary blowers of the Connersville type: for the converters, by a 14,000 cu. ft. Nordberg blowing engine, direct-driven by a synchronous motor; for the Casapalca mines, by 3 motor-driven air compressors with a combined capacity of 5,000 cu. ft. free air per minute. A 500-ton sampling mill and 16-oven coking plant were erected in 1919.

Production, for the last five years has been as follows:

Year	Fine Copper, lb.	Silver, Oz.	Gold, Oz.
1914	11,115,176	2,948,338	1,734
1915	11,438,165	2,842,477	1,989
1916	19,395,396	3,262,499	2,587
1917	23,647,771	3,492,724	3,494
1918	23,940,043	3,351,294	3,810

CAYLLOMA; CONSOLIDADA SOC. ESPLOTADORA DE PERU

Office: Casilla 178, Valparaiso, Chile.

Officers: G. C. Kenrick, pres.; H. A. Barker, mgr.; L. J. Rosenshine, mill supt.

Inc. 1906, in Chile. Cap., £125,000; shares 5 shillings par. Gross sales of products in 1917 were £34,142.

Property: 500 acres in Province of Caylloma, Arequipa, Peru. The outcrop of vein now worked is over 13,000' long. Company took over property originally worked by the Caylloma Silver Mining Co., formed in London in 1889. The first silver mines of the district were worked by Spaniards in 1630, and prior to that time by the Incas.

The mines, which are at 16,500' elevation, show andesite cut by quartz-rhodonite veins carrying rich silver minerals, together with galena and chalcopyrite. The ores of milling grade average 20 oz. silver per ton, the sorted ore 100 to 300 oz. silver per ton, with some gold.

Development: by 6,000' drainage tunnel tapping center of ore deposit.

Equipment: includes 80-ton treatment plant with 12 Nissen stamps, Deister tables, and cyanide works. Plant was reconstructed in 1919.

Production: the monthly output averages 110 tons of concentrate assaying 6 to 9 kg. (190 to 280 oz.) silver, with gold and lead. Cost of mining is $8; milling, $5; and total, $20 per ton of ore mined.

CERRO DE PASCO COPPER CORPORATION PERU

Office: 15 Broad St., New York.

Officers: L. T. Haggin, pres.; Edward H. Clark, v. p.; H. Esk Mo[illegible] sec.-treas.; S. L. Rawlings, gen. mgr., Lima, Peru.

Inc. Oct. 28, 1915, in New York, succeeding the Cerro de Pasco Copper vestment Co. **Cap.**, 1,000.000 shares, without par value; 898,225 issued. inual meeting second Wednesday in May. Columbia Trust Co., New rk City, transfer agent; Bankers Trust Co., registrar. Shares were $67½ h and $31 low in 1919, range being $52 to $63 in last three months.

Company owns $2,850,000 of the $3,000,000 capital of the Cerro de Pasco ilway Co. In 1917 the Cerro de Pasco Mng. Co. and Morococha Mining were dissolved, and their assets and liabilities were transferred to this poration. All bonds were redeemed in 1918.

Financial Statement: years ended December 31:

Assets.

r	Mines and works	Investments	Current	Total
.....	$25,723,581	$6,408,284	$16,818,731	$48,950,596
.....	25,339,400	6,087,011	12,618,272	43,994,683

Liabilities.

	Capital	Bonds	Capital Surplus	Deferred	Current	Property and operating surplus	Total
.....	$5,000,000	.....	$18,545,515	$4,156,338	$3,608,489	$17,640,304	$48,950,596
.....	5,000,000	$4,512,000	14,003,515	2,653,850	1,556,353	16,288,966	43,994,683

Profit and Loss.

	Reserves	Operating charges	Taxes, custom ore, etc.	Reserves	Net profit
.....	$27,422,807	$9,659,536	$9,104,929	$8,158,424	$499,916
.....	30,182,515	7,832,006	9,697,736	7,539,275	5,613,598

Surplus Account.

	Profit	Previous balance	Interest and Sinking fund	Dividends paid	Balance
.....	$499,916	$11,447,916	$263,650	$4,393,353	$7,290,830
.....	5,613,598	13,378,519	3,534,780	4,009,470	11,447,916

Dividends: $1 quarterly has been paid regularly since March 1, 1916, extras of $1.75 in 1917 and $1 in 1918. Total dividends, $19.75 per e to end of 1919. No. 17, of $1 per share, was paid March 1, 1920.

Property: over 940 claims, and 70,000 acres miscellaneous lands in the ococha and Yauli districts and about 400 acres of land that includes :-fourths of the rich Cerro de Pasco district, with a smelter site and isive coal tracts north of Cerro de Pasco.

Cerro de Pasco lies 14,300' above sea level, rendering physical labor fatiguing. The population of the town is about 6,000, of whom only a percentage are white. The region is bleak and all food and supplies be brought in from considerable distances. The year has but 2 ds, the wet and dry, the former from November to April. Both are to be bleak and exceedingly disagreeable. Snow and hail fall at any summer or winter, but rarely remain on the ground as long as 48 , even in winter. The fluctuation between mean summer and winter erature is about 20° F. only, less than the daily variation.

ilver was discovered at Cerro de Pasco in 1630, and the mines pro- , to the close of the nineteenth century, about 450,000,000 oz., from ,000 tons of silver and copper ore, nearly all extracted by hand-work arried 3 to 6 miles on the backs of llamas, to primitive smelters, e the silver bullion was transported by llamas 200 miles to Lima, 1870, when a railroad was completed to Oroya. Formerly only the r ores of 25 to 40% were shipped.

eology: the ore deposits occur in rhyolite agglomerates and tuff, ng the western part of a body of rhyolite 1¾ miles across, that is ive in, and surrounded by limestone. Over an area a mile wide and 2 miles long, nearly every claim carries ore. The orebodies outcrop nently, as crestones, or ridges, and carry gold, silver, copper, lead, nd cobalt. The oxidized zone carries considerable gold, running as

high as 1 to 2 oz. per ton, occurring in rich but erratic shoots. The high silver values usually extend to about 100′ depth only, occasionally running up to thousands of ounces per ton, followed by rich silver-copper ores, which in turn, at a little greater depth, are succeeded by ore low in silver but richer in copper, the copper ores being estimated to have averaged 15 to 30 oz. per ton in the old workings. Primary ores below the water level contain bornite and chalcopyrite, associated with pyrite, tetrahedrite, arsenopyrite and sphalerite, containing little silver and only traces of gold. There are occasional veins of high-grade silver-lead ores, with others carrying up to 8% zinc; practically all the copper ores are bismuthiferous, hence refractory in reduction. The ores carry about 35% silica and 14 to 30% iron, the excess of silica requiring considerable limestone for fluxing.

Development: the Cerro company is working its orebodies through shafts to a depth of 600′. The surface of the property shows scores of tajos, big pits resulting from the caving in of old open cast workings, some of these being 300′ deep. The property lies in a basin, and the mines are very wet, especially below a depth of 400′. The Rumiallana drainage tunnel, begun April, 1877, by Henry Meiggs, was completed 1907, by the Compañia Empresa Socavonera del Cerro de Pasco, with which a financial arrangement was made, through a 5% stock interest given in the Cerro de Pasco Copper Co., obviating the payment of a 20% royalty.

The company disregarded old workings and opened a new mine, by tunnels, of about 2 miles length each, and 5 new shafts. The Diamante, Peña Blanca, Carmen and Noruega 2-compartment shafts have 4 levels opened, and are bottomed at 410′. The Excelsior shaft is 800′ deep with levels 100′ apart and serves the entire mine. Waste is used for filling, timber being very expensive, and used only for lining shafts and timbering important tunnels. The mines are equipped with powerful pumps. Reserves of ore blocked out are said to be kept 4 years ahead of smelter consumption, these including first-grade ore of 8 to 10% copper tenor, with good silver values, and second-grade ore, of uncertain copper tenor, though probably workable in the main.

According to M. R. Walker, the Rumiallana drainage tunnel is a working level, 30′ below the 400′ level. Shrinkage, square set, and cut and fill methods are employed. Reserves averaging 5% copper, were estimated in 1918 as sufficient for 20 years. All hoists are electric. Coal and oil-fired boilers are available. A total of 1,600 h. p. is used at the mines. Electric locomotives run on the main haulage levels, pulling six 22-cu. ft. ore cars; new cars are to be 40 cu. ft. The equipment is equal to 420,000 tons per annum. Underground costs are $3 per ton. When the new smelter is built yearly output will be 70,000,000 lb. of copper.

Present reduction works: at La Fundición, near Tiñahuarea, 9 miles from the mines, are connected therewith by rail. All buildings are of steel frames, covered with corrugated iron. The plant treats a small quantity of custom ores and has a sampling mill with crushers, rolls and chain-bucket elevators. The works are terraced throughout, permitting the handling of material by gravity, and are built on the unit plan.

The furnace building has twelve 2,000-ton flat-bottomed steel ore bins filled from railroad tracks above, and loading into charging cars run alongside, that are drawn by small locomotives on a narrow-gauge track running on either side of each furnace, 2 cars constituting a charge. There are six 56″x180″ water-jacketed blast-furnaces of about 300 tons actual daily capacity each. Slag is granulated by running water. The smelter building has a steel stack, 220′ high and 20′ in diameter. There are three 60′ reverberatory furnaces, fourteen 18′ six-hearth McDougal calcining furnaces and 6 Dwight-Lloyd sintering machines.

The converter department, in a separate building, has 4 Pierce-Smith basic lined converters. Product of the converter is 99% blister copper in cakes, shipped to Baltimore for refining.

The present smelter is old, antiquated and built at too high an elev

n, owing to rarity of atmosphere. It will, therefore, be superseded by a w plant, authorized August, 1919, to be erected near Oroya, the junction int of the Cerro de Pasco Railway and the Central Railway of Peru. iis site, some 2,000′ lower than the present smelter, is much nearer to th the Morococha mines and to the port of Callao from which bullion shipped and where supplies and construction material are received. ielter will embody the most modern and approved ideas.

The **Morococha property:** includes the Gertrudis, San Francisco and n Miguel mines and a one-half interest in the Natividad mine, owned ntly with the Backus & Johnston Co.

The Mina Gertrudis, opened 1897, on the Cerro San Marcello, west of ke Morococha, shows 3 limestone beds with ore impregnations follow- ; the bedding planes; vein has strike of N. 51° E. and nearly vertical). It averages about 2 meters in width, with a paystreak of 60 cm. to 1 ter, carrying gray copper and chalcopyrite averaging about 14% cop- and 1,000 grams silver per metric ton, balance of vein carrying about copper and 300 grams silver per metric ton. The mine has a 12-meter ift, but is developed mainly by a tunnel, just above the level of Lake)rococha, mining through winzes sunk from short crosscuts in the hang- :. Ore is hand-cobbed at the portal of the tunnel.

The Natividad mine is opened to about 300 meters depth, developing ein about 4′ wide, carrying ore averaging 14% copper and 14 to 70 oz. ver per ton. A new tunnel, planned to be 750 meters long, is being ven under the old workings.

The Mina San Miguel is developed by the Copaycocha and Vulcano nels, latter of about 100 meters length, and ore is mainly enargite, with ne tetrahedrite and tennantite, associated with pyrite. Mine was opened 3, and in 10 years produced 6,476,400 kg. fine copper and 10,794 kg. fine ver from ore averaging about 20% copper and 333 grams silver per tric ton.

The San Francisco is opened by a 4,000′ tunnel, known as the Carlos ynaldo adit. Production is approximately 20,000,000 lb. per year, smelted the Cerro de Pasco works.

Cerro de Pasco Railway Co.

Subsidiary of Cerro de Pasco Copper Corporation. Results may be marized as follows:

ar	Revenue	Charges	Profit	Balance available	Dividends	Current assets	Current liabilities
3..	$1,069,056	$744,199	$324,857	$1,472,033	$285,000	$404,321	$65,256
7..	1,043,090	682,570	350,519	1,631,675	484,500	301,206	55,538

The company has a main line of 83 miles, running from Cerro de Pasco Oroya, where connection is made with the Central Railway of Peru, ch runs thence 130 miles to Callao, the latter line being one of the st notable in the world, having cost $43,000,000 and gaining nearly 3 es vertical elevation, reaching the highest altitude of any railroad on globe, having an average grade of 2.5%, with no less than 37 tunnels, uding the Galera tunnel of one kilometer length which cuts through dge of the Andes. The Cerro de Pasco railway has a branch to the l fields, and, with all spurs, sidings and yards, has about 135 miles of ndard-gauge track, laid with 70-lb. rails. Them ain line has an average de of 1.5%, with a maximum grade of 3%, and cost upward of $2,000,000 ipment includes 13 locomotives, in addition to 6 light switching engines he smelter, and 59 steel ore and coal gondolas, with a total of 247 forty- cars, rolling stock being of the best American manufacture. The rail- l is on a paying basis.

The company employs about 2,200 men at the copper mines, 1,500 men he smelter, 1,000 at the Goyllarisquisca coal mine, 400 at the Vincuscan- coal mine, and 200 at the Quishuarcancha coal mine.

In January, 1919, striking workmen at the Morococha dynamited the power lines, causing flooding of lower levels, and American employees had to abandon the camp.

Production: 3,389,787 lb. copper in 1906; 20,258,689 lb. in 1907; 23,646,[illegible] lb. in 1908; 30,327,423 lb. in 1909; 31,713,012 lb. in 1910; 48,600,926 lb. in 1911; 45,272,000 lb. in 1912; 43,856,000 lb. in 1913; 40,753,000 lb. in 1914; 61,000,000 lb. in 1915; 71,452,000 lb. in 1916; 72,650,000 lb. in 1917; 71,910,000 lb. in 1918, and 58,100,000 lb. in 1919. The silver content is important, as it amounts to over 3,000,000 oz. per annum. Output for January and February, 1920, was 9,334,000 lb. copper.

The Cerro de Pasco is undoubtedly the most expensive copper property ever developed, the total investment to date being $25,000,000. The ores are refractory and the great altitude of the smelter, which is 14,300' above sea-level, coupled with inefficient native labor, have given rise to an exceedingly complex and tiresome problem in ore reduction. Estimated cost of production at 8c per lb. and annual output at 70,000,000 lb., earnings per share of the Cerro de Pasco Copper Corporation would be $4.20 on a 14c, $8.40 on a 20c and $12.60 on a 26c copper market.

CERRO DE PASCO EXTENSION, INC.

Name changed to Peruvian Copper and Smelting Co., which see.

CERRO VERDE MINE

Owned by Carlos J. Lohman, Arequipa, Peru. Mine was under [illegible] option from October, 1916, to the Andes Exploration Co. of Maine, a subsidiary of Anaconda Copper Mining Co. J. A. Gibbons, mgr., Arequipa, Peru.

Property: 244 pertenencias, about 20 miles S. E. of Arequipa, [illegible] by automobile road from railway at Taibaya. Elevation of mine is [illegible]

Geology: copper occurs in a disseminated deposit in rhyolite, near contact with porphyritic diorite. Two irregular masses of granodiorite divide the rhyolite mass. An oxidized zone about 220' deep has silicates and carbonates; these pass downward into secondary sulphides changing at 300 to 450' in depth to primary sulphides.

Development: property is being thoroughly prospected by churning and by underground work from a 430' shaft. Work on the 250 [illegible] totals 3,000'. The deposit is said to contain more than 10,000,000 tons averaging between 2 and 2½% copper.

FERROBAMBA, LTD.

Office: F. F. Fuller, sec., 638 Salisbury House, London, E. C. **Operating office:** Arequipa, Peru. **Mine office:** Ferrobamba, Catoche, Apurimac, Peru.

Directors: A. C. Burrage, chairman; A. C. Adams, T. C. J. Burgess, H. W. Bliss, C. D. Burrage, H. W. Brown and A. Solomon.

Inc. Nov. 5, 1909, in Great Britain. **Cap.,** £150,000; 60,000 preferred shares, 10s. par; 36,658 issued; 120,000 ordinary shares, £1 par, fully issued. Is registered in Peru.

The Ferrobamba property is in central Peru at an elevation of [illegible] above the sea and about 45 miles west of Cusco, the terminus of the Southern railway, 500 miles from Mollendo, the seaport. The 207 claims are in 10 groups, covering 2,255 acres, in the Cotobamba district, state of Cusco, Peru. The deposits show oxidized copper ores at the surface, followed by sulphides largely bornite, and can be worked by steam shovels.

Property: includes valuable water-right concessions, from which it is planned to develop hydro-electric power, the rivers being fed by the melting snows of the Andes. The concessions include water rights to the Chalhuahuacho and several affuents, and application has been made for similar rights on the Rio Apurimac, about 25 miles in an air line from Ferrobamba No. 1. Including the last named concession, the available water power is rated at 120,000 h. p.

The property has been divided into 5 zones, or groups, known as Ferrobamba No. 1, Ferrobamba No. 2, Katanga, Charcas and Bonanza.

ions are much the same at these different properties and it is thought that ill can be worked opencast.

Ferrobamba No. 1, 900 acres, shows an enormous mass of garnet rock, pparently of contact metamorphic origin, rocks being hornblende-biotite-granite and limestone altered into wollastonite by contact metamorphism or a remarkable distance, in many places up to 3,000' from any recognized gneous contact. An area of 34 hectares of proven copper ground, 2,300' ong and 1,640' wide, is estimated to carry ore of payable tenor to a depth f 200', or approximately 12,000,000 tons of ore.

Churn-drilling with Keystone drills from 1910 to 1912, together with nderground work in 15 tunnels and in the shafts, proved 6,000,000 tons f ore averaging 3.7% copper and 1.3% sulphur.

Ferrobamba Nos. 2 and 3, 300 acres, constitute the Sulfobamba mine. Development to January, 1913, has proven 778,000 tons of ore carrying .25% copper, with 6.75% sulphur and 532,000 tons too low grade to work.

The Katanga or Reina de Cobre mine, 300 acres, is undeveloped.

The Charcas group, though having an area of only about 35 acres, contains a pyritic orebody 100 meters wide and 800 meters long, carrying chalcopyrite with pyrite, the face of a bluff of ore assaying 5% copper, 3 oz. ilver and 9 grams gold per ton.

The Bonanza claims, 420 acres, lying 9 miles south of Ferrobamba No. , apparently resemble the other properties, but no mining has been undertaken.

Development: 8,300' of tunnel or adit work and continuous operation f 2 churn-drills.

Property has been examined and reported on by Frank Klepetko and V. H. Wiley. Property closed down awaiting railway transportation.

IOROCOCHA MINING CO. **PERU**

Absorbed in 1917 by Cerro de Pasco Copper Corporation, and company issolved.

EW CHUQUITAMBO GOLD MINES, LTD. **PERU**

Office: 459 Salisbury House, London, E. C. 2, England.

Directors: F. Lowy, chairman; F. E. Macfadyen and F. H. McCardie.

Inc. May 22, 1907, in Great Britain. **Cap.**, £50,000; £1 par; 44,869 sued. Year ending June, 1917, showed a loss of £1,577. **Dividends:** 36% om 1907 to 1916.

Property: 142 acres at La Quinua, near Cerro de Pasco, Junin, Peru, ntains 2 replacement deposits of auriferous quartz lying with the bedding limestone where cut by andesite dikes. The ore is 65' wide, and car-s $4 to $25 per ton gold.

Development: by tunnels and open-cuts. A 40-stamp mill and cyanide ant are at work.

Production: £12,567 from 19,360 tons in 1916; £10,743 from 21,333 ns in 1917.

ERUVIAN COPPER & SMELTING CO. **PERU**

Offices: 115 Broadway, New York; and Pachacayo, Peru, S. A.

Officers: F. W. Mason, pres.; J. A. Vandegrift and B. W. Steele, v. p.'s; th J. F. Anderson, and R. R. Carter, directors. M. W. Braden, sec.-eas.; J. N. Vandegrift, mgr.; C. C. Semple, supt.; G. A. Ryder, and Frank iculicich, engineers.

Inc. Aug. 10, 1917, in Delaware. **Cap.**, $10,000,000; shares $1 par; non-sessable; 4,600,000 issued. U. S. Corporation Co., registrar; and transfer ice, 65 Cedar St., New York. Annual meeting second Tuesday in March. n thousand shares were advertised for sale in New York in October, 19, at 65 cents each. Company said to have ample funds in treasury to ry out the construction and development work planned for 1920.

Property: 830 acres of copper-silver and 40 acres of silver-lead claims Yauricocha, in the district of Yauyos, on western slope of the Andes, S. W. of Pachacayo on the Central Railroad of Peru, and 262 kilo-from Callao on the coast. Also owns 4,082 acres of coal land

at Jautenhausi, 20 miles E. of Yauricocha, and 30 miles from Pachacayo. Examined by John Glidden, C. C. Semple, and J. A. Vandegrift.

Geology: the Yauricocha ores occur in a contact between limestone and diorite. The orebody is vertical, runs N. W.-S. E. and has a length of 2,500′. Ore is carbonate, changing to sulphide at water-level at 400 to 500′ below surface. Ore said to average 12% copper, 3 oz. silver, and $2 gold per ton.

Development: at Yauricocha, by 2 vertical main shafts, 225 and 400′ deep, and 4,000′ of workings. Reserves reported as 70,000 tons, plus 60,000 tons of probable ore and 2,000,000 tons possible ore to a depth of 225′. One shaft caved in at 225′. In January, 1920, a crosscut on the 225′ level was reported to have gone through 110′ of 23% ore and the 375′ level showed 130′ of 26% ore. Vein is said to be proven for 2,500′ in length and to 400′ in depth.

At the Felicidad copper mine, 3 miles W. of Yauricocha, little work has been done. The vein is said to be 300′ wide and 4,000′ long on surface, and it is expected to become a large mine.

The Jupiter and La Porfia silver-lead mines, 14 miles W. of Yauricocha and 6 miles E. of the coal mines, have not been worked by this company, though they yielded ore running 51% lead and 100 oz. silver per ton when worked by former owners.

The Jautenhuasi coal properties contain 4 veins of coal 3 to 4½′ thick with no partings. The coal cokes well and is good enough for boilers. Tests made at the Casapalca smelter were satisfactory and the coal gave good results in locomotives of the Central Railroad of Peru. Reserves are given as 40,000,000 tons. The Government of Chile is said to have voted $1,500,000 towards construction of a railway to these mines.

At Rangracancha, 6 miles W., company has another coal mine.

Equipment: includes a 300-h. p. hydro-electric plant, with foundations for 600-h. p. steam and gasoline hoists, compressor, ½ mile of 3′ gage tramway, complete 100-ton copper smelter, with two 50-ton reverberatory furnaces, machine-shop, warehouse, dwellings, and motor road under construction. In January, 1920, 400 men were employed on the motor road and 200 at the mines.

Production: 1,541 tons of ore from the Yauricocha mine, reduced at the Casapalca smelter, averaged 23.68% copper and 2½ oz. silver per ton, giving a gross return of $153,422. None of this ore was selected, according to official reports.

Company proposes to increase the capacity of the smelter to 200 tons per day, which with cost of power plant, road, coal mine expenses, etc., will cost $300,000. Management estimates that treating 200 tons of 10% copper ore daily at a cost of $12 per ton of ore, or 7¼ cents per pound of copper, sold at 18 cents per pound, will yield a daily net profit of $12,600. Deducting $5,025 for charges on metal delivered at New York, plus $2,100 for amount paid M. Larke and associates, previous owners who still retain an interest, leaves a net profit of $5,475 per day, or $1,642,500 per year of 300 days. This estimate does not, it is said, include from $100,000 to $300,000 from precious metals and coal sold. On the present outstanding capital a return of 20 to 30% is therefore expected.

QUEQUENA; COMPANIA MINERA de PERU

Owners: Miguel Gamon y Rubio, Arequipa, Peru, and Manuel Chachilla, Valparaiso, Chile.

Property: about 18 miles S. E. of Arequipa, at an elevation of 11,000′, contains 8 veins carrying from 18″ to 5′ in width. Ore consists of silicate and carbonate of copper, changing with depth to chalcopyrite and bornite, with a quartz gangue and assaying from 4% to 60% copper, and up to 40 oz. silver per ton.

Development: by 2 old shafts, 250′ deep. Has shipped ore containing 20 to 30% copper and 25 to 40 oz. silver per ton. Idle.

TINTAYA MINE **PERU**

Under option to Andes Exploration Co.

Property: 1,320 pertenencias, 10 miles S. E. of Yauri, Cuzco, Peru, and 0 miles by good roads to Chuquibambilla on Juliaua Arzco Ry. Develop- ng by churn-drills and tunnels to prove whether mineralization is limited o contact of sedimentary rocks, or extends into the prophyritic igneous ocks. Silicate and carbonates, as well as cuprite, bornite, chalcopyrite, nd native copper are found.

VANADIUM CORPORATION OF AMERICA **PERU**

Formerly American Vanadium Co.

Office: 120 Broadway, New York; Vanadium Bldg., Pittsburgh, Pa.; Bridgeville, Pa., and Minasragra, Peru.

Officers: J. L. Replogle, pres.; M. G. Baker, v. p.; with Charles M. Schwab, A. A. Ryan, T. Coleman du Pont, Ledyard Cogswell, E. R. Tinker, H. P. Whitney, and Joseph De Wyckoff, directors. E. F. Nickerson, sec.; . K. Diffenderfer, treas.

Inc. 1919, in Delaware. **Cap.**, 300,000 shares, to be increased to 500,000 hares in 1920; no par value; 270,000 issued.

Initial balance sheet of September 16, 1919, gave total assets as $10,177,- 93, including $5,500,000 for mines; $1,000,000 for patents and processes; 2,000,000 for plant; $177,093 for inventories, and $1,500,000 cash.

Income from January 1, 1919, to January 20, 1920, was $1,907,553 from ales, plus $161,674 from other sources, a total of $2,069,227. After paying 741,823 for general charges, $128,334 in dividends, $120,233 for taxes and 68,347 for organization expenses, the surplus was $593,328.

Dividends: initial quarterly of $1.50 per share on April 15, 1920.

Property: vanadium mines at Minasragra, Peru, and smelters at Bridgeville, Pa., where ferro-vanadium is made.

The ore deposits, which are the richest and most productive vanadium eposits in the world, were originally located for coal but their real nature as discovered by the manager of the Hauranca smelter in 1905, who de- ounced them jointly with E. E. Fernandini. The latter sold out to J. J. Flannery, in 1910. A 12-mile railway, covering the most difficult part of the oad, is being constructed from the mines to Lake Pun Run.

Geology: the mines, which produce 80% of the world's supply of vana- ium, are in the Andes at an elevation of 16,800'. The orebody is a lens- haped mass 300' long and up to 30' thick, enclosed in red gypsiferous ales near igneous intrusions of varying composition. The ore is made up f the hydro-carbon mineral quisoqueite, coke and patronite, a greenish- lack sulphide of vanadium. (See Hewitt Trans. Am. Inst. Min. Eng., Vol. 1909). The ore averaged 19% metal, but the reserves are lower grade, ough estimated to contain 30,000,000 lb. vanadium in blocked out and robable ore and 70,000,000 lb. possible ore. Ore is packed on llamas for miles, to the Peru Central Railway.

Production: annual output of vanadium is about 3,000,000 lb., enough r 1,000,000 tons of steel. Ferro-vanadium sells for $7.00 per lb. Output is be doubled in 1920.

In December, 1919, the Vanadium Corporation announced that it had sorbed the Primos Chemical Co. of Colorado, which produces vanadium, ngsten, molybdenum and chrome. Vanadium Co. will sell 93,334 shares $45 a share to pay for Primos.

VENEZUELA

The mineral production of Venezuela has been almost at a standstill r several years, as mining is only done by a few foreign corporations and velopment is retarded by lack of confidence in the stability of the Gov- nment. Gold is the important product, but copper and iron, manganese d lead are mined in small amounts. The total value of the mineral pro-

duction for 1918 was $2,376,540, a decrease of $1,696,400, compared with 1917, the lessened output of copper and asphaltum being responsible for the decline. There are 179 metalliferous properties in operation, 53 subject to assessment work before titles are granted, and 97 merely filings which require the approval of Congress.

The gold-bearing regions have a bad climate, which is a serious hindrance to their development. The chief gold-bearing area is the Guianan highland in the southeastern part of the country, extending from headwaters of the river Yuruari down to the frontier of British Guiana. The gold occurs in shallow but rich alluvial gravel deposits.

Vein mining is practically confined to the Caratal district in the state of Bolivar, 150 miles south of the city of Bolivar. The district is underlain by metamorphic mica schists and hornblende and gneiss with intrusive masses of granite and diorite and later dikes of diabase. The gold quartz veins at Callao are in diorite, near diabase. The veins are small, the main bonanza vein but 2 ft. thick, but the ore is rich, varying between $75 and $90 per ton. It is worked to a depth of 1,100′ and a length of 1,000′ and between 1853 and 1895 yielded 1,438,638 ounces of gold.

Copper mining is practically restricted to the Aroa deposits.

In addition to the companies described in this section the following mining companies operated properties in Venezuela during 1918:

El Dorado Rubber, Balata & Gold Mining Co., owning the Perseverancia, Hechicer and San Carlos, gold quartz mines at Tumeremo, Roscio district, Estado de Bolivar.

Sindicato Aleman Minas Santa Isabel, operating the two Santa Isabel copper properties near Villa de Cura, Zamora district, State of Aragua.

Compañia Nueva Panama, owning a gold quartz mine of this name near El Callao, Roscio district, Bolivar.

Waterman y Compañia, at El Callao, and developing three gold quartz veins on the Esperencia, Las Nieves and Talisman claims, in the Callao section.

Bianchi y Odreman, Poggi Hermanos, Meris y Carlos Palazzi, Antonio Pieve y otros, H. Quensa y Cia, and others are operating placer gold properties, the first named getting out large nuggets, and averaging nearly $10,000 a month, working claims through leasers.

The Compañia La Cumaragua is opening up a promising group of 4 copper mines near Arog, and John C. Prince is developing the Camburito copper mine, and Johann Gathman, The Aroa bis, also near Aroa.

Other copper properties are under development by M. P. Maneiro y E. A. Modiano, at Manicuaro in Sucre; Carlos Stilling at Nirgua; M. Griffe y L. Mercado also at Nirgua.

Garbiel Rafalli developing the Canaima silver-lead property at Santa Rosa y Sta. Teresa in Benitez district of Sucre.

EL AMPARO MINE, LTD. **VENEZUELA**

Address: Guasipati, Roscio, Venezuela.

Property: the old and famous La Paz gold mine in the Roscio district, State of Bolivar, said to be almost worked out late in 1918. Equipped with 10-stamp mill, pans, tables, and cyanide plant.

GOLD FIELDS OF VENEZUELA, LTD. **VENEZUELA**

Address: El Peru, Venezuela.

Property: claims showing gold quartz veins, 4 miles west of El Callao in Roscio district, State of Bolivar, southwestern Venezuela. A plant employing 2 Chilean mills treats $15 to $20 gold ore by amalgamation and cyanid

INCE... COMPANIA A... MA MINERA LO... **VENEZUELA**

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...Increible ... at Guasipati, 8 miles N. E. of ...

...ro Ven... ...elopment work is said to ha...

...and ... ...quipment: includes 20-stamp ...

Production: over 40,000 tons of ore yielding $10 per ton by amalgamation, with $5 in the tails recoverable by cyanidation.

NEW CALLAO GOLD MINING CO. LTD. **VENEZUELA**

Address: El Callao, Venezuela.

Property: the famous Callao mine and the Callao La Union, Nueva Hanza alluvial mines; also the Culebra and El Porvenir vein mines near El Callao in southeastern Venezuela. The old mine is full of water, but some of the lesser mines are very promising.

The company is French and its financial condition is weak owing to the present status of European affairs.

SOUTH AMERICAN COPPER SYNDICATE, LTD. **VENEZUELA**

Office: 2 Broad Street Place, London, E. C. 2, England; and Aroa, Port of Tucacas, Venezuela.

Directors and officers: H. Edwards, chairman; H. D. Boret, T. O. Callender, H. Maubourguet, C. H. McEwen, and C. N. Murphy. C. D. Comrie, sec.; G. B. Butterworth, gen. mgr.; C. H. Stewart, cons. eng.

Inc. March 27, 1907, in Great Britain. **Cap.**, £40,000; shares 2 shillings par; 150,000 issued. Notes £37,500 of 7% issued in November, 1918.

Profit for year ended June 30, 1917, was £28,753, plus £3,167 brought forward; dividends absorbed £30,000; current assets were £93,516, and liabilities £55,448.

Dividends: 25% in 1909; 30% in 1910; 145% in 1911; 250% in 1912; 350% in 1913; 75% in 1914; 62½% in 1915; 150% in 1916; 200% in 1917.

Property: the Aroa mine and the San Antonio and Titiara mines, 55 miles from port of Tucacas, Venezuela. The Aroa vein is 50'-75' wide on the surface, and outcrops for 2,000'. The ore consists of pyrite and chalcopyrite, which as shipped to England, runs 9% copper. The low-grade ore is mixed with oxides and smelted to a matte at the mine. A 200-ton smelter is operated. Extensive drilling is under way in 1920.

The production is not made public, but profits are certainly large, judging by dividends.

YURUARI COMPANY **VENEZUELA**

Letters returned in March, 1919, from Caracas, Venezuela.

Property: gold-bearing gravel in Cicapra district, 25 miles N. W. of El Callao. The gold is in decomposed schist, and churn-drilling is said to have revealed several million yards of ground worth $1 per yd., which could be worked at cost of 50 cents. At last accounts a 200-yard clam-shell dredge was at work.

only 2 to 3% in the raw ore, while the bituminous matter ranges 10 to 17%, and carbon dioxide 7 to 13%. There are 2 roast stalls near the shafts, and at the furnaces the first-fusion product is a matte carrying 40% copper and 0.25% silver. This matte is broken up and roasted in calcining kilns, and the roasted matte, with the addition of 5 to 10% raw matte, is smelted in reverberatory furnaces to white metal carrying 74 to 75% copper and 0.45 to 0.50% silver. The slags from the white metal carry 4 to 6% copper and are returned to the shaft furnaces. Slag is utilized extensively for the manufacture of slag brick and paving blocks. The white metal is ground in Krupp ball mills and sent to the Saigerhütte refinery.

The Kochhütte, at Helbra, is the principal smelter, treating about three-fifths of the total production. There are 8 furnaces, 1 held in reserve, of circular shaft type, using cold blast. The Krughütte treats the rest of the ore. This plant, at Eisleben, near the mines, has 6 furnaces, one being held as a spare, all of circular shaft type, with forehearths, using cold blast.

The Eckardtthütte, at Leimbach, has 4 copper furnaces of circular shaft type, using cold blast. This plant also has 1 lead stack, producing silver and lead matte, and makes a little nickel speiss from resmelted fine dust. The Eckardtthütte has an acid plant, with 72 kilns and 5 lead acid chambers employing the chamber process of acid making.

The Kupferkammerhütte, at Hettstedt, has 3 circular shaft furnaces but employs a hot blast. The acid plant at the Kupferkammerhütte has 52 kilns and 6 lead acid chambers, turning out 50 metric tons of 50° Baumé sulphuric acid weekly.

The Gottesbelohnunghütte is one of the smaller and less modern smelters, equipment consisting of 13 small reverberatory furnaces, 17 roasting furnaces and 2 small furnaces for refining slags.

The Saigerhütte is mainly a refinery, including a desilvering plant operating on the Ziervogel process, which roasts the matte and retains the silver as a sulphate which is dissolved in water and the solution run over metallic copper, which precipitates the silver, the cement silver so secured being pressed and resmelted to metal 999 fine. The final furnace product, after the extraction of the silver, is blister copper of 99.7 to 99.8% tenor.

Production: which was only 5,865,898 lb. in 1867, increased to 15,230,300 lb. in 1877, to 29,176,000 lb. in 1887, and 40,230,400 lb. in 1897. Recent production has been as follows: 42,500,278 lb. in 1903; 41,629,349 lb. in 1904; 43,824,141 lb. in 1905; 40,108,000 lb. in 1906; 38,822,000 lb. in 1907; 39,686,800 lb. in 1908; 41,891,400 lb. in 1909; 44,769,800 lb. in 1910; 45,955,600 lb. in 1911; 45,188,600 lb. in 1912. Production in 1912 was secured from 873,305 metric tons of cupriferous material smelted. Estimates place the 1915 yield at 44,100,000 lb., and in 1916, 59,000,000 lb.

The Mansfeld is handled with high technical skill, and its orebodies by reason of their vast extent, are among the largest known. No detailed information has been available since 1913.

SAXON TIN & WOLFRAM MINING CO., LTD. GERMANY

In March, 1919, realization and distribution of the assets in England was proceeding, in conformity with the Act of 1918. See Vol. XIII for description of company, etc.

GREAT BRITAIN

AFRICAN ORE CONCENTRATION SYNDICATE, LTD. ENGLAND

Secretary and office: J. A. Stocker, 701 Salisbury House, London, E. C. England. A. S. Elmore, Walter McDermott and C. Pakeman, directors.

Inc. June, 1905. Cap., £12,000; shares £1 par; issued and fully paid.

Company owns patents for the treatment and concentration of ores and has erected plants at the Transvaal Consolidated Land & Exploration Co. and Namaqua Copper Co.'s properties in South Africa.

OLCOATH MINE, LTD. **ENGLAND**

Office: R. A. Thomas, mgr., Camborne, Cornwall.

Directors: F. Harvey, chairman; Oliver Wethered, J. M. Holman, E. . Janson, F. A. Robinson and F. W. Thomas.

Inc. July 15, 1895, in England. **Cap.,** £350,000; shares £1 par; all sued. **Debentures:** £75,000 of 6% participating, issued February, 1918.

Operations for the year 1918, resulted in a profit of £22,927, plus 9,548 from previous period. After allowing for depreciation and develop- ent, £11,916 was carried forward. Cash assets exceed liabilities by 30,000. The first half of 1919 resulted in a loss of £19,519.

Dividends: since 1896 total 135%; last one, 7½%, paid 1913.

Property: the most famous tin mine of Cornwall, worked from 1700 1799 for copper and which from 1799 to 1867 yielded ore carrying cop- r and tin, together with small amounts of arsenic, silver, and cobalt, to e total value of £3,234,693.

In 1918, Dolcoath, with the East Pool & Agar, Ltd., purchased the min- al rights to 9,000 acres of the Tehidy Estate for £90,000, Dolcoath taking 66% interest.

Development: by 3,000′ shaft and extensive workings. Prior to 1915, e annual advance was up to 1,500 fathoms, but in 1919 was only 150 thoms. A comprehensive drilling campaign was completed last year.

Equipment: includes machinery for the 3,000′ shaft, 16 Holman pneu- atic stamps, concentrators, and Elmore flotation plant.

Production: ear	Ore Treated, Tons	Black Tin (tons) (70% Metal)	Costs Per Ton
19 (half).....	28,877	387	$11.22
18.....	61,499	827	10.76
17.....	69,714	967	8.64
16.....	79,347	1076	6.52
15.....	82,967	1187	6.36
14.....	105,302	1439	5.80

The old mine still continues to produce considerable tin ore but with- t profit to company's shareholders.

AST POOL & AGAR, LTD. **ENGLAND**

Office: J. F. Maynard, sec., Carn Brea, R. S. O., Cornwall, England.

Directors: H. M. Rogers, chairman; J. M. Holman, J. C. Gardner, W. Loring, and C. A. Moreing. Bewick, Moreing & Co., gen. mgrs.; M. T. aylor, supt.; J. W. Partington, chemist.

Inc. Jan. 11, 1913, in England. **Cap.,** £100,000; shares £1 par; changed 480,000 of 5s. par in August, 1917; all issued. In April, 1919, 120,000 new ares of 5s. each were issued.

The net profit for 1916 was £22,485, of which £9,116 was paid in divi- nds. In 1917, profit was £59,651, and £24,061 in dividends. In 1918, ofit was £103,784, and dividends £60,000.

Dividends: 15% in 1916; 25% in 1917; 50% in 1918.

Property: a 42-year lease on 2 mines at Illogan, Cornwall, that were orked from 1834 to 1912. In 1918 company acquired a 33⅓% interest in e Tehidy Estate for £30,000.

Development: for 1916 amounted to 4,501′; besides 189′ of diamond illing. The vein on the 1,440′ level shows an orebody 39′ long and 5½′ de that carried 55 lb. black tin and wolfram per ton, and another 185′ ng and 6′ wide that assayed 10.8 lb. Other development at this depth s also satisfactory, so that reserves are practically unimpaired.

In 1918, there was 4,115′ of exploration and 1,078′ of diamond-drilling ne with satisfactory results, especially for the drill-holes.

Equipment: includes steam and electric power, Cornish and motor- ven pumps, compressors, hoists, shops, assay office, 10 Holman pneu- tic stamps, 6 tube-mills, 32 concentrators, slime plant, and magnetic

separators. Late in 1919 a flotation process was evolved by which the cassiterite could be floated with a 90% recovery.

Production: years ending December 31:

Year	Tonnage	Black Tin, tons	Wolfram, tons	Arsenic, tons	Tin and Scheelite, tons	Copper, tons	Value
1918.....	75,401	1,280	57	420	1.78	...	£
1917.....	77,287	.....	.....	.....	.....	.....	
1916.....	81,395	706	100	527	....	118	

Costs in 1918 totaled 50/8, or $12.08 per ton, against a yield of 77/, or $18.48 per ton, exchange figured at $4.85.

GEEVOR TIN MINES, LTD. ENGLAND

Office: W. C. Williams, mgr., Pendeen, Cornwall.

Directors: Oliver Wethered, chairman; E. J. Andrews, sec.

Inc. Feb. 22, 1911, in Great Britain. **Cap.,** £90,000; shares £1 par, 120,000 issued; increased in 1919 to £180,000; **Debentures:** £14,700 of 8% outstanding; £25,000 authorized.

Profit for 15 months ended March 31, 1918, was £8,177, of which £6,000 was distributed. Net profit for year ending March 31, 1919, was £17,854. **Dividends:** 10% in 1917; 20% in 1918; 10% in 1919.

Property: 208 acres at Pendeen, St. Just, Cornwall. Three lodes are worked, and a mill containing 4 Holman pneumatic stamps and tables of 100 tons daily capacity is at work. Reserves are given as 140,000 tons of tin-bearing ore. Development in 1918-'19 was quite satisfactory. The Wheal Carn mine has been unwatered and good ore found. Company is also interested in the South Crofty in Cornwall and Rayfield (Nigeria) Tin fields Co.

Production, in recent years:	Tonnage	Tin
1918	25,919	
1917-'18 (15 months)	26,313	
1916-'17 (15 months)	28,683	

Tin concentrate amounted to 439 tons, or 37.9 lb. per ton. Costs around 31/, or $7.44 per ton.

GRENVILLE UNITED MINES, LTD. ENGLAND

Office: H. Batens, mgr., Camborne, Cornwall.

Directors: T. Negus, chairman; J. R. Goold, and E. Hallett, J. Trevithick & Son, engrs.; F. M. Taylor, sec.; J. Nile, mgr.

Inc. July 2, 1906, in Great Britain. **Cap.,** £100,000; shares £1 par, 180,000 issued. In 1919 company was refinanced and two 5s shares issued for original 10s. shares, 3s. 6d. paid, the exchange providing £24,000 for future development.

Dividends: £21 13/6 paid by old company to 1911 on £100,000 shares; 90% from 1911 to end of 1913; nothing since.

Property: a tin-bearing tract at Camborne, Cornwall, on which there is a concentrating plant.

Production: in 1917 was 454 tons of black tin concentrate produced from 40,938 tons of ore, and 228 tons of black tin for first half of 1918.

LEVANT TIN MINES, LTD. ENGLAND

Address: Francis F. Oats, St. Just, Cornwall, England.

Inc. February, 1920, in Great Britain. **Cap.,** £160,000; shares £1 par, 240,000 issued. Company succeeds the Levant Mining Co., organized 1872.

Property: the Levant mine, on a cliff facing the Atlantic Ocean, 3 miles from Land's End in Cornwall, adjacent to the Geevor mine. There are [illegible] of lodes which intersect. They are in granite and [illegible] (clay) [illegible] since 1820, is practically dry, [illegible] being [illegible]

Development: by 1 main and 2 blind shafts, reaching depth of 2,100', nd many miles of workings. There are 3 blocks of unworked ground said o be worth developing.

Equipment: includes steam power, 50-h. p. pump, hoists, 64 stamps, and oncentrating machines.

Production: to end of 1918 the total was 3,800 tons of crude arsenic old for £32,657; 136,562 tons of copper ore for £859,303; and 21,959 tons f black tin for £1,531,977. The last three years for which returns are vailable follow:

Year	Arsenic Tons	Copper Tons	Black Tin Tons	Total Value
1918	52	54	278	£60,137
1917	86	146	372	53,815
1916	202	155	437	49,926

MINERALS SEPARATION, LTD. **ENGLAND**

Office: A. O. Williams, sec., 62 London Wall, E. C., England.

Directors: J. H. Curle, F. L. Gibbs, S. Gregory, H. A. Krohn, W. W. Webster. W Broadbridge, chief eng.; Sulman & Picard, cons. mets.

Inc. in 1903, to carry on metallurgical operations. **Cap.**, £50,000; shares £1 par; all issued and fully paid; increased to $500,000 in November, 1919.

Profit in 1917 was £36,400, and £38,717 was carried over from previous ear. Dividends amounted to £50,000, leaving balance of £25,117 carried orward. Cash assets exceeded liabilities by £81,000.

Dividends: 50% in 1917 and 1918.

The chief assets of the company are a number of patents (said to be ver 50) for flotation processes and machines for recovery of concentrates rom silver and lead, zinc, copper, and other ores. The use of flotation as been as great an advance in the treatment of zinc and copper ores as he cyanide process has been for gold ores. United States, Canadian, and Mexican Minerals Separation patents are owned by Minerals Separation North American Corporation, which see. In August, 1919, the patent rights or Spain were reported licensed to the Peñarroya company (which see) which is to act as agent; also to the Société Minerais et Metaux in France.

NATIONAL MINING CORPORATION **ENGLAND**

Office: Walter McDermott, Moorgate Hall, Finsbury Pavement, London, E. C. 2, England.

Directorate includes Walter McDermott of the Consolidated Mines Selection Co., J. A. Agnew of the Burma Corporation, F. A. Govett of the Lake View & Oroya Exploration Co., F. W. Baker of the Mexican Corporation, E. S. Christopherson of the Consolidated Gold Fields of South Africa, S. Kitzinger of the National Bank of South Africa, H. Strakosch of the Union Corporation, A. S. Elmore of the Chemical & Metallurgical Corporation, and H. Guedalla of the Imperial & Foreign Corporation.

Inc. November, 1919, in Great Britain. **Cap.**, £3,000,000; £1 par. The corporation is organized for exploration, investment and financing of mining properties throughout the world.

The first report, published in March, 1920, shows that 5 shillings per hare had been called, realizing £625,000. Net value of investments was £281,458, and cash on hand £345,891.

In February, 1920, company acquired an interest in the South American Copper Syndicate, Venezuela, which see.

ORE CONCENTRATION CO., LTD. **ENGLAND**

Office: 20, Salisbury House, London, Eng. Directors: Alex. Stanley [illegible], and F. E. Elmore; Walter McDermott and B. C. Hin[illegible] A. Stocker, sec.

[illegible] in Great Britain. **Cap.**, 230,000 ord. shares of £1 [illegible] 20,000 pfd. of £1 each, 8,795 issued.

Company owns the Elmore patents for concentration of ore by the use of oil, and has installed plants at several low-grade copper properties.

SOUTH CROFTY, LTD. ENGLAND

Office: Josiah Paull, mgr., Carn Brea, Cornwall.

Directors: F. Allen, chairman; H. J. Meyerstein, and H. A. Micklem, T. W. Evans, sec.

Inc. July 18, 1906, in Great Britain. **Cap.**, £50,000; shares 5s par; all issued; increased to £100,000 in June, 1919.

Profit for 1917 was £43,852. Dividends were £35,000. Reserve fund is £25,000. Profit for 1918 was £67,554.

Dividends: 321% from 1909 to Dec. 31, 1918, including 60% for 1918.

Property: the Trevenen Sett, arsenic-copper-tin-tungsten mine at Illogan, and the Castle Dinas tungsten mine at St. Columb, Cornwall. Both mines are equipped with concentrating plants.

Development: in 1918, 3,572' of work was done and 2,703' of drilling with disappointing results.

Production, years ending December 31:

	Ore, tons	Gross Yield
1918	70,055	£139,981
1917	67,688	196,545
1916	71,706	103,087

Costs are around 25/- ($6) per ton.

TEHIDY MINERALS, LIMITED ENGLAND

Office: J. F. Maynard, sec., 20 Copthall Ave., London, E. C., England.

Oliver Wethered, chairman of directors; R. A. Thomas, cons. eng.; Berwick, Moreing & Co., gen. mgrs.

Inc. February, 1919, in Great Britain. **Cap.**, £40,000; £1 par; all called up; increased in September to £300,000; 150,000 shares are held by Viscount Clifden.

The Dolcoath and East Pool & Agar companies have large interests in Tehidy.

Property: the mineral rights on more than 26,000 acres in and near west Cornwall, owned by the Basset (since 11th century) and Clinton estates, including the Tincroft and other operating tin mines; also deposits of silver-lead ore, hematite iron, and china clay, considered to be the most important mineralized area in Cornwall. Besides the famous Rogers lode, the ground contains several others. A large production of tin and other products has been made in the past, but there is yet a great area of unexplored ground. The lodes have been worked mainly in the killas (clay slate), but as the tin content increases in the granite, extensions will be made in this formation. It is proposed to start extensive lateral development of the principal fissures. Diamond-drilling is also to be done. Geology studied by Malcolm Maclaren; mining methods by W. A. Macleod.

TINCROFT MINES, LTD. ENGLAND

Office: Wm. Thomas, mgr., Carn Brea, R. S. O., Cornwall. F. E. Martin, sec.

Directors: Jas. Wickett, chairman; T. R. Bolitho, J. Gilbert, H. Bolitho, H. Rich, and W. D. Coode.

Inc. May 20, 1900, in England. **Cap.**, £62,500, in 50,000 priority and 200,000 ord. 5s. shares, of which all and 96,953, respectively, are issued. **Debentures:** £30,000 authorized, of which £10,000 have been issued.

Financial statements show that profits and losses have been erratic, as below:

	Receipts	Working Profit	Net Profit	Loss
.....	£61,979	.....	.....	£15,885
.....	126,385	£19,093	£15,685	.....
.....	103,605	18,004	14,954	.....
.....	77,846	5,046	2,500	.....
.....	68,630	3,739	1,266	.....
.....	62,854	804	.....	£3,865
.....	89,221	.....	.....	15,685
....	118,626	18,356	14,057	.....

† 10% in 1907, 5% in 1912 and 1913,

a, Cornwall, has a lode 3 to 15′ wide,
. of 1,248′ in granite. Ore carries arsenic,
rves are about 80,000 tons. The bottom of
specially on the 208-fathom level.
beam hoist, 2 Cornish pumps, motor-driven com-
ion dressing plant using ordinary gravity and Nissen
trators, and magnetic separators. Employs 598 men.

ction:

	Ore Treat., Tons	Arsenic, Tons	Copper, Lb.	Black Tin, Lb.	Wolfram, Tons	Yield P.T. Ore	Cost P.T. Ore
19.....	36,744	...	.....	705,000	..	.....	.....
1918.....	54,356	...	.....	848,960	..	$11.10	$9.66
1917.....	56,121	...	.....	1,003,520	..	8.70	7.50
1916.....	57,500	663	197,120	1,155,940	44	6.48	6.06
1915.....	59,000	538	67,200	1,361,920	39	5.22	5.04
1914.....	59,000	467	107,520	1,375,360	19	5.08	5.32

WEARDALE LEAD CO., LTD. **ENGLAND**

Office: Harold Chase, sec., Salisbury House, London, E. C. 2, England. E. P. Deas, chairman of board of directors; H. S. Willis, mgr.; Henry Louis, tech. advisor.

Inc. Sept. 18, 1900, in Great Britain. **Cap.**, £100,000; shares £1 par; 97,919 issued.

Profit for year ended September 30, 1918, was £18,143, of which £12,240 was distributed; £7,177 was carried forward. Profit for 1919 was £7,421 net.

Dividends: total 37/10 ($8.98) per share from 1901 to 1918, when 2/6 (60 cents) was paid. The distribution in 1919 was equal to 7½%.

Property: large area of mineral land at Weardale, Durham, containing deposits of galena and fluorspar in limestone. The milling plant was remodeled in 1919.

Property: in 1917, the 5,452 tons of ore smelted yielded 4,348 tons of lead; in 1918, 4,281 tons of ore gave 3,405 tons of lead. Output for 1919 was 1,869 tons of lead, and 11,500 tons of fluorspar.

GREECE

ANGLO-GREEK MAGNESITE CO., LTD. **GREECE**

Office: J. D. Henderson, 24 Finsbury Square, London, E. C. 2, England.

Directors: C. F. Colville, chairman; J. MacLaren, W. G. Waldron and J. Hogg, gen. mgr.

Inc. Aug. 21, 1902, in England. **Cap.**, £125,250 in 50,000 7% cum. pfd., 74,000 £1 dfd. and 25,000 1s dfd. shares, of which 37,845; 65,207; and 15,728 are issued, respectively.

In 1915, profit was £49,359; dividends absorbed £21,310; £18,512 was

carried forward; reserve fund was £32,000. In 1917, profit was £16,167; dividends absorbed, £13,216; £9,956 was carried forward; reserve fund was £32,000.

Dividends: 7% each year on pfd. shares; total on ord. shares since 1904 is 181%, including 15% in 1917; and 1325% on dfd. shares since 1911, the 1917 distribution being 100%.

Property: 5,000 acres near Pyli on the island of Eubea, Greece, mostly magnesite bearing.

Equipment: mining machinery suitable for open-cut work, 4-mile aerial tram, ore trams, etc.

Production: is not given, but operations must be highly profitable, judging by profits. Much of the ore comes to the United States in normal times.

ITALY

ENGLISH CROWN SPELTER CO., LTD.

Office: W. Saberton, sec., White's House, Port Tennant, Swansea, Wales, England.

Directors: R. J. E. Francis, chairman; W. H. Edwards, J. L. Richardson, and Sir G. Thomas.

Staff: E. W. Carlyle, supt.; E. Zay, mine mgr.; G. H. T. Tucker, mill manager.

Inc. March 9, 1883, in Great Britain. **Cap.**, £100,000; shares £1 par; 84,000 issued.

Profit in 1917 was £33,254; dividends absorbed £14,175; £15,326 was caried forward.

Dividends: total 400% since 1883; 15% paid in 1918.

Property: zinc deposits at Oneta, province of Bergamo, Italy.

Equipment: hydro-electric plant and concentrating works in Italy, and smelter in Wales.

Production: 10,862 tons of calamine and blende in 1916, and 5,263 tons in 1917.

LIBIOLA COPPER MINING CO. LTD. ITALY

Office: Bishopsgate House, 80 Bishopsgate, London, E. C. 2, England

Mine office: Sestri Levante, Genoa, Liguria, Italy.

Officers: T. V. Anthony, chairman; H. Hubert James, and Albert Straube, directors; C. J. Whitaker, sec.; Robert H. Craven, mine mgr.

Inc. January, 1867, in Great Britain, and reconstructed 1888. **Cap.** £252,000; shares, £5 par.

Profit in 1917 was £3,037, plus previous balance of £732. Dividend absorbed £3,150. Profit in 1918 was £1,819.

Dividends: 2s 6d in 1903; 3s 6d in 1904; 3s 6d in 1905; 2s 6d in 1907; 2s in 1908; 1s 6d in 1909; 1s 6d in 1910; 2s in 1911; 3s in 1912; 2s 6d in 1913; 1s 6d in 1914; 1s 6d in 1915; 1s 6d in 1916; 1s 3d in 1917, the total being £5 14/ per share.

Property is worked through a subsidiary company, organized under laws of Italy.

Property: 4 claims, leasehold, 1,000 hectares, also a half-hectare mill-site, including the Libiola mine, in the Carrara district, northern Italy. The mine, worked by the Romans, and reopened 1867, has about 12 miles of workings. The veins, in serpentine and diabase, carry chalcopyrite associated with pyrite, ores estimated by management to average 3.45% copper and 45.03% sulphur. A total of 64,440 tons of ore was blocked out for stoping at the end of 1916; in 1918 reserves were estimated at 900 tons copper ore and 11,000 tons pyrite.

Equipment: includes a 150-h. p. steam plant, 60-h. p. electric plant and a 30-h. p. hydraulic plant, with 90-h. p. used at the mine and 150-h. p. at the mill; one hoist, and two air compressors of 12 drills aggregate capacity.

The mine has a machine-shop, smithy and carpenter shop, all of stone, and saw mill. The mill covering 550 square meters, is built of reinforced concrete and stone, and has a daily capacity of 180 tons.

Production: 17,984 tons of pyrite and 1,687 tons of copper ore in 1916, and 16,930 tons of pyrite and 1,252 tons of copper ore in 1917.

Property is well managed and yields small though satisfactory returns. Operations continued without serious interruption during the war, but mine was closed down in 1919.

NORWAY

AAMDALS KOBBERVERK, A. S.

Address: Telemarken, Norway. N. A. Nielsen, Skippergaten 27, Christiania, chairman; H. H. Dahll, Aamdals Verk, Telemarken, mng. director.

Property: about 300 acres, besides considerable forest land. The ore is low grade, carrying chalcopyrite and bornite, averaging 2% copper, with a gangue of slate and quartz. Reserves are 800,000 tons of ore containing 12,000 tons of copper.

The new concentrating works, built in 1915, consist of coarse-sorting house, crusher, mills, jigs, tables and flotation plant for slime. Concentrates contain 25% copper. An electric smelter was being erected in 1919.

Production: 900 tons concentrates per year, equivalent to 225 tons copper.

ALTENS KOBBERGRUBER **NORWAY**

Idle since 1908, and resumption of operations very uncertain. See Vol. XIII for description.

Office: care of Sulitelma Aktiebolag, Helsingborg, Sweden.

DUNDERLAND IRON ORE CO., LTD. **NORWAY**

Office: C. A. Frith, 4 Copthal Ave., London, E. C. 2, England.

Directors: A. O. Cantley, J. H. Gretton and S. C. Magennis, C. Bannatyne, mgr.

Inc. April 22, 1902, in Great Britain. **Cap.,** £700,000; shares £1 par; all issued; originally £2,000,000 **Bonds** £150,000 of prior lien.

Property: iron ore deposits from 3 to 35 miles from Mo, on the coast of Norway, connected by 17 miles of rail with Storforshei, near Mo. About 80,000,000 tons of 39% ore has been proven.

Equipment: the concentrating works at Guldsmedirk, originally consisted of an Edison magnetic process plant as once used in the United States, but it was a failure. Another concentrator of 2,000 tons daily capacity awaits normal conditions before operations start. Product is shipped to England.

FOLDAL COPPER & SULPHUR CO., LTD. **NORWAY**

Office: 7 St. Michael's Alley, Cornhill, London, E. C. 2, England. **Mine office:** W. H. Lund, mgr., Foldal, Lille-Elvedal, Norway.

Sidney St. J. Steadman, chairman of board of directors. W. A. Carlyle, cons. engr.; D. N. Forbes, sec.

Inc. Jan. 27, 1906, in Great Britain. **Cap.,** originally £350,000; shares £1 par, in £150,000 preferred and £200,000 deferred stock. Company reorganized in 1914 and capitalization reduced to £185,000; shares £1 par; 28,000 shares issued, December 31, 1915.

Balance sheet: for year ending Dec. 31, 1915. November, 1916, includes: Assets—mining properties, £60,000; equipment, £52,479; ore stocks, £17,405; provisions and livestock, £16,006; debtors, £19,669; cash, £17,478. Liabilities—capital stock, £28,000; mortgages and liens, £155,074; creditors and credit balances, £21,911. Net receipts from ore sales amounted to £8,808. Operations for the year showed a loss of £1,610, with a total debit to date, £18,712.

Property: about 3,000 acres, at Foldal, Norway, timbered and includ-

ing 4 old mines, known as the Juliana Marie, Knutshovd, Foldal, Grer, Molfke and Grimsdal, worked for about 150 years. Mine, opened mainly by tunnels, shows a vein of about 12' average width, carrying massive cupriferous pyrite, with only traces of arsenic, vein giving every indication of persistence. Ore estimated to average about 2% copper and 46% sulphur. Property also has some ore of high copper tenor.

Development: during 1915 amounted to 5,385', compared with 6,328' in 1914. The main shaft was sunk to the 6th level, but exploratory work on this and the 5th and 7th levels did not fulfill expectations of the management.

Equipment: includes an excellent mining plant, installed at a cost of £105,000, and company has expended about £22,000 for substantial mine buildings. A large waterfall, on the Einuna river, held under a 25-year lease, subject to renewal, at annual rental of £25, has been improved with a hydro-electric power station. Good wagon roads have been built.

A 22-mile Pohlig aerial tram, which is one of the longest in the world, built at a cost of £38,412, runs from the mines to the Lille-Elvedal railway, and has a capacity of 40 metric tons per hour. Miscellaneous improvements include a telephone line, and a quay at Trondhjem, for ore shipments.

The tonnage of clean ore shipped from the mine to the railway was—

Year	Tons	Copper,%	Sulphur
1910	58,558	1.93	46.31
1911	48,832	1.96	45.84
1912	45,334	1.99	46.38
1913	38,579	1.85	44.79
1914	40,457	1.84	44.87
1915	58,400	1.81	44.35

Property considered promising and management good. No reports issued since 1915.

ORKLA GRUBE-AKTIEBOLAG — NORWAY

Address: N. E. Lenander, mgr., or V. B. Lange, Lokkens Verk, Norway.

Officers: Marcus Wallenberg, pres.; Th. Fearnley, v. p., at last accounts.

Inc. October, 1904, in Norway. **Cap.,** 16,000,000 kroner ($4,160,000); shares 180 kroner ($46.80) par.

Dividends: of 7% are paid.

Property: at Meldalen, Norway. Deposits are lenses in gabbro. Ore is a cupriferous iron pyrite, carrying 2% copper and 42 to 44% sulphur. The mine is opened by an incline and 2 vertical shafts to 1,300' depth.

Equipment: five 1,200- h. p. electric hoists, four 1,400-h. p. compressors, two 130-h. p. pumps and a mill of 500,000 tons annual capacity.

Production: in 1915 was 180,000 tons, and in 1916, 100,000 tons. No recent returns.

ROSTVANGEN AKTIESELSKABET — NORWAY

Head office: Skippergaten 19, Christiania, Norway. **Mine office:** Rostvangen, via Tonset, Norway.

Directors: Johan Didrichsen, chairman; V. Koren, managing director; B. Bredesen, mgr.

Inc. May 18, 1908, in Norway.

Mine: is connected with the Kristiania-Trondhjem railway by an aerial tram.

Production (annually): 40,000 tons of pyrite containing an average of 2.5% copper and 45% sulphur.

SULITELMA AKTIEBOLAG — NORWAY

Office: Helsingborg, Sweden.

Directors: Lord-Lieut. G. Tamm[illegible], pres.; M. [illegible]; Claes Andersson, R. M. [illegible]; Fred. Th. [illegible]

gelsson (managing director), Holm Holmsen (gen. mgr.), Dr. C. Sjunnesson, Vice-Consul Lloyd Lundström (vice-managing director), and Captain Loris Person Henning. Andr. Zuale, mgr.

Inc. 1890, in Sweden. **Cap.**, originally 3,000,000 kroner, but increased several times to present amount of 14,042,000 kr.; shares, 500 kr. par. Annual meeting in May.

Dividends: 6% was paid in 1907; and total to end of 1911 was 2,460,000 kr.

Property: 214 claims and total area of 50,000 hectares, more or less mineralized, mainly in the Fauske Herred district of Nordland. Lands include the Sulitjelma, Carlotta, Giken, and Altens groups of mines. The company also owns the Vaddasguisa mine, in the Oksfjorddalen, in Skjervö and Kvaenangen herreds, the Vaddasguisa being the largest and best ore deposit so far known in the Oksfjorddalen.

The Sulitjelma mines are situated within the Arctic Circle on the shore of Lake Langvand, 400′ above sea-level and 12 miles E. of Fineidet, a port on the Saltenfjord. Discovered 25 years ago, they have been developed to an enterprise in which 1,600 workmen are employed, and in which the Knudsen pyrite smelting process was invented and is still in operation.

Geology: ore consists of cupreous iron pyrite and pyrrhotite, disseminated through mica-schist and sometimes found massive. This ore occurs in long and narrow lenses on the contact between schist, amphibolite, and olivine gabbro, the lenses running E.-W. on the N. side of the lake, changing to N.-S. on the S. side of the lake. There are 17 outcropping orebodies, 15 under development, which range from 1 to 30′ in thickness, and from 200 to 2,500′ in length. The ore is sorted by hand and 4 grades produced; the first, called sulphur ore, contains 3% copper, 44% sulphur, and is shipped to acid makers; the richer ore carries 6% copper and 32% sulphur, and is smelted at the mines; the concentrating ore with 1.8% copper and 22% sulphur, is treated by water concentration and by the Elmore process; waste, carrying 0.25% copper and 3% sulphur, is discarded. The total ore mined averages 2.45% copper and 45% sulphur. Of the sulphur ore exported, about 90% is fines and 10% lumps, shipped to various points in Norway, Sweden, Denmark, Great Britain and the Continent.

Development: is mainly by 4 tunnels, 2,500, 1,250, 500, and 200′ long. Workings total over 12 miles. Reserves in 1919 were given as 1,725,000 tons. Underground haulage is by electricity. Longwall stoping is the general method used. Power includes a 970-h. p. hydraulic plant, 1,220 h. p. electric plant, 780-h. p. compressor plant, and 10 h. p. gasoline plant.

Equipment: includes eight 20-h. p. hoists, 5 air compressors, 3 at the mines and 2 at the smelter. The mine has 2 pneumatic drills, 1 Temple electric drill, and 18 pneumatic hammer-drills in service. There are 3 sawmills, a general store, 3 schools, a church and a lodge, with a large number of dwellings for employees, the company owning a total of 320 buildings.

There is an extensive system of aerial tramways, with 15 stations and 2 power stations, the tram system including a 4-mile line to the Jakobesbakken mine.

The frame concentrator, of 36,300 sq. ft. area, is equipped with 3 Hadfields and five 13x24″ Krupp Grusonwerk crushers, 15 sets of rolls, 76 Harz jigs, 17 Ferrari concentrating tables, 1 slime table and 62 sizers.

There is a separate mill of 12,800 sq. ft., containing an Elmore vacuum oil flotation plant, the largest Elmore plant in the world, having 18 units, with a productive capacity of about 25,000 tons of 6.5% copper concentrate yearly. The plant went into commission April, 1909, and in the first year of operation produced about 8,000 tons of concentrate, carrying 6.75% copper, with a recovery of better than 80%. This Elmore plant is not only the largest installation in existence, but has given perfect satisfaction, redeeming all promises. [illegible] Elmore units, installed at other copper mines [illegible] other parts [illegible] proven unsuccessful, but the high saving [illegible] low co[illegible] at the Sulitjelma show that the process,

Portugal, carrying tungsten (wolfram) deposits, and equipped with two concentrators.

Production: 235 tons of wolfram concentrate in 1914; 300 tons in 1915, and 337 tons in 1916.

RUSSIA

See under Siberia, Asia, for Siberian mines which were listed under Russia in former volumes.

CAUCASUS COPPER CO. RUSSIA

Office: E. W. Lowe, Pinners Hall, Austin Friars, London, E. C. 2, England.

Directors: J. Colquhoun, chairman; M. Grancini, Viscount Grimston and E. B. Lockhart.

Inc. Oct. 4, 1900, in England. **Cap.,** £1,000,000; shares £1 par; 513,50[illegible] issued. **Debentures:** £42,620 of 5% firsts, and £1,238,500 of 5% seconds issued.

No accounts have been available for 5 years owing to the war, but in 1915 the debit balance was £178,319. Creditors, loans, and bills payable amounted to £236,400; and debenture interest accrued, £76,447.

Property: near Dzansul, Department of Kutais, Caucasus, southern Russia. In 1912 reserves were estimated at 3,600,000 tons of 3.1% copper ore. In 1914 the Turkish army took possession, but was ejected 5 months later. A little work was done late in 1916, but none in 1919.

Equipment: includes a 1,000-ton mill using flotation.

Production: 3,030 tons of copper in 1911; 2,992 tons in 1912; 3,936 [illegible] in 1913.

KYSHTIM CORPORATION, LTD. RUSSIA

Head office: J. P. B. Webster, sec., Pinners Hall, Austin Friars, London, E. C. 2, England. **Operating office:** Moscow, Russia. Mine office: Kyshtim, Perm, Russia.

C. J. C. Scott, chairman of board of directors; Leslie Urquhart, mng. director; P. A. Ivanoff, mng. director; R. G. Brown, cons. engr; and T. [illegible] Jones, advisory eng. in Russia.

Inc. Oct. 29, 1908, in Great Britain, to acquire the entire share capital of the Kyshtim Mining Works, a Russian corporation. **Cap.,** £1,[illegible] shares £1 par; 1,254,240 issued and fully paid. Debentures authorized £650,000 at 6%, all issued and redeemed.

Dividends: initial 5% dividend paid in December, 1912; total in 1914, 22½%; 25% in 1913; 5% in 1914; 10% in 1915, paid in November, 1916.

Balance-sheet for year ended Jan. 13, 1918, submitted Dec. 19, [illegible] showed a balance carried forward of £82,401. The Kyshtim Mining Works Co.'s reports have not been issued. Its profits in 1916, before charging depreciation and income tax, was about 6,111,000 rubles.

In December, 1917, the interest held in the Kyshtim Mining Works was transferred to the Russo-Canadian Development Corporation, so-called, the Kyshtim Corporation receiving debentures in the new company in exchange.

Property: 2,198 sq. miles, or 1,406,700 acres, the mineral land [illegible] 189,000 acres, the remainder being farm and forest areas, all [illegible] Government of Perm, southern Urals, Russia. The copper mines [illegible] from Kyshtim, are connected [illegible] company's own line with the Government railroad. The iron mines [illegible] mountains, and the timber [illegible] fuel and mining purposes, also [illegible] public.

Principal copper mines [illegible] Smirnoff, and Tissoff. Ore [illegible] tons, averaging 2.75% copper.

Geology: as described by [illegible] Kyshtim are a compact, dense

d quartz, carrying irregular blotches, streaks, and minute grains of chalpyrite, sphalerite, and tennantite. The evidence indicates that the ore is result of the metasomatic replacement of alternating bands of a sheared d broken schist by a rather fine-grained, cracked, and broken pyrite, andral barite, and quartz. This granular aggregate contained considerable en interstitial space, which was later filled by contemporaneous chalcorite, sphalerite, and tennantite. Tennantite probably also marks a slightlater stage in the primary mineralization, and with it are contemporanusly associated chalcopyrite and quartz of a second generation. The ragenesis of the sulphide minerals is one of decreasing iron and increasing pper content. The orebodies, as viewed in a vertical section, normally ow four distinct, roughly horizontal and parallel zones. From the outop downward they may be designated as: (1) the gossan zone, which exnds from the surface to a maximum depth of 60′; (2) the zone of loose ritic sand, extending from the bottom of the gossan to a maximum depth 150′, the greater part of which lies beneath the level of the ground-water;) the loose, leached sulphides, which reach from the bottom of the baritic nd to a maximum depth of 180′, where they gradually pass into (4) the derlying, firm, massive, mainly unaltered sulphide ore. Downward enchment of secondary sulphide does not occur in the form of a shallow, ell-developed, commercially important, horizontal zone. typical of many her localities, but has taken place to a relatively slight degree along the mediate walls, especially the hanging wall, to the greatest depth yet atined in exploration, which is 600′ below the ground-water level.

Equipment: complete mine plants, also smelter at Karabash capable of roducing 10,000 tons of copper yearly. There are 3 blast-furnaces of a otal capacity of 1,500 to 1,800 tons daily, and one 100′ gas-fired regenerave-type reverberatory for fine ore and flue dust. Company has an elecolytic refinery at Kyshtim, with annual capacity of 13,000 tons of copper, here it also treats blister copper from other companies.

Production, years ending January:

Year	Copper, Tons	Year	Copper, Tons
917	5,000	1915	7,642
916	6,392	1914	7,588

In 1914 total cost was £37.84 per ton of copper, which is equal to 8.1c er lb. in January, 1918, the Bolsheviks nationalized the Kyshtim properties, but they were ousted and work resumed early in 1919. Late in 1919 ompany was merged into the Russo-Asiatic Association, which see.

ROSPECTING COMPANY, THE **RUSSIA**

Office: Basildon House, Moorgate St., London, E. C. 2, England.

Inc. in Russia, Cap., 200,000 rubles. Company holds the mining inter- of the Russo-Canadian Development Corporation, during the develop- stage.

Property: concessions covering about 73 sq. miles have been located. the mineralized area of 1,550 acres of the Steppe region there are 5 porhyry deposits and 7 veins with favorable indications. Prospecting has een done by drilling.

USSIAN MINING CO[illegible]TION, LTD. **RUSSIA**

Officers: Henry Richa[illegible] 41 Salisbury House, London, E. C. 2, ngland.

Directors: F. W. Bake[illegible] R. Haig, Walter McDermott, A. Elmore, Baron A. de [illegible] ory engineer in Russia, A. Gernet; P. Hutchins, cons. engi[illegible]

Inc. Jan. 6, 1911, [illegible] 250,000 shares £1 par; £65,250 ued.

Pro[illegible] Siberia was sold to Altai [illegible] interest in collieries in

Inc. Aug. 31, 1900, in Spain. **Cap.**, 15,000,000 pesetas shares (accounts) and 7,000,000 obligaciones.

Accounts for 1916 showed a current balance of 143,240 pesetas and expenditures of 175,573 pesetas for construction account; 185,540 pts. for interest on bonds; 98,198 pts. for interest on accounts and 50,000 pts. loaned to Coto Teular Co., leaving a balance of 30,050 pts. Total expenditures to date amount to 5,803,317 pts.; for mine account, and 14,914,332 pts. for railway account. Total all accounts, 31,153,638 pts.

Property: a group of 8 mines, 345 hectares, at Cala, near the Pena and Rio Tinto mines, carrying extensive bodies of magnetic iron ore and cupriferous pyrite. Company owns and operates a 97-kilometer railroad from the mines to San Juan del Aznalfarache, on the Guadalquivir river, in the adjoining province of Sevilla. The mill and reduction works were installed in 1917.

Production: for 1916 was 23,973 tons of ore. Shipments were 12,60 tons crude ore; 7,346 tons calcined ore; 1,010 copper mineral, the total value being 286,536 pesetas. No later figures procurable.

CAMPANARIO; SOCIÉTÉ DES MINES DE CUIVRE DE SPAIN

Address: 5 Rue du Helder, Paris, France. **Mine office:** Valverde del Camino, Huelva, Spain.

Baron A. de Dietrich, chairman of board of directors; Arthur Marshal, gen. mgr.

Inc. Dec. 20, 1906, in France. **Cap.**, f5,000,000; shares f500 par.

Property: seven hundred hectares, including 6 old mines, and actually having about 250,000 tons of cupriferous pyrite in sight.

Equipment: includes an elaborate and extensive surface plant.

Production: about 40,000 tons of pyrite annually, ore being first treated by lixiviation and cementation to recover its copper content, and residue sold for sulphur. No exact figures available.

CASTILLO DE LAS GUARDAS; SOC. ESPANOLA DEL SPAIN

Office: Apartado 12, San Sebastian, Spain. **Mine office:** Castillo de las Guardas, Sevilla, Spain.

Officers: Edmond Delage, chairman; Julio Astoreca, sec.; Ernest Largillier, managing director, with Louis de Beauce, Georges Thurel, Ernest Juan, directors. Francisco Zarraga, manager; Manuel Fernandez Balbuena, engineer.

Inc. July 12, 1901, in Spain. **Cap.**, 7,500,000 pesetas, increased later to 10,000,000 pesetas; shares 500 pesetas par; issued 9,000,000 pesetas. Annual meeting in March.

Property: 240 hectares, 23 kilometers from Zalamea la Real, having 15½ kilometer private railway, known as the Ferrocarril de Minas Castillo y Empalme Ronquillo, connecting at Estacion Ronquillo with the Ferrocarril Sevilla y Cala.

Mine shows granite-porphyry and diabase, carrying 5 orebodies, one of which under development, has a lens of 40 meters width and 230 meters length, proven for depth of 165 meters, carrying cupriferous pyrite averaging about 1.5% copper, 0.5% lead, 0.13% zinc and occasionally up to 2 oz. silver and 4 grams gold per metric ton. Mine was discovered 1843, and worked in a small way, until taken over by the present company, 1901.

Development: by the following shafts: Menesses, 142 meters; San Pablo, 142 meters; Malacate, 100 meters; Colorado, 110 meters; Dos de Mayo, 40 meters; Remedies, 42 meters.

Equipment: includes a 683-h. p. steam and electric plant, with two 200-h. p. hoists, good for 140 meters each, 250-h. p. air compressor.

The company owns 353 buildings, with stone shops, also [illegible] rate schools for boys and girls, a hospital for workmen and their [illegible] and a town hall.

[illegible]OBA COPPER CO., LTD. SPAIN

[illegible] Place, London, E. C. 4, England. Mine office: Sevilla, Spain.

Officers: Edgar Taylor, chairman; Hugh F. Marriott, C. H. Villiers, Lord Vaux of Harrowden, Richard E. Carr, J. E. Champney, directors; F. H. Williams, sec.; John Taylor & Sons, mgrs.; J. Hocking, mine supt.

Inc. Aug. 5, 1908, in Great Britain. **Cap.**, £200,000; shares 5s par; all issued, and fully paid. Company is a consolidation of the Cerro Muriano Mines, Ltd., and North Cerro Muriano Copper Mines, Ltd.

For year ending Dec. 31, 1911, profits were £14,899; for 1912, £39,405; 1913, £83,321; 1914, a loss of £4.203; in 1915 profits were £10,077; in 1916, £45,665; in 1917, £13,513. In 1919 there was a loss of £11,603. Net cash assets were £73,773 at end of 1919.

Dividends: in 1912, 20%; in 1913, 20%; in 1914 and 1915, nil; in 1916, 10%; nothing since.

Property: 469 hectares, 10 miles N. E. of Cordoba, in the south of Spain, held under perpetual lease from the crown, and reached by the Andalusian railway. Mines show old workings, dating from the Roman era, extending to a depth of 400', notwithstanding a heavy flow of water. There are 6 large veins and several small veins in mica-schist, diorite and quartzite, carrying chalcopyrite and pyrite, with gangue of calcite, quartz and country rock, the ground being soft, requiring the filling of stopes with waste. Veins are reported to have widths of 12' to 40', with proven lengths as follows: Calavera, 1,635'; Excelsior, 635'; Lorenzo, 4,575'; Isabel, 5,550'; Cerro Muriano, 8,500'. Some ore taken from the old Roman workings assayed 28 to 34% copper.

Development: by 8 main shafts—the Santa Victoria, bottomed in footwall at 950'; San Rafael, 1,571'; San Arturo, 1,115'; Esperanza, 196'; Eastern, 1,539'; Excelsior, 850'; Lorenzo, 1,018', and the Isabel, 620'. Development work for year 1916 totaled 6,821', including 260' of shaft sinking. The San Rafael shaft, 300 meters from the Santa Victoria, shows a vein of 5 to 13 meters width with the better portions worked out by the Romans. Ore reserves were estimated, Dec. 31, 1916, at 142,914 long tons, averaging 2.39% copper, against 99,139 tons of 2.16% in 1917, and 64,894 tons of 2.23% in 1918. The San Rafael and Eastern sections have been abandoned. Development work at the mine has been retarded considerably by water.

Equipment: about half of the product is treated by the mill and half by the smelter. The mill has 6 units of the Murex magnetic separation process which treats the re-crushed jig middlings, other flotation processes being unsuitable owing to the presence of calcite. In 1916 Murex plant treated 14,599 tons of re-ground jig middlings and tailings, averaging 1.34% copper, and produced 1,374 tons of concentrates averaging 10.6% copper, with 74% recovery.

The smelter includes a calcining plant and a converter plant. The blast-furnace, blown-in, August, 1908, is used only alternate months, its capacity being double that of the mine.

Production: in 1916 the mine output was 95,947 tons of 2.18% copper content. After sorting, 84,800 tons of 2.47% copper content were treated in the milling, concentrating and smelting works. The concentrator treated 48,727 tons of 1.57% ore, which yielded 4,798 tons of 9% concentrates, and 14,599 tons of middlings assaying 1.34% copper. The recovery for the Murex and concentrating plants was 75% as compared with 70.7% of the previous year. Yield in 1916 was 1,746 tons of blister copper. In 1917 the output was 1,554 tons of copper from 61,373 tons of ore treated; and in 1918, 1,453 tons from 46,369 tons. In 1919 the yield was 284 tons of blister copper.

This property is one of the largest and most interesting of the old Hispana-Roman mines and was famous before the Christian era for the high quality of copper and brass produced from its ore, but was entirely idle for 2,000 years, until re-opened, 1903, by the predecessors of the present company. In September, 1919, company announced the sale of its mining properties for 1,000,000 pesetas; assets now consist of £70,000 government bonds, which is to be spent partly in developing an option secured on

Inc. Aug. 31, 1
and 7,000,000 obliga
Accounts for 1
penditures of 175,5
terest on bonds; 9
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date amount to 5
way account. To
Property: a
Rio Tinto mine
erous pyrite.
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adjoining pr
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being 286
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h

ag 2.18% copper
, but the copper conten
for 4 years past. The ores a
with traces of gold, and sm
ess, at the smelter. About me
or sulphur contents, about me
ed or sent abroad. The ores rece
ndary enrichment, and with depth i
.000' depth the average copper
body is cupriferous pyrite, carrying
chalcocite and chalcopyrite. Owing
sulphur the shipping ores of the Rio Tin
ddition to supplying various British wor
sulphur ore in large quantities to Germ
umber of acid works in the United States
me are estimated to carry about 150,000 long

Tinto has 3 mineral zones, carrying a succes
nown as the South or Nerva lode, the San Dionis
e North lode, in addition to which there are 2 sm
acent to the North lode, which also are being w
re 3 different mines, of which 4 are worked opencast
The underground mine is worked pillar-and-stall
of 12½ meters, levels being opened 4 meters high and
ded into galleries and crosscuts of 4x4 meters, leavi
meters, which is not an entirely satisfactory method of ex
loes more ore in the pillars than is mined.
The San Dionisio mine, the westernmost and deepest of the group
shaft is nearly 1,200' depth. The work of changing over the San Dion
for opencast extraction was begun 1907, and completed 1911. The
burden, consisting principally of porphyry and slate, was removed by st
shovels and carried through tunnels on the different levels, similar w
being done in the South lode opencast extension. Ore will be mined
steam shovels to as great a depth as practicable, below which it wi
necessary to hoist by shafts to the lowest tunnel level. The San Dion
is likely to be the chief source of ore supply for several decades to c
and work has been planned systematically for 10 years in advance.

Most of the ore mined is hauled out through tunnels without the use
of small steam engines. The lowest tunnel now in use for the 2 main lodes
the South and Dionisio, has not proven deep enough and management plan
driving a new tunnel, 200' below the present one, which will be 3 miles long
and will require 3 to 4 years for completion.

Wherever possible mining has been done by open pit workings which
have the great advantage of giving complete extraction of the ore, and are
therefore economical in tonnage costs in the long run, though require
enormous initial expenditures for the removal of overburden. Fortunately
the financial resources of the company permit the outlay of vast sums, the
principal of which will not be repaid for many years, but which eventually
will be returned in full with very handsome interest. The possibility
of the caving system for underground mining was considered, but a
adverse decision was reached. Timber is scarce and high-priced. The depth
of the largest pit is about 600' and beyond the great pit the immense ore
bodies are worked by drift-stopes, the capping being blasted and sent down
raises to fill and hold the ground as the ore is removed. Steam shovels
recently have replaced manual labor to a considerable extent in opencast
extraction.

Production: 1876-1916, was 20,000,000 tons of pyrite shipped, and 40,000,
(?) tons of ore treated locally, a total of 60,000,000 long tons, this ore yield
ing 800,000 long tons fine copper. No production figures are available sinc
1913, on account of war reasons, but considering strikes and temporary

[redacted] these figures are approximately correct. In 1913 there was [redacted]8 tons of pyrite, while 1,207,403 tons of 2.19% ore was treated [redacted] This total of 1,859,571 tons compares with 2,406,969 tons in [redacted]ve copper outputs were 44,978,880 and 57,395,520 lb.
[redacted]nagement of the company is both technically and financially [redacted]cism, and the mine itself, after 3,000 years of production, requires [redacted]ndation.

[redacted]GUEL COPPER MINES, LTD. **SPAIN**

[redacted]e: E. Johnston, sec., 295 Salisbury House, London, E. C. 2, Eng-
Mine office: Almonaster, Huelva, Spain.
[redacted]ficers: C. C. D'Anvers, chairman; H. Barrett, R. B. Levy, M. Paisant, [redacted]rges and C. A. Massaouti, directors; J. F. Allen, con. eng.
Inc. Oct. 12, 1904, in Great Britain. **Cap.,** £150,000; shares £1 par; [redacted]reased, November, 1908, to £200,000; fully issued and fully paid.
Dividends: 18¾% in 1906; 7½% in 1913; 5% in 1914; 18¾% in 1915. [redacted]ccounts for 1915 show a loss of £1,835, and in 1917 a loss of £7,180.
Property: 1,900 acres, including the San Miguel and adjoining mines [redacted]ontaining cupriferous pyrites. The property was worked for some years [redacted]y Sociedad Miniera de San Miguel de Huelva, a Portuguese company, until [redacted]aken over in 1904 by the present owners. In 1907 the opencast levels of [redacted]he mine caved, since which time production has been limited to under-[redacted]round ore extraction. The mine has ore reserves, estimated, 1912, at 700,000 [redacted]ong tons, and in addition there are about 450,000 tons of partly leached ore [redacted]n surface, in heaps. Underground ore reserves are estimated at 2.5% [redacted]opper tenor.
The company owns a 12-mile private railway, built at a cost of £40,000, [redacted]rom Almonaster to El Cerro, connecting at the latter point with the Ferro-[redacted]arril Zafra y Huelva.
Production: 1,612,800 lb. copper in 1904; 978,880 lb. in 1906; 797,440 lb. [redacted]1 1907; 1,124,480 lb. in 1908; 1,438,080 lb. in 1909; 1,635,200 lb. in 1910; [redacted],729,280 lb. in 1911; 1,422,400 lb. in 1912; 1,379,840 lb. in 1913; 952,000 lb. in [redacted]914; 1,252,160 lb. in 1915; 828,000 lb. in 1916; 707,840 lb. in 1917.
The mine was reported closed down late in 1919 and company is to [redacted]e liquidated.

[redacted]HARSIS SULPHUR & COPPER CO., LTD. **SPAIN**

Head office: George Reid, sec., 136 W. George St., Glasgow, Scotland. **[redacted]fine office:** Huelva, Spain. **Works in Great Britain:** Hebburn-on-Tyne, Villington Quay, Cardiff; and Glasgow.
Directors: Lord Glenconner, chairman; L. Oscar Schmidt, René Millet, [redacted]lbert J. J. Messéan, Hugh Brown, F. Alexis Ducoing, Sir Herbert E. Max-[redacted]ell, S. C. Hogarth; W. P. Rutherford, Jr., man. director.
Inc. Oct. 27, 1866, in Great Britain. **Cap.,** £300,000, since increased by [redacted]malgamation with other companies and the issue of new capital, to £1,250,-[redacted]00. Shares £2 par, fully paid.
Dividends: begun 1868, have been paid since without the lapse of a [redacted]ngle year, and have averaged 18½% per annum. To the end of 1918 they [redacted]ggregated 948 1/6%, amounting to the magnificent total of £10,758,432, [redacted]utting this company well to the front among the profitable mines of the [redacted]orld. In 1918 dividends amounted to £125,000, or 10%.
In addition to dividend disbursements, the company has written off [redacted]ms, aggregating £2,630,855, and on Dec. 31, 1917, had £458,996 in cash [redacted]d securities. Net profits of operations have ranged from a minimum of [redacted]27,052 in 1868, to a maximum of £478,878 in 1899, with £162,743 in 1909; [redacted]161,211 in 1910; £188,140 in 1911; £253,066 in 1912; £246,727 in 1913; [redacted]10 in 1914; £103,291 in 1915; £199,150 in 1916; £158,078 in 1917; [redacted]5 in 1918.
[redacted]erty: company owns a number of cupreous and iron pyrite mines [redacted] of Huelva, Spain, some of which were worked in ancient [redacted]ans, and possibly by the Phœnicians before them.
[redacted] time its supplies of ore are principally drawn from the

of the mine for 1912 was 2,406,969 tons, carryi
was gradually increased for the last 7 years,
varied and is now higher than it has been for 4
an average of 1.5 oz. silver per long ton, with t
able silver is saved, by the Claudet process, at th
of the total production is exported for sulphur
smelted, and the balance either leached or sent ab
to 5% copper in the zone of secondary enrichmen
gradually in value, until at about 1,000′ depth the
only about 1.25%. The main orebody is cupriferous
in the form of minute grains of chalcocite and chalco
ore being unusually rich in sulphur the shipping ores
in good demand, and in addition to supplying vario
company exported washed sulphur ore in large qu
France, Belgium, and a number of acid works in the
reserve heaps at the mine are estimated to carry abo
fine copper.

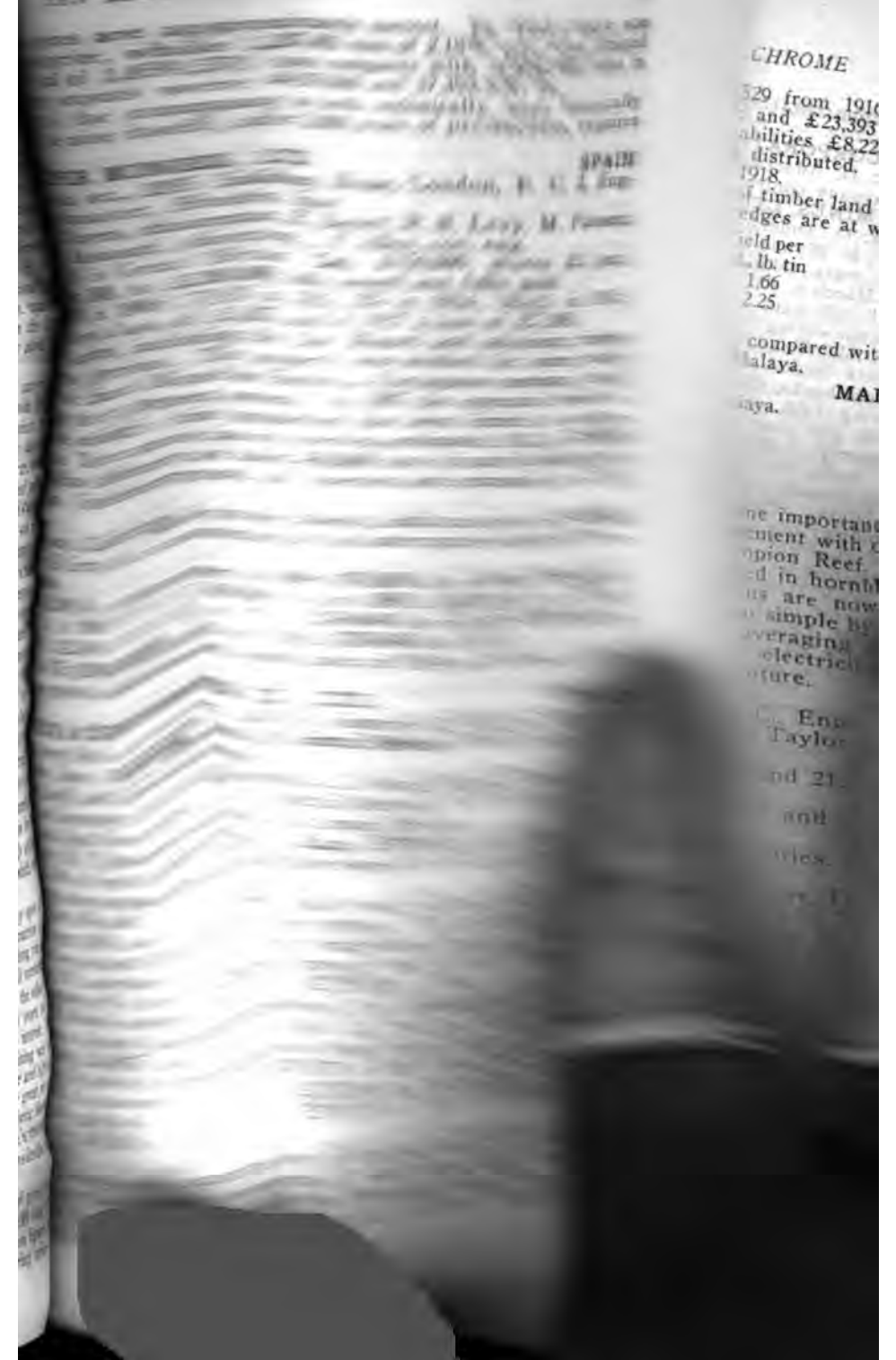
Development: Rio Tinto has 3 mineral zones, carr
lenses, these being known as the South or Nerva lode,
Middle lode and the North lode, in addition to which
detached lenses adjacent to the North lode, which als
opencast. There are 5 different mines, of which 4 are w
1 underground. The underground mine is worked p
levels at intervals of 12½ meters, levels being opened 4 n
entire floor divided into galleries and crosscuts of 4x4
lars of 6x6 meters, which is not an entirely satisfactory
tion, leaving as it does more ore in the pillars than is m

The San Dionisio mine, the westernmost and deepes
a shaft of nearly 1,200′ depth. The work of changing ove
for opencast extraction was begun 1907, and completed
burden, consisting principally of porphyry and slate, was
shovels and carried through tunnels on the different le
being done on the South lode opencast extension. Ore
steam shovels to as great a depth as practicable, below
necessary to hoist by shafts to the lowest tunnel level.
is likely to be the chief source of ore supply for several
and work has been planned systematically for 10 years in

Most of the ore mined is hauled out through tunnels
of shafts or engines. The lowest tunnel now in use for
the South and Dionisio, has not proven deep enough and
driving a new tunnel, 200′ below the present one, which wi
and will require 3 to 4 years for completion.

Wherever possible mining has been done by open pi
have the great advantage of giving complete extraction of
are more economical in tonnage costs in the long run,
enormous initial expenditures for the removal of overbur
the financial resources of the company permit the outlay
principal of which will not be repaid for many years, bu
will be returned in full with very handsome interest.
using the caving system for underground mining was co
adverse decision was reached. Timber is scarce and high-pri
of the largest pit is about 600′ and beyond the great pit th
bodies are worked by drift-stopes, the capping being blaste
the shafts to fill and hold the ground as the ore is removed
recently have replaced manual labor to a considerable ex
ore extraction.

Production: 1876-1916, was 20,000,000 tons of pyrite sh
000 tons of ore treated locally, a total of 60,000,00
ing 730,000 long tons fine copper. No produc
1913, on account of war reasons, but consid



ASIA

The mines are arranged alphabetically by countries.

KARA BURUN MERCURY SYN., LTD. ANATOLIA (ASIA MINOR)

Address: Aidin, near Smyrna, Turkey in Asia.

Property: yields quicksilver ores from cinnabar-bearing quartz veins in schist near limestone. Mining is done by open-cuts, and ore as low as 0.25% mercury is mined, concentrated by screening and the lump ore calcined in two double Spirek furnaces, the fines going to a Cermak-Spirek furnace. Total output of mine 30 tons daily.

Production: about 3,000 flasks of quicksilver yearly.

CHINA

It is difficult to procure specific data concerning the operating mines or active mining companies of China.

The geology of the country and its mineral resources, are described in various books, but the foreign owned mines are few and those operated by Chinese firms are with few exceptions, private enterprises. The American consular service reports that the following firms are interested in mining:

Chater, C. P.	Hongkong Iron Mining Co., Ltd.
China Mining & Metal Co., Ltd.	C. E. Richardson.
The China Crude Ore Export Co., Ltd.	R. W. Weymouth.

The above firms can probably be reached through the American Consulate at Hongkong.

The Wah Chang Mining and Smelting Co. is the world's largest producer of antimony. The largest iron mines of China are in Tayeh. The Han-yeh-ping company's mines produced 600,000 metric tons during 1919, compared with 596,000 tons in 1918. About half of this is used in the company's iron and steel works.

NEW YORK-ORIENT MINES CO. CHINA

Address: H. Foster Bain, Box 994, American Post Office, Shanghai, China; or D. C. Jackling, Hobart Bldg., San Francisco.

This syndicate composed of various well-known American engineers has been endeavoring to secure desirable mining concessions in the Orient for several years, but apparently, thus far without success.

WAH CHANG MINING & SMELTING CO., LTD. CHINA

Main office: Changsha, China. **Other offices:** 9 Ningpo Road, Shanghai, China; Wah Chang Trading Corporation, Woolworth Bldg., New York; H. M. Newhall & Co., Newhall Bldg., San Francisco; and H. E. M. Bourke, 21 Great Winchester St., London, E. C. England.

Officers: Y. H. Wang, pres.; H. Y. Liang, v. p.-chief engr.; K. C. Li, v. p.-New York mgr.; M. C. Wang, v. p.; N. F. Chu, v. p.-treas.; S. L. Tang, supt.-asst.-treas.; K. K. Chang, sec.; T. W. Tseng, asst. sec.; D. C. Chow, Shanghai mgr. **Auditors:** Y. G. Chow, M. H. Li, and C. F. Tsai. **Directors:** H. L. Shuan (chairman); H. Q. Liang, Q. Yang, C. T. Chow, D. W. Tang, P. Q. Yuen, H. K. Liang, L. C. Tsow and F. C. Chow.

The Wah Chang company was formed in 1898, under the name of Kin-Tung Antimony Mining Co., and was the first antimony mining company in

China. In 1908 it was reorganized, and obtained a patent for its antimony smelting process from the Chinese Government. In addition to this, the company obtained a monopoly of the smelting of antimony in the province of Hunan, to extend over a period of 10 years as from 1908. It has since been extended for a period of 25 years. Under this monopoly, no company has the right to erect works in the province, unless the consent of the Wah Chang company is obtained. The patent granted extends over the whole of China.

The main office is situated at Changsha, next to the antimony works, which extend over a large area, and includes in addition, a lead plant, warehouses, etc.

Antimony Mines: (1) the Yi-Yang, a good property with modern mining equipment. A railway has been built to connect the mine with the river; (2) the An-Hua mines; and (3) the Lu-Lin mines.

Tin Mines: the An-Yuen and Poo-sha.

Tungsten Mines: the Yao Kan Sian and Ton An mines. Each mine is controlled by a subsidiary of the Wah Chang Company.

Lead Mines: the Tien For Tai mines.

Products: the principal product is the WCC Antimony, with a guaranteed minimum purity of 99% Sb, but assaying 99.6% and over. Company also markets Chinese needle antimony, white oxide of antimony, and antimony ore; tungsten concentrates, which assay 70% WO_3 and over; lead and zinc ores; and Chinese No. 1 tin ingots. The antimony tin and tungsten are shipped all over the world. The lead is entirely disposed of in China for domestic purposes.

At the antimony works the Herrenschmidt process is used. This was described by K. C. Li in a paper prepared for the American Institute of Metals, and reprinted in the E. & M. Journal of October 20, 1917, also by C. Yu Wang in Bull. 136, of the A. I. M. E. in April, 1918. The ore mined is low-grade. In 1915 and 1916 there was extracted from accumulated residue over 9,000 tons (20,160,000 lb.) of metal. The works treat custom ore.

This company is the largest antimony producer in the world and supplied 55 to 65% of American imports since 1915. Exports of antimony from Changsha to the United States during 1916, amounted to 4,762 tons valued at $2,681,190, against $1,500.000 in 1915. The 1917 figures were 3,292 tons worth $245,672 (U. S.) plus 454.836 Hankow taels (83 to 106 cents U. S.) Exports from Changsha in 1917 to all countries were 21,333 tons of crude antimony, valued at $2,252,807; 102 tons of ore, $9.394, and 14,804 tons of regulus, $3.258,712.

Wah Chang Trading Corporation.

Head office: Woolworth Bldg., New York.

Officers: K. C. Li, pres.-treas.; H. T. Liang, v. p.; Chas. Gitlan, sec.

History: in the winter of 1914-'15 the Wah Chang Mining & Smelting Co., Ltd. decided to open a branch office in America for the direct sale of its products. The business, which began in a small way with the handling of antimony metal and tungsten ore only, rapidly developed, and in 1916 it was decided to form a New York corporation under the above title with a capital of $10,000. It did not become operative until March 1, 1918, when the capital was increased to $100,000. and the entire business of the Wah Chang Mining & Smelting Co., Ltd. branch office was taken over.

In April, 1918, the capital was increased to $1,000,000, and in May, 1919, was again increased to $2,000.000. The Wah Chang Trading Corporation became the sole representative of Wah Chang M. & S. Co., outside of China, and consequently took control of Wah Chang M. & S. Co.'s agencies abroad. The scope of the business has been greatly extended, and now includes antimony metal (crude and oxide), tungsten and other ores, tin, silk, etc. as imports, and machinery, pig iron, railway equipment, soda ash and other chemicals, aluminum, brass and sporting equipment as exports. It is hoped to extend the business still further.

Production:

	1918-19	1917-18	1916-17
Gravel hydraulicked, yards	1,976,950	2,477,850	2,252,800
Recovery per yard, pounds	1.06	0.90	1.09
Value per yard, cents	....	23.26	23.96
Cost per yard, cents	....	7.60	6.72
Total black tin, tons	937	1,018	1,019

IPOH TIN DREDGING, LTD. MALAYA

Office: 4 London Wall Bldgs., London, E. C. 2, England; and Ipoh, Perak, Federated Malay States.

R. Pawle, chairman of board of directors; E. W. Sandeman, sec.; L. G. Attenborough, mgr.

Inc. Sept. 25, 1913, in Great Britain. **Cap.,** £90,000; £1 par; 89,600 issued; increased to £225,000 in February, 1920; 110,400 issued.

Profit in 1917 was £10,338, of which £8,960 was distributed. Cash investments and supplies, amount to £23,096, and accounts payable, £4,769. Profit in 1918 was £14,916.

Dividends: 5% in 1916; 10% in 1917; 10% in 1918; and 5% in January, 1919.

Property: 563 acres of tin-bearing ground being worked by one dredge; another to be erected in 1920. Additional ground was bought from the Borneo Co., Ltd., early in 1920 for 20,800 shares.

Production: Year	Ground dug, yards	Black tin, tons
1918	635,420	246
1917	603,700	264

KAMPONG KAMUNTING TIN DREDGING, LTD. MALAYA

Offices: Challis House, Sydney, New South Wales, Australia, and Kamunting Taiping, Perak, Federated Malay States.

A. W. Freeman, chairman and managing director; W. E. Hill, sec.; Sydney; H. K. Bennett, sec. at mine. A. J. King, mgr.

Inc. Nov. 24, 1916, in Federated Malay States. **Cap.,** £150,000; £1 par; £140,000 issued.

Revenue for half year ended June 30, 1918, was £54,499, of which £32,365 was profit. Dividends absorbed £28,000, and £6,003 was carried forward. Current assets total £69,404, and liabilities £1,522.

Sales during half year ended June 30, 1919, were £43,830, of which £19,402 was profit; £24,500 was distributed as dividends.

Dividends: 30% in 1916; 32½% in 1917; 20% in 1918; 17½% in 1919 for half year.

Property: 602 acres of tin-bearing alluvial ground near Taiping, which is worked by two dredges. The estimate life is from 10 to 12 years.

Production (half years):

Year	Ground dug, yards	Tin oxide, tons	Cost per yard, cents	Profit per yard, cents
1919 (June 30)	907,000	350	...	...
1918	915,300	324	8.4	20.1
1917	965,000	432	7.2	20.1

Drilling showed an average of 1.07 and 0.75 lb. of tin per yard, and in the last period the respective recoveries were 86% and 88%.

KAMUNTING TIN DREDGING, LTD. MALAYA

Office: 7 Martin's Lane, London, E. C. 4, England; and Penang, Federated Malay States.

J. I. Philips, chairman of directors; Bright & Galbraith, Ltd., sec.; R. L. Naish, gen. mgr.

Inc. May 2, 1913. **Cap.,** £150,000; £1 par; 130,000 issued.

A profit of £35,195 was made during year ended June 30, 1918. With previous balance and other income there was available £45,646. Dividends absorbed £13,000. After writing off development, taxes, etc., £12,771 was was carried forward. **Dividends:** 20% in 1915-'16; 5% in 1916-'17; and 10% in 1917-18.

Property: 750 acres of tin-bearing alluvial ground near Taiping, Perak. From 220 drill-holes put down to an average depth of 36' the average tin content was 1.37 lb. A 7-cu. ft. dredge is at work.

Production: Year	Gravel dug, yards	Black tin, tons	Average value per yard	Cost per yard
1917-18.....	834,013	397	34c.	10c.
1916-17.....	936,500	369	20c.	8c.

KINTA TIN MINES, LTD. **MALAYA**

Offices: 65 London Wall, London, E. C. 2, England; and Osborne and Chappel, mgrs., Ipoh, Federated Malay States.

W. A. Luning, chairman of board of directors; H. P. Hood, sec.

Inc. May 17, 1900, in Great Britain. **Cap.,** £120.000; £1 par; all issued.

Profit for year ended June 30, 1917, was £22,653, plus £2,622 from previous year. Dividends absorbed £24,000. Working capital was £13,587. Profit in 1919 was £85,738, of which £36.000 was distributed.

Dividends: 255% to Oct. 21, 1918.

Property: 923 acres owned or under lease, situated in State of Perak.

Equipment: storage dams and pipe-lines used jointly with the Gopeng Consolidated, and hydraulic apparatus.

Production: 476 tons of black tin in 1915; 548 tons in 1916; and 510 tons in 1917; 742 tons in 1919.

KRAMAT PULAI, LTD. **MALAYA**

Offices: 265 Winchester House, London, E. C. 2, England; and Ipoh, Federated Malay States.

A. L. Knaggs, chairman, board of directors; A. H. Cullen, sec.; B. W. Thunder, mgr.

Inc. Oct. 19, 1907. **Cap.,** £100,000; £1 par; all issued.

Profit in 1917 was £32,337, and dividends absorbed £20,000. Balance from 1916 was £7,767, and that carried to 1918 was £20,104. Working capital, £37.725. Profit in 1918 was £35,551.

Dividends: 10% in 1912; 10% in 1913; 7½% in 1914; 12½% in 1916; 10% in 1916; 20% in 1917; and 15% in 1918 to November.

Property: 1,395 acres of tin ground at Pulai, Kinta district, State of Perak, a prospecting license on 1,114 acres adjoining, and a lease on 57 additional acres, worked by 3 hydraulic elevators.

Production: 206 tons of tin oxide in 1916, 227 tons in 1917, and 177 tons in 1918.

LAHAT MINES, LTD. **MALAYA**

Offices: Portland House, 73 Basinghall St., London, E. C. 2, England; and Ipoh, Federated Malay States.

W. J. Payne, chairman of board of directors; A. H. Cullen, sec.; Osborne and Chappel, mgrs.

Inc. Nov. 26, 1906. **Cap.,** £120.000; £1 par; all issued.

Revenue in 1917 was £59,335, of which £25,089 was profit, and £18,000 was paid in dividends. Cash, investments, and reserve, total £27.884, with accounts payable, £7.087.

Dividends: 91% from 1909 to December, 1918.

Property: 283 acres of tin land at Lahat, worked centuries ago. The tin deposit is on a granite-limestone contact. Ore is mined by open cut work.

Equipment: 220-k. w. Diesel generator, 160-h. p. gas engine, hoists at mines, water and gravel pumps, monitors, elevators, puddlers, etc. Electric power is purchased.

Production:

Year	Yardage sluiced	Recovery per yd., lb.	Black tin, tons	Value per yd., c.	Cost per yd., c.
1917-18.....	505,700	1.07	242	.....	....
1916-17.....	580,000	1.0	259	23.70	7.52
1915-16.....	607,000	0.8	215	17.18	7.48

TEKKA LIMITED — MALAYA

Officers: Station Hill, Redruth, Cornwall, England; and Osborne & Chappel, Ipoh, Federated Malay States.

James Wickett, chairman of board of directors; Tom Wickett, sec. C. H. Preedy, mgr.

Inc. Jan. 21, 1907, in Great Britain. **Cap.,** £90,000; £1 par; all issued. Company controls Tekka-Taiping, Ltd., which see.

Profit for year ended January 31, 1919, was £72,166, plus £13,336 from 1918, making £85,502 available. Dividends absorbed £39,987, and £37,98 was carried forward to 1920.

Dividends: 69/6 ($16.62) per share since 1909; 8/6 in 1918, exclusive of shares of Tekka-Taiping distributed in 1913.

Property: about 500 acres of tin-bearing land in Kinta district, State of Perak. Bedrock is limestone.

Equipment: water supply for monitors, elevators, and Pelton wheels.

Production: Year	Yardage sluiced	Yield per yd., lb.	Black tin tons	Cost per yd., c.
1918.....	487,950	2.35	510	21.04
1917.....	452,000	2.43	507	16.00

Company is an important tin producer, with a promising future.

TEKKA-TAIPING, LIMITED — MALAYA

Subsidiary of Tekka Limited, which see.

Offices: Station Hill, Redruth, Cornwall, England; and Osborne & Chappel, cons. engrs., Ipoh, Federated Malay States.

James Wickett, chairman of board of directors; Tom Wickett, sec.

Inc. Sept. 29, 1913, in Great Britain. **Cap.,** £90,000; £1 par; 65,000 issued. In September, 1919, company was reorganized with a capital of £300,000, shares £1 par.

Accounts for year ended October 31, 1917, show a revenue of £55,8[illegible] of which £37,832 was profit. Dividends absorbed £12,998. After allowing for all charges, £25,541 was carried forward. Current assets were £51,9[illegible] above liabilities. Profit in 1918 was £59,642, of which £12,999 was paid in dividends.

Dividends: 20% in 1916; 20% in 1917; 20% in 1918; and 5% in January 1919.

Property: 2,046 acres of tin-bearing gravel ground near Taiping, State of Perak.

Equipment: includes a dredge and gravel pumps.

Production: Year	Yardage	Tin saved per yd., lb.	Value per yd., c.	Cost per yd., c.
1918.....	767,000	1.21	.....	[illegible]
1917.....	903,200	1.15	28.26	[illegible]
1916.....	938,000	1.26	29.00	[illegible]

TRONOH MINES, LTD. — MALAYA

Offices: Portland House, 73 Basinghall St., London, E. C. 2, England; and Tronoh, Federated Malay States.

C. V. Thomas, chairman of board of directors; A. H. Cullen, sec.; [illegible] Rich, mgr.

Inc. Dec. 3, 1901, in Great Britain. **Cap.,** £160,000; £1 par; all issued

Profit in 1917 was £51,047, plus balance of £20,529 from 1916, making £71,676 available. Dividends amounted to £40,000; and £23,393 was carried forward. Current assets were £190,157, and liabilities £8,228.

Profit in 1918 was £124,095, of which £80,000 was distributed.

Dividends: total 500% from 1902 to December, 1918.

Property: 2,679 acres of tin land and 2,000 acres of timber land in Kinta district, State of Perak. Washing machines and 3 dredges are at work.

Production:

Year	Yardage	Yield per yd., lb. tin	Cost per yd., c.
1917	1,399,835	1.66	15
1916	1,639,661	2.25	13

In 1918 the total output of black tin was 1,367 tons, compared with 1,044 tons in 1917. This is one of the largest producers of Malaya.

YUKON GOLD CO. **MALAYA**

See Addenda, under United States, for operations in Malaya.

INDIA

The Kolar goldfield, in the State of Mysore, is the one important producing area of India. The mines are all under one management with offices in London, and are all operating on one lode—the Champion Reef. This is a rather thin quartz vein, much folded in places, encased in hornblende-schist, which is surrounded by granite rocks. Operations are now at a depth of 4,000' or more. The gold is free and its extraction simple by amalgamation and cyanidation. Production is very regular, averaging around £2,250,000 for several years. All machinery is driven by electricity, generated 90 miles distant. The field has a very promising future.

BALAGHAT GOLD MINING CO., LTD. **INDIA**

Office: W. L. Bayley, 6 Queen St. Place, London, E. C., England.

Lord Ribblesdale, chairman of board of directors, John Taylor & Sons, gen mgrs.; W Pritchard, supt.

Inc. Dec. 7, 1896. **Cap.,** £308.000, in 95,400 preference and 212,600 ord. shares of £1 par; all issued.

Dividends: total 132½% on pfd. shares from 1900 to 1907 and 52½% on ord. shares from 1901 to 1906; none since.

Profit in 1917 was £5,493. Assets are £4,651 above liabilities. Reserve fund amounts to £13,000. Profit in 1918 was £5.072.

Property: 1,565 acres in the Kolar gold field, State of Mysore, India.

Development: by shafts and extensive workings. Reserves in 1918 were 8,614 tons, compared with 30,076 tons in 1917, and 26,133 tons in 1916.

Equipment: is complete, including mine plant, stamp-mill, and cyanide works.

Production:

Year	Ore, tons	Tailing, tons	Gold, oz.
1918	26,745	54,130	22,135
1917	28,525	61,600	19,929
1916	29,476	57,438	17,725

BALUCHISTAN CHROME CO., LTD. **INDIA**

Office: E. Price, 19 St. Swithin's Lane, London, E. C. 4, England.

E. Davis, chairman of board of directors and mgr.; E. Oughton, mgr.

Inc. July 29, 1914, in Great Britain. **Cap.,** £1,650,000 in 55,000 10% cum. pfd., and 110,000 ord. shares of £1 par, all issued.

Profit in 1917 was £17,500, and £8,703 was carried forward. Net current assets were £22,000. **Dividends:** 10% on pfce. in 1917; and 11½% on pfce. and 15% on ord. in 1918.

Property: 6,176 acres of mineral land in the Hindubagh district of Baluchistan, India.

issued, and 450,000 ord., 422,465 issued; shares 10s. par. Preference shares get 20% per annum.

The year ended Sept. 30, 1917, resulted in a loss of £6,671. Cash and supplies totaled £28,182, and accounts payable £9,226. The following year showed a loss of £8,054.

Property: about 3 sq. miles in Anantapur district of Madras, India.

Equipment: 20-stamp mill and cyanide plant.

Production: 29,600 tons yielded 7,531 oz. of gold in 1917, and 16,000 tons yielded 12,983 oz. in 1918. A good tonnage of tailings was also treated in 1918. By July, 1919, returns had fallen to 900 oz. per month, and it was decided to suspend mining operations. From December, 1913, to September, 1918, the total output was 35,816 oz. gold from 128,570 tons of ore.

KANBAUK (BURMA) WOLFRAM MINES, LTD. INDIA

Offices: 34 Great St. Helen's, London, E. C. 3, England; and Foucar & Co., Rangoon.

W. Nuding, chairman of board of directors; C. M. Lyons, mgr.; H. D. Griffiths, cons. eng.

Inc. March 24, 1917, in Burma. **Cap.,** £190,000; £1 par; 140,000 issued. Debentures, £60,000 authorized; £50,000 issued at 10% for 5 years.

Profit for 18 months ended Dec. 31, 1917, was £26,380. Current assets were £16,800, and liabilities £22,500.

Property: lease of 4,732 acres in the Tavoy district of Burma, carrying tungsten and tin deposits. A concentrating plant is at work.

Production: 305 tons of wolframite in 1916, and 358 tons in 1917.

MAWCHI MINES, LTD. INDIA (BURMA)

Office: J. A. Henderson, sec., 18 St. Swithin's Lane, London, E. C. 4, England. **Mine office:** Mawchi, via Toungoo, Burma.

F. D. Holroyd, chairman of board of directors; M. B. Geeson, mgr. of Burma; E. Adamson, technical manager.

Inc. Nov. 2, 1914, in Great Britain. **Cap.,** £250,000; £1 par; 220,000 issued. Also £29,590 of 6% debentures.

Profit for year ended June 30, 1918, was £33,690. Dividends absorbed £33,168; £17,303 was carried forward. Current assets exceeded liabilities by £60,000.

Dividends: 5% in 1916; 10% in 1917; and 5% in 1918.

Property: a concession of 11 sq. miles, 16 miles from Pazaung, in southern Burma, for which company pays rental and royalty to the government. Tin and tungsten deposits are worked, and reserves were 83,000 tons of ore esimated to carry 3.95% mixed concentrate.

Production: 639 tons of mixed concentrate from 22,071 tons in 1916, and 678 tons in 1917.

MYSORE GOLD MINING CO., LTD. INDIA

Office: W. F. Garland, 5 Queen St. Place, London, E. C. 4, England. Lord Ribblesdale, chairman of board of directors; R. H. P. Bell, supt.; John Taylor & Sons, gen. mgrs.

Inc. July, 1880, in England. **Cap.,** £305,000; shares 10s. par; all issued. Late in 1919 it was proposed to increase the capitalization to £610,000 and issue 610,000 shares, 10s. par.

Profit in 1917 was £404,296, of which £259,250 was distributed. Balance from 1916 was £111,665, and that carried to 1918 was £83,944. Reserve fund was £150,000; cash and gold, £243,624; and stores, £[illegible]. Profit in 1918 was £126,513. Revenue in 1919 was £663,826, of which £186,443 was profit. After paying dividends, £66,189 for taxes, and £[illegible] for depreciation, balance forward to 1920 was £7,201. Cash assets £197,707 net.

Dividends: total 3230% to end of 1919, equal to £8,847,844.

Property: 3,051 acres at Kolar, State of Mysore, India.

Development: by shafts over 4,000 [illegible] narrow lode. Reserves were 600,[illegible] 1919. Ore [illegible]

normal conditions, development was 51,000′ less than normal during the years 1914-1918.

Equipment: complete, with 160 stamps, tube-mills and cyanide plants.

Production: to end of 1919 was 5,179,025 oz. gold from 5,701,861 tons of ore.

Year	Ore, tons	Gold Yield, oz.
1919	270,425	163,719
1918	293,186	174,208
1917	307,126	198,446
1916	307,023	198,258
1915	305,000	207,981

The Mysore has been one of the world's largest gold mines. Its depleted ore reserves are quite low-grade, but inasmuch as zones of impoverishment overlying high-grade ore are a feature of the mine, deeper development is to be done.

NORTH ANANTAPUR GOLD MINES, LTD. **INDIA**

Office: W. L. Bayley, 6 Queen Street Place, London, E. C. 4, England. J. Taylor, chairman of board of directors; L. C. Oliver, supt.

Inc. June 23, 1908, in Great Britain. **Cap.,** £125,000, in 25,000 pfce. (all issued), and 100,000 ord. (91,253 issued); £1 par. Preference shares are entitled to 20% per annum.

Profit for year ended June 30, 1919, was £18,445, which is £3,410 less than in 1918.

Dividends: from 1912 to March, 1919, the pfce. shares received a total of 140%, and ord. shares 20%.

Property: 1½ square miles in Anantapur district, Madras, India; also holds a 2-year option on the Baragunda copper mine in northern India.

Development: by 5 shafts. Ore reserves are 11,000 tons, compared with 10,000 tons in 1918, and 32,000 tons in 1917.

Equipment: includes 35-stamp mill and cyanide plant.

Production, years ending June 30:

Year	Tons	Gold, value
1919	14,200	£49,569
1918	20,100	57,287
1917	26,500	57,705

The gold mine appears to be nearly exhausted, but the new copper property is considered promising.

NUNDYDROOG COMPANY, LTD. **INDIA**

Office: W. L. Bayley, 5 Queen St. Place, London, E. C. 4, England.

W. B. McTaggart, chairman of board of directors; C. H. Richards, supt.; John Taylor & Sons, mgrs.

Inc. April 20, 1893, in England. **Cap.,** £283,000; shares 10s; all issued.

Profit in 1918 was £123,424, of which £63,675 was distributed, against £141,558 and £94,333 in 1917. The reserve fund remains at £50,000.

Dividends: since 1888 total 968%.

Property: 1,497 acres at Kolar, State of Mysore, India.

Development: by 5 main shafts, 3,440′, 4,037′, 3,993′, and 4,085′ deep, the [illegible] being 18′ diam. and under construction. Reserves are estimated at [illegible] tons.

[illegible]ment: complete with 80 stamps and cyanide plant.

	Ore, tons	Gold Yield, oz.
[illegible]	102,731	78,757
[illegible]	99,345	79,586
[illegible]	98,000	80,401
[illegible]	94,000	82,822

Boveri-Rateau blowers, a complete lining department, and 140-ton electric crane. Blister copper from the converter is refined electrolytically, the product being 99.95% copper. The slime from the electrolytic tanks is treated in two cupel furnaces. The monthly capacity of the electrolytic plant is 1,200 tons.

The electrolytic zinc refinery at the Kosaka mine was installed in 1915. There are 4 Herreshoff calcining furnaces, which were used before the matte calcining, one muffle furnace, and 5 Ding's magnetic separators. The daily production of electrolytic spelter is about one ton.

Power is all electric, the Kosaka installations aggregated 3,550 k.w. a.c. and also 220 k.w. d.c. for the mine, smelter, shops, and rail lines. It is generated by 4 water plants on the river Oyu, near the mine, also by a Locomobile steam plant.

The Kosaka mine operates an electric trolley, with 9 miles of main line and branch lines, equipped with 35 locomotives and 400 three-ton ore cars. The lines reach all principal points at the mine, smelter, and shops and connect with the Kosaka railway at the Kosaka depot. The Kosaka railway, which is 15 miles between Kosaka and Odate, connects with the Government railway at Odate.

Production: the annual output of the Kosaka has been as follows: 12,76[illegible] long tons of copper, 335 tons of lead, 829,970 oz. silver, 20,000 oz. of gold and 251 tons of zinc.

The Tokito dressing plant is 2 miles from the smelter, with aerial tram connection. Mixed ores from the branch mines of the Kosaka mine are dressed, the capacity being 100 tons per day.

Hanaoka Mine: in Kita-akita-gun, Akita Prefecture, Japan, owned by the Fujita Co. since 1915.

Ore: the deposit is massive and worked by filling methods. The ore contains chiefly copper and iron pyrite, galena, zinc blende, and gypsum. After hand-picking, it is transported to the Kosaka smelter, 18 miles away.

Production: in 1918 was 125,582 tons, which contained 0.000092% gold, 0.00513% silver, and 3.112% copper.

Omori Mine: situated in a mountainous region in the province of Iwami (Omori-machi, Nima-gun, Shimane-ken), in the northwest of Honshu, near the coast of the Japan Sea. This mine is said to have been discovered some 600 years ago, and reopened in 1525. The mine once was highly productive, but was closed in 1872 by an earthquake, and reopened in 1[illegible] by the present company, which, after spending considerable capital, equipped the mine with a modern plant.

Geology: the district is composed of Tertiary tuffs and sandstone, interspersed with a great mass of andesite containing ore. There are five veins which have been produced by the fillings of the fissures with mineral solutions. The dip of veins varies from 80° to 70° N., with from [illegible]' to 3' width. Ore exists in bands in the veins, its average width being 7", but it sometimes swells to 6'. Some of the veins are 2,000' long, composed principally of chalcopyrite, galena and zinc blende, containing gold and silver. Five of the veins—Sato, Honnakase, Nakase, Sanjio and Uenose—are now being worked. The ore contains 0.00148% gold, 0.050[illegible] silver, 6.66674% copper and 0.58771% lead.

Development: the veins are worked by stoping, and material is removed by adits and shafts. The ore, after being cobbed and picked, is mechanically dressed by breakers, rolls, trommels, jiggers, etc. The dressed ore, with the requisite quantity of limestone and coke, is smelted raw in an ordinary circular jacketed furnace. The matte formed from this ore-pyrite smelting is once more smelted, forming blister copper (98% Cu) containing 2.3% gold, 77% silver, and lead. This last operation is carried out according to the Japanese Mabuki process.

Production: the output was 1,071,100 lb. of blister copper in 1916, [illegible] lb. in 1917, and 729,366 lb. in 1918. All blister copper from this mine is shipped to the Kosaka electrolytic refinery.

Oarasawa Mine: about 17 miles W. of Kurosawajiri station on the Government railway, to which a tramway has been constructed from the mine, is situated at Yuda-mura, Waga-gun, Iwateken (east district of Akita-ken, not far from the Kosaka mine). It was opened 33 years ago, passing in 1910 to the present ownership.

Geology: country rocks are granite, tuff, and liparite of Tertiary age. Traversing these rocks, especially tuff, many veins in various widths from 6″ to 6′ occur, running nearly parallel in the strike of N. 35 to 60° E. and dipping N. W. at 60 to 70°. A few veins dip at the same angle as the former, but in the opposite direction. The gangue is principally quartz, and the veins carry mainly chalcopyrite and iron pyrite, also some oxides of copper.

At five miles W. from the Oarasawa mine is the Unekura mine. This is a branch of the Oarasawa at present. The district consists mainly of liparite and tuff of Tertiary age, and fissure veins are found in liparite and tuff. These can be classified into two general groups; the strike of one is N. 25° E., the other N. 85° E. The minerals contained in the ore are chalcopyrite and a little iron pyrite; the gangue is quartz.

Development: the veins of Oarasawa and Unekura are worked by overhand stoping, and the material is removed by adits and shafts. The ore mined is mechanically dressed to 7.5% grade.

Production: is about 151,000 long tons of dressed ore yearly, plus 1,000 tons of purchased ore. The blast-furnace process is generally similar to that at the Omori. Annual production of blister copper (anode) contains 98% copper, 0.0005% gold, 0.05% silver, is 1,650 long tons, which is transported to Kosaka refinery. About 1,000 men are employed, including branch mines.

Matsuoka Mine: situated at Yamada-mura, Okachi-gun, Akita-Ken, and three miles W. from Yuzawa station on the Government railway, to which a light railway has been laid from the mine. The mine was worked in the eighteenth century by Shinen Sato, a famous economist, miner and metallurgist, to whom modern mining in Japan is greatly indebted. Since the end of 1906 the present company has operated the property.

Geology: country rocks are liparite and tuff of Tertiary age. Ore deposits consist of a network of veins in the upper part, but only a few veins in the lower part. The ore consists of chalcopyrite, galena, and zinc blende, gold, and silver; and assays 0.003% Au, 0.0085% Ag, and 0.95% Cu. This is dressed to 0.006% Au, 0.015% Ag, and 2.3% Cu, and is transported by railway to Kosaka. Production was 15,000 tons of dressed ore in 1916.

Yanhara Mine: situated in Kume-gun Okayamaken, about 10 miles from the Tsuyama railway station of the Chugoku line. Property is traversed by the River Yoshii, a stream of considerable size, so that the mine output is carried by boat to the port of Kuban on the Island-Sea, at the river mouth, 35 miles below. The ore deposit was discovered in 1911.

Geology: a Mesozoic clay slate is intruded at several places by a basic rock of the gabbro family. The deposit is a magmatic segregation near the slate and in the gabbro itself, in several masses, one of the largest measuring 400′ by 500′ by 250′. The ore is an iron pyrite, containing only 4% copper and 46% sulphur, and is used mostly for making sulphuric acid.

Production: 420,000 tons of pyrite and 30 tons of copper ore yearly.

Hirota Steel and Ferro-Alloy Works: situated near Aizu, in Fukushima prefecture. Owing to the war, Japan has suffered from the lack of some materials imported from foreign countries in ordinary times, and all ferro-alloys are among them. The company taking advantage of this opportunity decided to produce these alloys and special steels. The works are [illegible] electric power, and now produce ferro-silicon, ferro-[illegible]tungsten, ferro-molybdenum, ferro-titanium of every description, and special kinds

Most of the products are used in Japan by the navy and army arsenals, also by various engineering works, while some alloys are exported to Russia and other foreign countries.

FURUKAWA GOMEI KAISHA (FURUKAWA & CO.) JAPAN

Directors: Baron Toranosuke Furukawa, pres.; Rokusaburo Kondo, chief director; Masayuki Otagawa, Koji Inoue, Bunjiro Kondo.

In 1875 the late Ichibei Furukawa established the Furukawa Copper Firm in Tokyo. He was very energetic, and devoted himself to developing and equipping the mines he had prospected. In 1903 the late Junkichi Furukawa, the son of the founder, succeeded his father and became president of the firm. In the same year the concern was reorganized into a company under the Japanese law. On his death, in 1906, Toranosuke Furukawa, his brother, succeeded him, and since then he has been president of the company.

The company has 11 offices, 4 copper works, and 25 mines, whose total area of concession is about 70,000 acres; 1,200 officials and 25,000 men are employed; the annual production is 35,000 tons of copper, 20,000 tons of copper wire and plate, 220,000 tons of copper ore, 1,200,000 tons of coal, and quantities of bullion, pig lead, silver ore, zinc ore, etc.

Head Office: Yaesucho, Kojimachi-ku, Tokyo, Japan.

Branches:	**Address:**
Osaka Branch Office	Ajikawa kamidori, Kita-ku, Osaka.
Moji Branch Office	Hamamachi Moji.
Wakamatsu Branch Office	Kaigan dori, Wakamatsu, Fukuoka-ken.
Hakata Branch Office	Hakata Kaigan dori, Fukuoka.
Keijo Branch Office	Nandaimon-dori, Ni-chome, Keijo, Chosen.
Shanghai Branch Office	Pekin Road, British Concession, Shanghai, China.
Hankow Branch Office	French Concession, Hankow, China.
Tairen Branch Office	Yamagata-dori, Tairen, Manchuria.
Hongkong, in China; Branch Office	Des Vouex Road, Central Hongkong.
London Branch Office	Bishopsgate St., London, E. C.
American Office	120 Broadway, New York.

Principal Mines:

Ashio Copper Mines	Ashio Kamitsuga-gori, Tochigi-ken.
Ani Copper Mines	Ani, Kita-akita-gori, Akitaken.
Nagamatsu Copper Mines	Shiraiwa, Nishimurayama-gori, Yamagata-ken.
Mizusawa Copper Mines	Jwakimura, Waga-gori, Iwateken.
Otori Copper Mines	Oizumimura, Higashi-tagawa-gori, Yamagataken.
Kawaiyama Copper Mines	Ikumo-mura, Abu-gori, Yamaguchi-ken.
Kune Copper Mines	Sakuma-mura, Iwata-gori, Shizuoka-ken.
Furokura Copper Mines	Oyu-mura, Kazuno-gori, Akita-ken.
Kijo Gold Mines	Todo, Kijo-gun, Heinanhoku-do, Chosen.
Innai Silver Mines	Innai, Ogachi-gori, Akitaken.
Daira Lead Mines	Fujikoto-mura, Yamamoto-gori, Akitaken.
Shakanoo, Shiogashira and Daini-Shakanoo Colleries	Otani-mura, Kano-gori, Fukuoka-ken.
Shinshakanóo Colleries	Nishiawa-mura, Kurate-gori, Fukuoka-ken.
Shimoyamada Colleries	Kumada-mura, Kaho-gori, Fukuoka-ken.
Yoshima Colleries	Yoshima-mura, Ishiki-gori, Fukushima-ken.

Works:

Mizushima Smelter	Mizushima Is., near Tamashima, Kojimagun, Okayama-ken.
Amagasaki Refinery	Amagasaki, near Osaka.
Nikko Copper Works	Nikko, Tochigi-ken.
Honjo Copper Works	Yanagiwara-cho, Honjo-ku, Tokyo.

Ashio Mines.

These mines are in Ashio, Kamitsuga-gori, in Tochigi-ken, about 100 miles from Tokyo, connected by the Imperial government railroad and the Ashio railroad. They are 11 miles W. of famous Nikko. Area of the concession is 4,000 acres.

Geology: the district consists mainly of Paleozoic sediments and Tertiary liparite (rhyolite). The liparite forms a volcanic neck erupted through the paleozoic sedimentary rocks and is 2 miles in diameter. The ore deposit of Ashio occurs in veins, most of which traverse the liparite. The strike or course of the veins is either N. 60° E. or N. 80° W. The veins of the first named direction are called the 60° lodes, or the Yokomabu series, and the others the 100° lodes, or the Shinsei series. The mines have more than 200 veins, of which 40 of the Yokomabu series and 60 of the Shinsei series are now being worked. The most important veins of the first series are named as follows: Yokomabu, Kosei, Jimbo and Deai. The second series embraces the Shinsei, Eisei and Tengu. They intersect each other and form rhombic nets of veins. The lodes are generally 1 to 16′ thick, 400 to 6,000′ long, and generally have steep dips. The chief minerals are chalcopyrite and pyrite, with accessory amounts of zinc blende, arsenopyrite, galena and pyrrhotite. Bornite, chalcocite, cuprite, malachite, pisanite and sometimes azurite and native copper are found in the oxidized zone. The gangue minerals are found in small amount; clay and chlorite are common, quartz is also common, and calcite is found at deep workings. Native bismuth, bismuthinite, wolframite, fluorite, crystallized vivianite, ludlamite and apatite are rarely found.

Development: the mines have three main adits, namely: the Ariki, Kotaki and Isudo, which are three miles apart.

The Ariki adit is driven mainly along the strike of Yokamabu vein and is 10′ high, 10′ wide and about 8,000′ long. It is an important level for transportation and drainage. The Kotaki adit, whose portal is to the N. W. of the mine, is driven chiefly along the course of the Kosei and Tengu veins, and is connected with the Ariki tunnel. Both the Kotaki and Ariki tunnels are used as trunk haulage ways for underground transportation. The 6 levels' below and the 12 levels above are within the reach of the Tsudo adit.

Tsudo adit: this adit is S. of the mine, on the bank of the Watarase river, 475′ lower than the Ariki. This level was begun in 1885, and driven northward for 12,000′. More than 50 veins were cut in the tunnel, most of them still being profitably worked. The Tsudo tunnel is the main drainage and transportation way of the mine. It is 11′ high and 13′ wide. There are 12 mine levels below it, the lowest one 1,500′ beneath the tunnel.

Honkuchi shaft: which is 6′x9′, is a half mile from the portal of the Honkuchi tunnel, connects with the 10th level and extends down to the Ariki tunnel level. It is equipped with electric hoists.

Yokomabu No. 1, or first shaft, which is 6′x11′ in the clear, is sunk on the Yokomabu vein at a point 4,600′ from the portal of the Ariki adit, connecting at 457′ below with the Tsudo level. There are 7 levels and many working faces that are now being profitably operated.

Yokomabu No. 2, or second shaft, which is 6′x18′, is sunk on the same Yokomabu vein, at a place 2,500′ from the Ariki adit. It taps the Tsudo adit at a depth of 410′ and goes 100′ below it. The shaft has 7 levels between the Ariki and Tsudo tunnels, and 6 levels below the Tsudo adit.

Yokomabu No. 3, or third shaft, 5′x12′, is 1,900′ from No. 1 Yokomabu and passes through Tsudo level at 466′ below Ariki level, and reaches to the depth of 1,300′, and more sinking is going on. A hoist is fitted up at the mouth of this shaft for the workings below Tsudo level. The Kolaki shaft, 6′x14′, is near the Kosei vein, 2,100′ from the Kolaki adit, [illegible] Tsudo level at depth of 448′. No. 1 Kosei shaft, 6′x18′, near [illegible] vein, is along No. 23 vein, 2,600′ W. from the Tsudo adit. It is

900′ deep, and further sinking is in progress in 1917. There are 8 levels connecting with the shaft for the working of the Kosei, Kosei-machi, Tengu, etc., veins. No. 2 Kosei shaft, 6′x18′ and 660′ deep is 2,000′ W. from No. 1, on the Kosei vein. There are several levels connecting with the shaft, which open up to the eastern part of the vein. The Kosei-machi shaft, 6′x23′, is over 1,500′ below the Tsudo adit.

The vertical depth of the underground workings from the highest outcrop to the lowest level is as follows: Outcrop on Bizendate peak to Tsudo adit, 2,200′; below Tsudo adit, 1,500′; a total of 3,700′.

The aggregate length of drifts amounts to about 1,000,000′, or 190 miles

Overhand stoping is generally used, but also square set work. Each stope is 6′ high, and more than 2½′ wide, varying according to the thickness of the vein.

General features: waste water from the precipitating tank for cement copper and the slimy water from the dressing plants are treated with milk-of-lime, after passing through slime setting ponds.

The smoke from all furnaces passes through Cottrell treaters. Ashio being in a very mountainous region, aerial tramways are widely used for transportation of timber, etc.; their total length is 25 miles. The Tanamura system is adopted in all lines.

Power is supplied from the Hosoo hydro-electric power plant (12 miles from Ashio), developing 20,000 h. p.

Production: has increased gradually during the past 10 years as follows: 6.315 long tons in 1907; 7,191 in 1908; 7,526 in 1909; 7,453 in 1910; 7,932 in 1911; 8,470 in 1912; 10,428 in 1913; 12,204 in 1914; 11,624 in 1915; 14,81[illegible] (33,187,840 lb.) in 1916.

Cost of Ashio copper is probably a little less than 10c per lb. finished

Ani Copper Mines.

(Annual production, 1,500 tons of copper.)

The Ani Copper Mines are at Ani, Kitaakita-gōri, on the western side of the Moriyoshi Mountain, in Akita-ken. The concession is over 4,600 acres, and is over 5 miles long.

Geology: rocks include Tertiary tuff, tuffaceous shale, liparite, and andesite. Veins traverse the whole formation, there being two sets of veins, one running N. S. and the other E. W. The dip is generally steep, though a few of the N. S. lodes have a dip less than 40°. The E. W. lodes are cut by the N. S. lodes, which are sometimes brecciated veins, and occasionally have a clay filling. The E. W. lodes are numerous, though not thick nor long; while the N. S. lodes are big, though few in number.

The principal metallic minerals are chalcopyrite, associated with pyrite, some galena and zinc blende. The gangue or vein stuff is mainly quartz, but sometimes calcite and barite are found. The oxidized zone is deep and contains bornite, chalcocite, native copper, etc.

For timbering, only rough, round logs are used. There are several forms of timbering used including legs and caps, saddle back, and polygonal sets. It is interesting to note that large excavated spaces such as the hoisting and pumping stations and chambers, each 40′ wide, 25′ high, are timbered with big logs.

Transportation: underground of ores, waste and supplies is by electric locomotives and electric hoists; the former in the Ariki-Kotaki adit, Tsudo adit and No[illegible] and 8 levels below the Tsudo. The total length of electrically [illegible] tackage is 10 miles. All shafts are equipped with electric hoists. [illegible] power used is 1,200 h. p.

The [illegible] Kotaki le[illegible] drain the water coming from above. [illegible] There are many kinds of pumps, [illegible]rbine types. Total electric pump[illegible]

[illegible] by electricity, transmitted [illegible] plant to five substations.

where it is transformed down to 2,200 volts, again stepped down to 500 volts at underground substations.

Ore dressing: the mines have three concentration mills at Honzan, near the portal of the Ariki, Kotaki and Tsudo tunnels. Crude ore is sorted into two grades underground, one averages 12% copper, the other 0.8%. The daily output of crude ore for the three mills is 250 long tons of 1st and 1,500 tons of 2nd grade. The former is selected mostly by hand, the latter is treated by jigs, tables and flotation. Concentrates from these mills amount to 300 tons of 12.5% grade daily.

Cement copper: is recovered from old workings and weathered rubbish. The daily production is 2½ tons of 66% copper, which is sent direct to the smelter.

Smelter: this is at Honzan, the eastern part of Ashio. The lumps and fines from the concentrating mills being silicious, some basic ores and limestone is supplied from other places. About 105,000 tons of 12.5% product is treated annually, indicating a production of 13,000 tons of copper.

The lumps are charged raw to the blast-furnace, the fines are reduced in reverberatory furnaces after roasting in 5 McDougall furnaces. The matte is bessemerized as usual.

There are four blast-furnaces, 160x42″ at the tuyere level; the height from the center of the tuyeres to feed floor is 8½′. Blast is supplied by a Root No. 8 blower, also by turbo-blower. Matte averages 40% copper. Slag assays silica, 39%; iron, 25%; lime, 19%; aluumina, 9%, and copper, 9.2%.

The reverberatory furnace is 19′x110′. Waste heat is utilized by steam boilers. Matte is ladled into converters by an electric traveling crane.

There are 7 converters of the barrel type, 72″ diam. and 100″ in length. The tuyeres have Dyblie ball valves. Blast for the converters is produced by two turbo-compressors. Lining for converters is a decomposed rhyolite porphyry (liparite).

The converters produce more than 100,000 lb. of blister copper daily. Blister is cast into 70-lb. ingots or anode plates, and carried to the Nikkō Copper Works by rail.

Gases from the roasters, blast and reverberatory furnaces, and converters, pass through two Cottrell treaters to eliminate the fumes and dust. Arsenic is also saved. The dust carries 1.37% copper, 19.72% sulphur, and 31.83% arsenic.

Analysis of the blister copper is as follows; copper, 99.077%; gold, 0.0003%; silver, 0.1065%; arsenic, 0.029%; bismuth, 0.006%; iron, 0.052%; sulphur, 0.028%, and selenium and tellurium, 0.038%.

Mining: there are many levels and shafts, including the Manaita, 10′ wide, 7′ high, and 8,000′ long, the most important transportation and drainage level. Below this there are four levels at present. The Kanbun is 7′ high, 4′ wide, and 4,500′ long. There are ten other levels above the Kanbun tunnel with intervals of 60′ to 80′, the lower five now being used. The Kosawa main shaft, 4′x4′, is one of the blind shafts, which is sunk down to Maehi vein in Manaita level, and is 400′ deep. It is equipped with hoists, and pumps. The Chōmatsu crosscut opens nearly all of the chief veins in this mine. It is 7′ high, 10′ wide, and 1,000′ long and is the most important transportation level. There are seven levels above and six below it.

The Sosuido level is the third below the Chōmatsu, and is 4′ wide, 6′ high, and 1,700′ long. It is used for drainage only. The Kavakusa, 4′x14′, is one of the blind shafts sunk to the Shinsei vein on the Chōmatsu level, and is 600′ deep at present. The Koganehira level is the lowest for transportation and drainage, and is 7′ high, 4′ wide, and 1,500′ long. The [illegible] level is 50′ above the former, and is 6′ high, 4′ wide, and 3,000′ long. There are 10 levels above the Koganehira, connected by winzes. The [illegible] cut through at the foot of the mountain range between [illegible] Sammai valleys. It is the lowest level in the mine, and [illegible] 2,000′ long, with double tracks. During the driving

Transportation: the ore
way to bins built on the bar
boats and carried to the
Railway.

Power: 2,500 h. p. is ge
the mines.

Fu

(Annual production, 50.

These are in the village
area of the concession is 2.3

Geology: the rocks in w
shale, and andesite, cut by
Hompi vein is the master lo
N. W. or S. E. The thickn
is 5.000'. In the middle pa
the Shijunenhi vein, whose
minerals are chalcopyrite a
ous hematite occurs with th
druse.

Mining: the Ogiri tunn
it is 5' wide, 7' high, and 5.
tion and drainage level. T
also driven on the Hompi v
is 530' above the lowest or
and winzes. Stoping is pr
Leyner rock drill and Inge

Treatment: high-grade
grade ore is concentrated
silicious, containing 5.5% c
sands, and are sent to the
& Co.

Power: gas engines of
plant of 1.300 h. p. is unde

The ores and all suppl
mines and the Kosaka pro

(Annual production, 2.

This mine is in Tōdō.
It is 27 miles N. E. from
are transported on horseb
20,000 acres.

Geology: quartz veins
1' to 20'. The principal
zinc blende and a little ar
pyrite occur as accessory

Mining: exploitation of
disclosed numerous
proceeding on a

Smelting: the
for experimental
and sent to the Am

(Annual produc

These are in
within 3 miles of
area of the conce

Geology: the
tuffaceous sand

ing the Tertiary. The deposit consists of quartz veins that traverse all rocks.

Mining: the portal of the Sosuidō adit is near the concentrating mill; it is first a crosscut, and then a drift along the Hompi vein, the champion lode of the mines. It is 7,800′ long, and is used for drainage and transportaion.

No. 1 Yamaichi shaft, 4′x13′, is 1,370′ deep and develops the Hompi vein. It is equipped with an electric hoist. No. 2 Yamaichi is on the E. end of the Hompi vein, connects with the Sosuidō adit level at a depth of 300′, but it has no connection with other levels.

Ore treatment: crude ore is crushed by gravity stamps and concentrated on Wilfley tables. Concentrates and old tailings are treated by cyanidation. The former contains 1.09% (355 oz.) silver, and the latter 0.02% (6.5 oz.) silver. The cyanide plant was completed in August, 1917, and produces 400,000 oz. of silver annually.

Daira Lead Mines.

(Annual production, 600 tons of lead, 5,000 tons of zinc ore.)

These are in the village of Fujikoto, in Yamaoto-gōri, Akita-ken. The mine is 17 miles from the Futatsui station of the Ou line of the Imperial Government Railway.

Geology: the rocks include Tertiary tuff, andesite, and liparite. The quartz vein carries mainly argentiferous galena, and zinc blende. The deposit is reached by a tunnel driven along the vein.

Treatment: dressing is done by hand, mechanical crushing, screening, jigging, and flotation, and finally by an electro-magnetic separation. The lead ore is smelted here, and the zinc ore sold. The former is roasted in pots with limestone, and is reduced by charcoal in Mabuki hearths, and made into base bullion. A 400-h. p. hydro-electric power plant was erected, and a light railway connecting the mines and Futatsui station of the Government Railway has been constructed.

Coal Mines.

Name	Coal	Tons per Annum
Shiogashira, Shakanoo, Daini-Shakanovo	Bituminous	380,000
Shimoyamada	Anthracite	160,000
Shinshakanoo		60,000
Yoshima		500,000

Mizushima Smelter.

This is a customs smelter, situated on the islet Mizushima, 5 miles S. E. of the Havour Tamashima, near Okayama City. It includes pot roasters, blast furnaces, and Mabuki hearths. The blister copper is sent to Nikkō Copper Works.

Production is 3,500 tons of copper per annum.

Amagasaki Refinery.

This refinery is in the town of Amagasaki, near Osaka. Copper is refined in reverberatory furnaces. Lead ingots and silver bullion are also produced.

Annual production is 5,000 tons of refined copper, 2,000 tons of lead, and 10,000 oz. of silver bullion.

Nikko Copper Works.

[illegible] works are at Kiyotaki, near Nikkō, and make electrolytic [illegible], alloy wire, copper plates, etc.

[illegible] and other mines is refined here. The plant consists [illegible]tem, and one for the multiple system, blue [illegible] slime house.

[illegible]ills for rods and plates, wire drawing

Year	Gold, oz.	Silver, oz.	Copper, lb
1918	63	44,820	562,247
1917	509	86,017	1,001,168
1916	800	116,600	1,115,646
1915	1,000	129,310	987,742
1914	600	103,960	915,116
1913	320	79,640	650,185

Ikuno Mine: area 6,213 acres, at Ikuno Machi, Hyogo prefecture, Japan. G. Tajuchi, mgr., R. Kamada and C. Kato, asst. mgrs. The principal mines of this group are the Tasei, Kanagase, Akenobe and Kasei. There are 4 smaller ones.

Geology: the Tasei has a 14′ main vein with numerous branches in quartz porphyry and altered andesite tuffs. The ores carry native gold and silver, together with chalcopyrite, galena, zinc-blende, and pyrite. The vein is notable for its silver content, and has been the mainstay of the mine for centuries, giving it the name of "Silver Mine of Ikuno."

Production: copper is shipped in slabs carrying 96.83% copper, 0.0072% gold, and 0.4742% silver. Output for the past 6 years follows:

Year	Gold, oz.	Silver, oz.	Copper, lb.	Tin, lb.
1918	2,007	168,147	4,930,918	—
1917	1,184	196,175	6,138,172	—
1916	2,140	249,000	5,486,119	551,[illegible]
1915	2,110	223,200	5,219,481	684,[illegible]
1914	2,600	240,200	4,749,880	164,[illegible]
1913	3,200	258,900	3,870,311	41,[illegible]

Kanagase Mine: near the Tasei, has many veins in quartz trachyte, three of them being workable. The property is traversed by several massive dikes, with fault dislocation of the veins along the dikes. The main copper vein is 8′ to 10′, runs N. S., dips 60 to 80° E., and is 10,000′ long. The ore carries native copper, bornite, chalcopyrite, and tetrahedrite. The other veins now being worked are 3′ to 9′ thick, nearly vertical, [illegible] for 2,000′, and contain argentite, sphalerite, galena, ruby silver, and stromeyerite besides copper sulphides.

The Akenobe mine has numerous copper and tin-bearing veins in Paleozoic slate, scattered along the Akenobe river. Eleven veins are worked, varying from 3′ to 4′ wide. Ores carry chalcopyrite, bornite, cassiterite, wolframite, and blende also.

The Kasei mine shows hornblende gneiss, cut by rhyolite and porphyry dikes with fissure veins carrying silver sulphides associated with chalcopyrite and native silver.

Equipment: includes steam, water, and electric power plant.

Yoshioka Mine: area 3,137 acres, at Fukiyamachi, a small town in Kawakami district, Okayama prefecture, 33 miles from Tatami, on the railway. M. Yamashita, mgr.

Geology: slates, sandstones, and phyllites are cut by porphyry and quartz porphyry. The ore deposit is divided into two parts, one in sedimentary beds, increasing in richness with depth; the other an impregnation in metamorphic slates in an igneous contact zone. The former shows veins of erratic width, in the form of a stockwerk. Ore is chalcopyrite, with some pyrite, arsenopyrite, pyrrhotite, with a quartz gangue, and averages 3 to 8% copper.

Development: the mine has a 360′ shaft, with [illegible] shaft. Total openings amount to 28 miles.

Production: 7,000 tons of ore annually. The output was as follows:

Year	Gold, oz	Silver, oz.	Copper, lb.
1918	144	41,624	1,299,356
1917	158	60,608	1,749,627
1916	120	63,200	1,607,312
1915	130	64,500	1,608,555
1914	130	61,790	1,741,342
1913	130	61,250	1,519,989

Makimine Mine: area 1,388 acres, at Kitakata village, Higashi-Usuki district, Miyazaki prefecture, Japan. It is far away from railway lines, but in a well traveled region. It is accessible by steamer up the Gokase river to Tomi.

Geology: country rock is slate with interbedded standstone, and a capping of lava from the Aso volcano. These rocks are cut by veins of small size, carrying lenticular ore shoots of pyrite, averaging 5% copper, the ore shading into pyrite and lievrite. There are 11 main veins, whose ore-bodies are from 10′ to 20′ wide, though averaging but 1′ to 7′, and are 30′ to 300′ long.

Development: is by tunnels at 50′ to 60′ intervals, with inclined winzes of 310′ and 1,000′, and a vertical 240′ winze. Workings aggregate 23,300′.

Equipment: is hydro-electric.

Production: for past 6 years was as follows:

Year	Gold, oz	Silver, oz.	Copper, lb.
1918	597	3,735	853,505
1917	644	8,325	1,573,300
1916	630	8,350	2,121,223
1915	627	8,100	2,415,395
1914	618	7,740	2,103,181
1913	615	6,430	1,515,903

Naoshima Smelter: is on an islet called Naoshima, 1½ hours from kayama City by train and boat. This smelter is divided into two departments—one smelting copper ore, the other lead ore. The copper department includes MacDougall furnaces, reverberatory furnaces, and converters; the lead department includes preliminary roasting furnaces, pots, ast furnaces, softening reverberatory furnaces, Park's pans, refining reverberatory furnaces, distillation furnaces, and cupellation furnaces. Furce gases are treated by 5 units of electric precipitation apparatus. The ster copper and bullion are sent to Osaka Refinery.

Osaka Refinery: at Shinkawasaki-machi, K... employing the ...perial Mint, S. Namura, mgr. The work... employ ...out 350 people. It includes 15 reverberator... 97 to 99% purity for conversion into electr... 99.89% copper, 0.0037% silver, 0.014% lead ... phur. Gold and silver slime yielded by electr... is dried preparatory to roasting in a small muffle ... ched with the waste solution of the refinery to ...pper, the residue being mixed with lead and cupel... ced by all Mitsubishi mines is refined here. Contro...

ar	Gold, oz.	Silver
8	26,301	690,4...
7	44,907	895,48...
6		1,099,90...
5		975,360
4		982,630
3		85,440

The Mitsubishi is one of ... ...an, and, like the others, is ... ...mpani...

been won by the possession of mines of exceptional value, though the company has some excellent properties, but rather by the utilization of the most modern methods and appliances in mining and metallurgy, directed by the best technical skill available.

MITSUI MINING CO., LTD. JAPAN

Head office: No. 1 Surugacho, Nihombashiku, Tokyo, Japan. **New York office:** 65 Broadway, New York.

Directors: Gennosuke Mitsui, pres.; with Genyemon Mitsui, Dr. Nagai Yamada, Dr. Tamaki Makita, Dr. Buntaro Yamada, Dr. Heinojo Ueki, Kenzaburo Iwata, Dr. Takuma Dan, Kikusaburo Fukui, and Kwan-ichi Okamoto. **Auditors:** Jutaro Mitsui, Shogoro Hatano, and Tomojiro Ono.

Cap., 50,000,000 yen paid up.

Property: the Miike, Tagawa, Yamano, Hondo, Noborikawa, Sunagawa, Kushiro, and Kawakami coal mines; the Kamioka, Kushikino, and Kosaka metal mines; the Iwaonobori sulphur mine; zinc refinery, by-product coke and gas power plant and dye manufactory. The Kamioka smelter is in the heart of a sericulture district and in order to prevent fumes and dust from damaging the mulberry trees and silkworms, a 3-unit Cottrell treater handles gases from the furnaces. Dust from the precipitator carries 1.13% free sulphur and 19.65% arsenic.

Production: in 1918 was 3,696,000 tons coal, 31,000 oz. gold, 657,000 oz. silver, 41,000 lb. copper, 5,750 tons lead, 10,400 tons zinc, 15,700 lb. arsenic, 94 tons tungsten ore, and 7,000 tons sulphur, also 114,000 tons coke, 1,300 tons sulphate of ammonia, several kinds of oil, intermediates, dye-stuffs, and chemicals.

SUMITOMO COPPER CO. JAPAN

Offices: Kitahama, 5 chrome, Higashi, Osaka, Japan. Kobe, Japan (shipping department); Niihama, Iyo, Japan (mine).

Directors: M. Suzuki, K. Nackada, K. Yukawa, M. Kubo, C. Kasaki, M. Ozura, and Y. Yamashita, two latter being managers.

Company owns the various mines and smelters described below, and other properties comprising 3 claims, 6,353 acres, besides a 5-acre mill-site, 33,452 acres timber lands, and 575 acres miscellaneous lands, are in the Besshi district. The Besshi mine proper, on Besshi mountain 4,400 ft. in height, has an area of 209 acres. The timber lands carry large plantations of fir, set out yearly since 1879, which have now become available for cut timber, 15 to 20 years growth being required. Water supply is taken from the Kokuriu river.

The Besshi Mine.

The Besshi mine is situated near Kobe, 10 miles from the sea and 4,000 ft. above it. It has been in the possession of the Sumitomo family for more than 200 years, being successfully worked by native methods until 1874, in that year modern methods of mining were adopted and the property is now the second largest mine in Japan.

Geology: the Besshi copper deposit is a bedded vein occurring in crystalline schists considered to be of Archæn age and characterized by chlorite and graphitic schists with serpentinized dike rocks in the hanging country. The ore deposit itself is a vein of crushed quartz schist conformable in strike and dip to the enclosing rocks, but broken when they were folded. The vein is traceable for 6,000' and has an ore shoot which is 5,000' long, 5' to 25' and averaging 7' thick, that has been developed to a depth of 2,500' without decreasing in size or value. The ore is a mixture of chalcopyrite and pyrite interbanded with schist and carries from 3 to 4% copper, and is fairly free from other metals, the smelter product selling at Lake Superior copper prices, without electrolytic refining. Numerous parallel E.-W. veins [illegible] the orebody [illegible] 30' and rarely 50'.

[illegible] inclined shaft, 1,200' deep on the [illegible] workings with the surface. The [illegible] haulage and drainage way, 10x7' [illegible] ries a stream through the [illegible]

which has a fall of 1,800′ after leaving the mine and generates 6,000 kw. The latest work is a fourth adit, 16,000′ long, from Hateba, the end of the private railway conveying ore from the mine to the sea. A shaft 16′ in diameter and 1,875′ deep was sunk vertically from No. 3, or main working tunnel, to meet the new level. Work in the tunnel was advanced at the rate of 200′ per month.

The orebody is worked by ordinary overhand methods and the output is sorted at the surface into lump ore, constituting 70% of the product, fines 20% and waste 10%.

The mine has 9 main levels with largest production from the 6th and 7th levels. There is a system of natural ventilation by which warm air from the valley entering through the Tonaru tunnel escapes through the mouth of the Toyen shaft, near the crest of the mountains, the air current being regulated by brattices. The mine has 61,268′ of workings, with about 2,500,000 tons of ore blocked out for stoping. The mine is well timbered, with a tram line on each level, and ore is blasted with guncotton, a little dynamite and occasional gunpowder. Electric pumps force water from the lower workings to a large sump on the 8th level, whence it is discharged through the Tonaru tunnel which is lighted throughout by electricity and has the terminal station of an aerial tram at its portal.

The **Nishinokawa mine** is at Oboki-mura, Nu-gori, Iyo, Japan. This property shows quartz-schists with lenses of 3 to 12′ width carrying chalcopyrite ore with 3 to 4% copper, associated with sphalerite, pyrite, magnetite and hematite, with quartz gangue. The mine employs an average of 225 men.

Mining equipment includes a 1,000-h. p. electric installation having three 200-h. p. electric hoists, good for 1,200′ depth each, with three 120-h. p. Rand, two 120-h. p. and one 75-h. p. Leyner, and one 50-h. p. Schramm air compressors. As ore extraction is mainly through No. 3 tunnel, no exceptionally powerful machinery is required.

The concentrator at the mouth of the Tonaru tunnel is of 700 tons daily capacity, equipment including 2 Blake crushers, 4 belt conveyors and 4 trommels, ore being assorted mainly by hand labor.

Owing to complaints by farmers of damage from copper-laden waters, a cementation plant was installed several years ago, and considerable copper is precipitated on scrap iron and coke, the production of 80% cement copper amounting to upwards of 200 tons yearly.

A 3,600-meter Bleichert aerial tram leads from the mill and tunnel to the railway at Hateba, this having a longest span of 600 meters, with an hourly capacity of 90 tons at an average speed of 2.5′ per second. Hateba is the terminus of a railway running to Niihama, the nearest port. The connections between the mine and shipping wharf include about 2 miles of aerial tram and several miles of railway. The mine also has 3 aerial trams of 1,276′, 5,200′ and 5,178′ lengths, respectively.

The company owns 2 private railways of 9.73 miles aggregate length, with 30″ gauge, rolling stock including 10 locomotives, 10 box cars and 184 ore cars.

The company operates 3 electric plants, 2 driven by steam and 1 by water. The steam plant at the mine and hydro-electric plant at Otoshi on the Kokuriu river, distribute electric energy to the mine, mill and shops, while the steam-electric plant at Shisaka furnishes power to the smelter.

The general shops at Niihama, about midway between the mine and smelter, include a foundry making castings up to 5 tons in weight, extensive carpenter shoops, machine shops, boiler shops and smithies, these works not only making ordinary repairs, but turning out a large part of the machinery and castings used at the mines, works and smelter.

The Besshi smelter formerly was at Niihama, but owing to serious damage to neighboring farmers from smelter fumes, was transferred 1905, to the island of Shisakajima, 12 miles from Niihama, only the general shops remaining at the old smelter site.

The **Shisakajima smelter,** 20 miles from the mine, built at a cost of about 4,000,000 yen, is thoroughly modern in design and equipment. Ore is received from barges, strings of 10 being towed by tugs 10 miles and unloaded by a 20-ton crane, into cars operated in counterbalance, on an incline leading to the top of the works, which are laid out in 7 terraces, gravity being used throughout for the flow of material.

The smelter handles 600 metric tons daily of ore containing 30 to 33% sulphur mixed with 7% gneiss as flux and 4 to 5% coke. The fines are nodularized with flux and water in a revolving conical wooden cylinder and afterwards pot-roasted in Nakamura roasting pots. The sintered ore, with lump ore and coke, is fed to the first blast furnaces which make a 20% matte and an 0.2% slag. This first matte is smelted a second time, making 35% matte and 0.3% slag.

The furnace building has four 160-ton 39x192" blast furnaces, of the water-jacket type for ordinary or pyritic smelting, and a 400-ton 48x288" blast furnace for pyrite smelting. There are four 37-metric ton circular blast furnaces, each with a corresponding light reverberatory forehearth, with blast, for smelting roasted matte and making blister copper. There are two 15-metric ton reverberatories for refining, 1 being used as a spare, and 4 sets of Mabuki hearths, using an old Japanese process, improved by the Sumitomo Co., for the conversion of matte, these having a daily capacity of 32 tons of roasted matte each, 1 being held as a spare. Barren quartz pebbles are used for fluxing. No custom smelting is done. The product is blister copper averaging 99.8% in copper tenor, carrying traces of silver and gold. About 20% of the product is sent to the Osaka rolling mill, owned by the Sumitomo family, and the greater part of the remainder is sent to Kobe, whence exported, mainly to Europe.

The smelter power plant has 3 No. 4 and 3 No. 6 Connersville blowers, and blast for the 4x24' pyritic furnace is furnished by a Curtis steam engine direct-connected to a turbo-blower that delivers 750 cu. ft. per minute of free air, compressed to 1.24 atmospheres normally, with a maximum absolute pressure of 1.34 atmospheres. Steam for the turbo-blower is furnished at 200 lbs. initial pressure by a Babcock & Wilcox boiler. There is an air compressor for converter blast.

Fuel is coal at the mine, and coal, coke, and waste gases from coke ovens at the smelter, coal being used for the reverberatories and reverberatory forehearths, with coal and wood employed for the roast stalls. Fuel costs are 4.2 and 4.7 yen per long ton for coal, according to grade, and 8.8 to 21 yen for coke, yearly consumption being estimated by the management to average 9,333 long tons of coal and coke. The company has a coking plant at Niihama with 72 brick kilns, having a daily capacity of about 55 tons, using coal from the Keeki mine at Kiushiu.

The company owns a very extensive fleet of vessels, including 2 steamers for passengers and package freight, 1 steamer for carriage of coal, and 81 sailing vessels, with 20 sailing vessels held under charter. The company operates a passenger line, with a steamer plying between Niihama and Kobe, a distance of 125 miles.

The Besshi mine employs about 3,000 and the various enterprises of the company employ about 4,800 hands. The miscellaneous enterprises in connection with the Besshi mine are very extensive, including a large number of warehouses and stores, and a branch of the Sumitomo bank at Niihama. The company maintains a main hospital, with 4 branches, and supports 7 elementary schools for the children of employees.

Production: of the Besshi mine is about 20,000,000 lb. copper annually at an estimated cost of between 9 and 10 cts. per pound for finished copper

KOREA.

CHOSEN GOLD MINES, LTD. **KOREA**

Operations ceased at end of 1916. See Vol. XIII of this book for detail of organization, etc.

HUCHANG MINING CO. **KOREA**

Address: Koshagun, Heianhokudo, Japan.

Inc. 1917, in Japan. **Cap.**, 4,000,000 Yen.

Property: in northern part of Chosen, not far from the Yabu river, contains a large deposit of copper ore on which mining operations were started late in 1918.

ORIENTAL CONSOLIDATED MINING CO. **KOREA**

Office: 15 Broad St., New York. **Mines and works:** Unsan district, Korea, Asia.

Officers: H. C. Perkins, pres.; Leigh Hunt, v. p.; Frederic Bull, 2nd v. p.-treas.; L. T. Haggin, 3rd v. p.; with Ogden Mills, J. S. Fassett, Wm. P. Palmer and H. F. Meserve, directors. George Kennaby, sec.

Officers in Korea: Alf. Welhaven, gen. mgr.; Thos. W. Van Ess, asst. gen. mgr.; C. A. Crispin, auditor; A. B. Palmer, cashier; E. S. Barstow, supt. of transportation; J. B. Lower, supt. of Tabowie, etc.; J. A. Vernon, asst. supt. of Chintui, etc.; E. H. Emerson, elec. engr.; W. H. Aldridge, mech. engr.; K. F. Hoefle, supt. of fuel and timber railway; E. L. Power, medical officer; S. E. Iijima, sec. to gen. mgr.; W. D. Townsend, agent, Chemulpo.

Inc. Sept. 29, 1897, in West Virginia, to operate mining concessions in Korea. **Cap.**, $5,000,000; outstanding $4,293,900, and the balance is owned by the company; shares $10 par. No bonded debt. Stock transferred and dividends paid at 15 Broad St., New York. Listed on London Stock Exchange.

Comparative General Balance Sheet, years ended June 30:

Assets.

	Mines & Prop.	Cash	Supplies	Misc.
1919.....	$5,085,147	$431,480	$477,752	$180,711
1918.....	3,569,234	531,114	453,514	233,115
1917.....	3,743,900	432,534	398,938	10,826
1916.....	3,893,900	401,490	381,922	13,774
1915.....	4,043,900	463,410	266,688	19,109
1914.....	4,043,900	512,781	356,085	69,301

Liabilities.

	Capital Stock	Sundry Creditors	Surplus Pro on Hand
1919.....	$4,293,900	$51,570	$83,950
1918.....	4,293,900	83,624	409,453
1917.....	4,293,900	61,615	230,684
1916.....	4,293,900	66,435	330,753
1915.....	4,293,900	52,189	447,018
1914.....	4,293,900	42,465	645,702

Comparative Income Account:

	Total Income.	Costs Mine.	Mill.	Conc't. Exp's.	Other Exp's.	Total Exp's.	Divi
19.....	$1,282,086	$496,068	$154,375	$53,813	$448,994†	$842,978	----
18.....	1,528,525	555,657	153,615	63,868	361,922**	1,135,060	$214
17.....	1,602,597	547,338	139,905	61,969	126,378	875,390	644
16.....	1,636,299	554,535	144,070	60,082	141,831	901,118	644
15.....	1,672,487	569,872		[illegible]	280,442	1,012,921	858
14.....	1,781,473	596,189		[illegible]	[illegible]	[illegible]	644
13.....	1,661,476	610,212		[illegible]	[illegible]	[illegible]	429
12.....	1,562,110	520,136		[illegible]	[illegible]	[illegible]	429

* Deficit. ** Includes $174,66 [illegible] $310
ation and depletion.

Dividends: in recent years, 1903, $1.25; 1904, 1905 and 1906, $1 each; 1907, 60c.; 1908, $1.50; 1909, $1.15; 1910, $1; 1911, $1.50; 1912, $1; 1913 and 1914, $1.50; 1915, $2; 1916, $1.50; 1917; 50c.; 1918, 25c.; and 25c. in 1919-'20, making a total of $19 per share, or 190%, or $8,045,993.

Property: a concession covering 400 sq. miles, including a number of gold mines in the Unsan district in the northwestern part of Korea, described by Evans and Heofle in "Min. & Sci. Press" of March 29, 1919.

Geology: the region shows granite rocks cut by erosion into a high and rugged mountainous area. The lodes are typical fissure veins varying from 20′ to 140′ wide, and of unusual persistence downward, but are broken by intense crushing and faulting. The vein quartz contains pyrite, galena, sphalerite, gold and a little silver. A predominance of galena is generally accompanied by an increase in gold, but free gold is rarely seen. Graphite is distributed in small quantity through the ore.

Development: the following tables summarize mining operations:

Tabowie Mine.

	1919	1918	1917
Deepest shaft, feet	.....	2,600	.....
New work, feet	10,488	11,510	13,092
General results	Discouraging	Unsatisfactory	Fairly Satisfactory
Ore reserves, tons	441,000	485,000	550,000
Value per ton	$5.44	$5.70	$6.00
Ore mined in year, tons	127,122	122,106	132,441
Value per ton	$6.57	$6.56	$6.29
Cost of mining per ton	2.08	1.86	1.79

Taracol Mine.

	1919	1918	1917
Deepest shaft, feet	.....	1,942	1,615
New work, feet	.....	13,156	11,719
General results	Good	Encouraging	Satisfactory
Ore reserves, tons	260,000	238,000	220,000
Value per ton	$4.54	$4.54	$4.20
Ore mined in year, tons	107,401	101,617	103,097
Value per ton	$4.53	$4.73	$4.80
Cost of mining, per ton	1.70	1.67	1.46

Tongkol Mine.

Deepest shaft, feet	.....	.....	.....
New work, feet	.....	5,489	5,110
General results	Fair	Fair	Satisfactory
Ore reserves, tons	5,500	7,000	8,000
Value per ton	$10.18	$8.00	$8.00
Ore mined in year, tons	4,443	8,040	8,492
Value per ton	$16.50	$10.62	$10.34
Cost of mining per ton	$5.61	$4.00	$4.34

Chintui Mine.

Deepest shaft, feet	.....	1,085	985
New work, feet	.....	4,535	2,852
General results	.....	Satisfactory	Encouraging
Ore reserves, tons	32,500	35,000	30,000
Value per ton	$4.33	$4.17	$4.00
Ore mined in year, tons	11,902	23,881	28,140
Value per ton	$4.03	$4.63	$4.93
Cost of mining per ton	$1.96	$2.01	$1.76

Reserves in all the mines are 779,000 tons, worth $5.22 per ton.

Extensive prospecting is carried on continuously on the concession, [illegible] of work being done in 1917; 1,226′ and 3,323′ of ditching in 1918, and 9,85[illegible] 1919. This cost $1.15 per foot.

Mining methods vary somewhat, but overhead stoping, with or without timber, is the general practice. Large stoping widths, soft walls, and slipping of backs along graphitic seams in the quartz requires square-sets. As waste and dike matter are mixed with the ore, sorting is necessary.

Equipment: includes 20-mile narrow-guage timber tramway, 22½-mill transmission line; sawmill and wood-working shop; 2 hydro-electric power plants of about 2,500-h. p., the second one (the Suribong), finished in October, 1919, at cost of over $400,000; mine fans, pumps, compressors, and hoists; tool-shop; machine-shop and foundry; 3 stamp mills, containing 80, 80, and 40 head, respectively, also amalgamating plates and amalgamators, vanners, classifiers, and canvas tables; concentrate treatment plant; refinery; assay-office; living quarters, medical and surgical department; and an afforestation department, which has planted 869,025 trees (mostly larch, acacia, and red pine) since 1913.

Production, years ending June 30:

Year	Tons Crushed	— Per Ton — Yield	Costs	Year	Tons Crushed	— Per Ton — Yield	Costs
909.....	296,417	$4.80	$2.72	1914.....	301,162	$5.60	$3.68
910.....	320,707	4.40	2.43	1915.....	297,889	5.45	3.40
911.....	344,097	4.37	2.45	1916.....	309,730	6.04	2.90
912.....	323,703	4.76	2.68	1917.....	317,601	5.94	2.76
913.....	313,701	5.19	3.25	1918.....	303,672	5.90	3.06
				1919.....	250,868	5.84	3.36

Total production to June 30, 1919, was 5,017,138 tons of ore, valued at 30,888,065, of which $8,045,993 was distributed as dividends.

Company's operations are extensive and ably conducted. Geological condi-ons are carefully studied, and while one of the mines is almost exhausted, the thers maintain ore reserves. The native labor problem has been solved without erious perplexities, mainly by a close study of Korean adaptability and industry. ltogether a highly profitable concern, operating on low-grade ore at low cost. esults are given with commendable detail and frankness.

EOUL MINING CO. **KOREA**

Offices: First National Bank Bldg., Denver, Colo.; 57 Post St., San rancisco; 3 Buckingham Gate, London, S. W. 1, England; and Seoul, Korea. orporate office: Deep River, Conn.

Officers: H. Collbran, pres.; H. R. Bostwick, v. p.; S. L. Selden, 2nd p. and gen. counsel; H. E. Collbran, sec.-treas., with A. Coors, F. B. Lawson, d A. H. Collbran.

Staff: A. R. Weigall, cons. eng. and gen. mgr.; B. V. Barton, acting pt. Suan mine and supt. of general development on the Concession; James illiams, Suan mine foreman; H. B. Fields, Suan mill foreman; Alex McFar-ie, Tul Mi Chung mine foreman; E. L. Blackwell, Tul Mi Chung mill fore-n; W. G. B. Boydell, supt. of ore estimation and surveying; J. H. Woolf, asst. foreman; K. I. Yun, in charge of Tong Ahm; H. T. Matson, in charge of Kung l and Peh Jai; W. W. Barnett, chemist and assayer; C. S. Crowe, millwright l mechanical foreman; Baron H. Maki, cons. elect. eng.; S. Ishikuma, supt. of ct. power; F. A. Smith, in charge of Nau Chauri, W. H. Minford, medical cer; G. C. Cranor, accountant, F. A. Oldis, auditor.

Inc. April 27, 1908, in Connecticut. **Cap.,** $500,000; shares $25 par; ued 22,545 shares. **Notes:** coupon and supplementary note issues, $624,-

Bankers' Trust Co. of New York, registrar. H. C. Ellis, Denver, transfer nt. Annual meeting, third Monday in October.

Balance Sheet, years ending December 31:

Assets.

	Property	Ore reserves	Stores	Concentrates	Cash	Total
.....	$1,516,658	$847,109	$241,583	$422,078	$628,458	$3,155,837
.....	1,571,654	717,487	297,719	140,188	876,973	3,618,021

Liabilities.

	Capital	Notes	Reserves	Profit & loss account	Surplus from ore reserves	Creditors	Total
1918.....	$568,625	$624,625	$1,154,500	$190,914	$847,109	$275,063	$3,125,8
1917.....	522,000	890,000	988,000	298,257	717,487	.....	3,011,7

Income Account.

	Sale of Products, etc.	Operating Charges	Interest, Royalties, Depreciation	Profit	Dividends
1918.....	$1,404,685	$787,436	$1,231,672	$173,013	$140,99
1917.....	1,698,418	1,029,624	338,268	330,526	255,30

Dividends: have been 25% in 1910; 50% yearly from 1911 to 1917, inclusive.

Property: a lease on the Suan concession, granted Nov. 4, 1905, to the Korean Syndicate, comprising 59,000 acres, about 55 miles E. from Pyeng Yang. The concession carries full rights to examine, develop and operate all mines and deposits contained within the area covered by the grant. Company also has permission to cut timber and to use all the water required for mining, milling and other purposes from sources within, or adjacent to, the district. These privileges are given for a royalty of 1% on the gross value of the output of the mines. There is an additional annual tax of about 30 cents per acre (50 sen for each 1,000 tsubo), on all land actually selected for mining operations, such selections being made by December, 1916.

The rights in this concession are secured to the Seoul Mining Co. by an agreement made with the Korean Syndicate which provides for the payment of 8% royalty of the actual profits derived from the concession, clear of all depreciation charges. (Royalties and taxes paid in 1918 amounted to $70,884.)

Geology: property shows both granite and limestone, the principal orebody, known as the Collbran Contact, lying between limestone and a batholith of granitoid rock. Ores carry gold, copper, tungsten and bismuth, the gold seldom being visible and rarely in coarse condition. Silver is also present, alloyed with the gold to an appreciable amount. The copper ores contain chalcopyrite, bornite and tetrahedrite, with a high gold content, a fair average probably being about 1.2% copper and $10 gold. The ore-bodies are irregular and in general parallel with the limestone-granite contact, connected more or less by generally well-defined fissures. The gangue is a highly siliceous crystalline limestone, altered by contact action and containing a considerable amount of magnesia and alumina.

Development: there are 3 principal and several subsidiary mines being worked, the former being the Tong Ahm, Tul Mi Chung, and Soctarie. In 1918, 38,209′ of new work was done, and the total development is now about 200,000′.

The Suan mine is about exhausted. It has been an interesting mine, as the ore contained $9.20 gold, 1.15% copper, and 1.7 lb. bismuth per ton. Mining is conducted through shafts and tunnels.

Tul Mi Chung is the largest mine, and contained reserves estimated at 410,614 tons, averaging $10.12 per ton in gold, silver, and copper in 1918. The main work has been done on orebodies occurring at the junction of limestone and schist. Good ore was found at the limestone-granite contact, and possibilities in that formation are encouraging.

Tong Ahm is a new mine, and has every indication of developing into an important producer. It contains 50,424 tons of $9.02 ore.

Peh Jai is a new and promising prospect, containing 11,000 tons of $6.66 ore, which is extremely complex, containing gold, silver, copper, bismuth and tungsten. The gangue is a heavy magnetite and garnet.

Reserves at all mines are as follows:

	Tons	Value per ton	Total Value
1918	771,575	$8.09	$6,242,833
1917	816,957	8.57	7,005,625
1916	1,206,136	....	15,014,376
1915	1,221,331	....	.....
1914	1,208,600	12.42	15,015,000
1913	633,300	12.07	7,646,000
1912	421,000	14.44	6,080,000
1911	211,400	16.55	3,499,000

The Soctarie deposit consists of an extensive band of quartzite, interbedded with limestone, of an average thickness of 25'. This band carries 0.3% tungsten as scheelite, 40 cents gold, and 0.4% copper. Reserves are estimated at 267,717 tons, worth $4.93 per ton. A great deal of experimental work has been done on this ore, locally and abroad, especially in making marketable products.

Equipment: includes steam and hydro-electric power plants, 56-mile transmission-line, complete mining machinery, 40-stamp mill at Suan mine to be enlarged to treat ore from the Soctarie mine, and 480-ton mill at the Tul Mi Chung, including regrinding, flotation, and cyanidation plants.

Production:

Year	Tons Ore	Rec'y p. t.	Cost p. t.	Profit p. t.	Total Output
1918	201,151	$9.64	$4.00	$5.64	$1,343,234
1917	215,039	7.61	3.47	4.14	1,636,923
1916	176,518	10.63	3.98	6.42	1,823,768
1915	108,078	9.35	3.94	5.11	978,383
1914	74,550	9.44	3.90	5.54	.....
1913	71,535	9.39	4.13	5.26	.....
1912	74,432	8.25	3.52	4.73	.....
1911	70,229	7.83	3.01	4.82	.....
1910	32,793	9.86	4.35	5.81	.....

This is a highly profitable company, directed by able technical men who have many problems to solve, not the least being the separation of gold, copper, and tungsten, upon which experiments have been under way for the past four years. Flotation is expected to make a good recovery. The Tul Mi Chung mill is now treating 488 tons daily of gold-copper ore and a 1,000-ton mill is planned. If 90% of the gold, copper and tungsten can be extracted from the Soctarie ore, a 1,000-ton mill will also be erected there. Company conducts extensive prospecting on its concession, following geologic examinations.

Technical operations on the Suan Concession are described by A. R. Weigall and J. F. Mitchell-Roberts in the "Min. & Sci. Press," October 11, 1919.

PHILIPPINE ISLANDS

The following is as complete a list of the metal mines in the Philippines, as can be secured. We have endeavored in vain to secure detailed information on these companies; the Benguet Cons. Mining Co. being the only company which supplied complete data on its operations.

Name	Address	Metal	Remarks
Alabat Mng. Assn., Manila	Alabat Island	Placer	Prospecting
Benguet Cons. Mng. Co.	Antamok, Mt. Province	Gold	Mining and milling.
La Riqueza Nacional.	" " "	Gold	Development.
Colorado Mng. Co.	Aroroy, Sorsogon	Gold	Mining and milling.
Syndicate Mng. Co.	" "	Gold	Mining and milling.
Keystone Mng. Co.	" "	Gold	Mill closed. Dev'g.

SIAM

BANGNON VALLEY CO.

Address: Bangnon Valley, Renong, Siam. Controlled by Australian capital.

Property: tin-bearing land in Bangnon Valley, Renong, Siam, on which a dredge is operating. During half-year ended November 30, 1917, the boat dug 382,845 cu. yd., from which 117 tons of black tin (71% metal) was saved. The value was 18c. per yard, and cost 8c. The profit was £7,928, compared with £35,077 in year ending May 31, 1917. Regular dividends are being paid.

DEEBOOK DREDGING

Office: J. W. Barrett, Renong Chambers, Ringwood, Victoria, Australia.

E. T. Miles, chairman of board of directors; A. H. Miles, mgr.; H. J. Coates,, sec. at Renong, Siam; E. Habben, sec., at Palmerston House, London, E. C. 2, England.

Inc. May, 1913, in Victoria, Australia. **Cap.,** £100,000; £1 par; all issued.

During year ended May 31, 1918, profit was **£18,243**, plus £10,856 from previous year. After paying dividends there was a balance of £24,099 carried to 1919. Cash assets exceed liabilities by **£41,172**, including **£24,450**, value of shares in Ronpibon Extended.

Dividends: 5% in 1914; none from 1915 to 1917, and 20% in 1918.

Property: 440 acres of alluvial ground at north end of Bangnon Valley, Renong, Siam, worked by 2 dredges.

Production: 230 tons of black tin in 1917 and 235 tons in 1918.

RATRUT BASIN TIN DREDGING CO.

Address: G. M. Yetts, Bangnon Valley, Renong, Siam.

Property: tin-bearing ground in Siamese Malaya, worked by a dredge which in year ended May 31, 1917, dug **492,000 yards**, and saved 183 tons black tin. Cost of working was 7.84c. per yard. Dividends are being paid.

RENONG TIN DREDGING CO., LTD.

Office: Guthrie & Co., 5 Whittington Ave., London, E. C. 3, England.

F. B. Lawson, chairman of board of directors; F. Nicholls, mgr.; F. W. R. Payne, cons. engrs.

Inc. July 1, 1913, in Great Britain. **Cap.,** £135,000 in 25,000 [illegible] pfcc. (all issued), and 100,000 ord. shares (87,267 issued) of £1 par. Increased to £200,000 in March, 1920, 32,000 shares being given for new [illegible]

In 1918, profit was £49,269, of which £29,930 was paid in dividends; assets exceeded liabilities by £90,000. Reserves are £16,000.

Dividends: preference shares paid in full; while common received in 1915: 30% in 1916; 30% in 1917; and 10% in 1918.

Property: 460 acres of tin-bearing gravel land on the Renong and Chan rivers, Siam, on which 2 dredges are working, also 1,000 acres in Siamese Malaya, of which 650 acres contain 18 to 24' of ground averaging 1.2 lbs. black tin per yard. A dredge is to be erected there.

Production years ended June 30:

Year	Yardage	Black Tin	Cost
1918	2,033,357	842	[illegible]
1917	2,170,177	970	[illegible]

RONPIBON EXTENDED

Address: J. W. Barrett, Ringwood, Victoria, Australia.

Inc. November, 1917, in Victoria, Australia. **Cap.,** £40,000 [illegible] by Deebook Dredging and Ronpibon Tin.

Property: 90 acres of tin-bearing gravel in Bangnon Valley, Siam. One dredge in operation.

RONPIBON TIN

Address: J. W. Barrett, Ringwood, Victoria, Australia.

Property: tin-bearing ground in Bangnoa Valley, Renong, Siam. With the Deebook Dredging Co., Ronpibon is interested in Ronpibon Extended. A dredge was to be erected at last accounts.

SIAMESE TIN SYNDICATE, LTD. **SIAM**

Office: Capel House, New Broad St., London, E. C. 2, England.

W. H. P. Stevens, chairman of board of directors; C. A. Underwood, sec.; H. G. Scott, gen. mgr.; A. N. Wakefield, res. mgr.

Inc. Nov. 22, 1906, in Great Britain. **Cap.,** £200,000; £1 par; 120,000 issued.

The net profit for 1917 was £34,984, of which £30,000 was paid in dividends. Profit in 1918 was £35,652.

Dividends: 30% in 1913; 20% in 1915; 25% in 1916; 25% in 1917; and 25% in 1918.

Property: 1,730 acres of tin-bearing land at Ngow, Renong district, Siam. The new areas recently acquired contain over 30,000,000 cubic yards, carrying from 0.8 to 4 lb. of tin per yard. A cocoanut plantation is also being cultivated.

Equipment: includes 3 dredges.

Production: 798 tons of black tin in 1917, and 978 tons in 1918.

In March, 1920, a subsidiary, the Bangrin T. D. Co., was formed with capital of £170,000 to work a property 5 miles N. of Ngow, containing 16,000,000 yd. of 0.75 lb. ground.

TONGKAH HARBOUR TIN DREDGING CO. **SIAM**

Office: H. J. Wise, A. M. P. Chambers, Elizabeth St., Hobart, Tasmania.

A. H. Ashbolt, chairman of board of directors; E. T. Lewis, gen. mgr.; Alex. McEwan, sec. in Siam, with G. H. Symons.

Inc. 1906, in Tasmania. **Cap.,** £250,000; shares £1 par; 150,000 issued.

Net profit was £40,336 in 1915; £40,808 in 1916; £67,923 in 1917, and £118,920 in 1918. Current assets at end of September, 1918, totaled £98,236, and liabilities, 6,884. Profit in 1919 was £75,548.

Dividends: to September, 1919, total £550,000.

Property: 5,650 acres in Tongkah harbor, Siam, of which over 545 acres have been dredged. The dredgable material averages 1 lb. tin oxide per yard. Five boats are at work.

Production:

Years	Yardage	Tin Oxide 73% metal (tons)	Value	Cost per yard, cents
1913-'14	.....	1,126	£108,053	.....
1914-'15	2,968,600	1,262	123,260	10.19
1915-'16	3,363,750	1,077	115,000	9.27
1916-'17	3,682,550	1,188	144,845	8.80
1917-'18	3,383,250	1,314	221,651	10.04
1918-'19	3,208,350	1,149	.....	....

This is one of the most profitable mining companies in the Orient, and its annual reports give full data concerning dredging operations and costs.

SIBERIA

Under this head we have listed those companies formerly described under Russia. While several are in the Ural region, they really belong in the Asiatic section.

The following first-hand information regarding conditions that affect mining in Russia and Siberia appeared in the "Mining and Scientific Press" of October 11, 1919:

Until July 25, 1919, the plant of the Kyshtim Corporation, a notable copper and iron enterprise, was being operated by the Russian staff of the English corporation, but with the help and under the authority of the Siberian government.

3.5% lead, 0.5% copper, 1.7 oz. silver, and 0.7 oz. gold per ton. There are 360,000 additional tons of sulphide ore carrying gold in Sokolni mine, making a total of 3,534,000 tons, containing an estimated profit-value of £13,000,000.

Equipment: first unit (50,000 tons) of a concentrating mill of 200,000 tons per annum capacity, power plant, coke plant, zinc distillation plant of 20 blocks of retorts (6 finished), lead smelter, refinery and accessories, 143-mile railway, 8 river steamers and 28 barges; also a farm to supply food to employes.

The ore is mined and treated at the Ridder property, carried 63 miles by rail, 430 miles by river, and then 80 miles by rail to the colliery and smelters.

Production: amounted to 210 tons of 99% spelter in 1916, and 333 tons in first half of 1917. A considerable tonnage of zinc and lead concentrates is on hand.

When in full operation this great property will add considerably to the world's metal output. Late in 1919, company was merged into the Russo-Asiatic Consolidated, which see.

LENA GOLDFIELDS, LTD. SIBERIA

Head office: H. Richards, 441 Salisbury House, London, E. C. 2, England. **Agency:** Russian Mining Corporation, Ltd., Nevsky 19, Petrograd, Russia.

Officers: Lord Harris, chairman of board of directors; C. W. Purington, cons. engr.

Inc. July 10, 1908, in England. **Cap.,** £1,405,000; shares £1 par; 1,163,297 issued. Company holds 8.85% of capital of the Lena Gold Mining Co. (Lenskoie), which see, the operating company in Russia. Ruble exchange and shareholdings make the financial situation complicated.

Financial Statement, for years ending September 30 (Sterling figured at normal exchange, £1 = 9.52 rubles):

Revenue.

	1915-'16	1916-'17	1917-'18
Cash balance on hand	£613,872	£157,983	£410,899
Lenskoie shares sold	245,635	321,722	....
Russian 5% bonds	.....	378,731	294,...
Lenskoie dividends, 1913-'14	50,071	.....	....
Lenskoie dividends, 1914-'15	.....	74,386	
Royalties, etc	16,817	.....	
Interest	21,738	37,470	
Premium on 246,703 Lena shares sold	.....	154,189	
Subscription on above shares	.....	5,000	
Repayment of advances by Lenskoie	102,598	18,787	
Total	£1,050,730	£1,148,268	£1,...

Expenditures.

	1915-'16	1916-'17	1917-'18
Advances to Lenskoie	£32,877	£396,544	
Dividends paid, etc	159,651	80,526	
Repayment of account loan	37,000	.....	
Russian 5% bonds	663,219	.....	
British war bonds	.....	260,300	
Purchase of new Lenskoie shares	.....	.....	
Sundry investments	.....	.....	
Cash balance on hand	157,983	410,899	
Total	£1,050,730	£1,148,268	£1,...

Cash assets and investments in London on September 30, 1918, were £... Shares in Lenskoie were placed at 37,934,000 rubles, a massive valuation in the exchange situation. Cash balance in Russia was 8,749,772 rubles. £1 sterling = 30 rubles = £1,225,624. Add...

above cash and investments, and deducting liabilities of £83,774 net assets are £1,799,046.

Dividends: 20% in 1909-'10; 30% in 1910-'11; 20% in 1911-'12; nil in 1912-'13; 5% in 1913-'14; 1¼ rubles per share in 1914-'15, paid in April, 1916.

Property: gold placers worked since 1863, yielding over $200,000,000. There are four groups totaling 90,376 acres in the Irkutsk province of Siberia.

Development: for many years operations were on somewhat primitive lines, but modern methods are gradually being introduced, including prospecting by drilling, underground drift mining, hydraulicking, dredging and winter washing of gravel; also improved sluices, riffles, jigs, and clean-up accessories. Over 5,000 men and 800 horses are employed.

Proved reserves of gravel ore are as follows:

Class	Yards	Recoverable value per yd.	Gross profits	Years life
Drifting	711,200	39/10 ($9.46)	£456,363	1½
Dredging	58,984,000	1/7½ ($0.40)	£2,577,800	16

The calculated life of the mine is based on the old rate of extraction for drift mining, and the use of two 17 cu. ft. dredges for the other ground.

Winter washing operations were not begun until 1913; 25% of the total yardage was washed in the winter of 1914; 36½% in 1915, and 52½% in 1916.

Production, years ending September 30:

Year	Yardage	Yield per yd.	Value	Cost per yard
1916-'17	570,529	46/1 ($11.05)	£1,318,445	.....
1915-'16	788,942	39/10 ($ 9.56)	1,503,010	27/6 ($6.54)
1914-'15	974,234	38/11 ($ 9.23)	1,791,944	26/7 (6.31)
1913-'14	873,635	29/4 ($ 6.80)	1,277,609	26/10 (6.44)

This is an immense property now passing from primitive to modern methods of mining. The work has been handicapped by prejudices, complex finance, inefficient labor, a severe winter climate, and long distance from sources of supplies.

Alaskan methods are applicable in Siberia and are now being tried. As the gravel yields up to $9 per yard, there is a big margin for profit. Lena Goldfields is one of the world's greatest gold producers.

LENSKOIE COMPANY **SIBERIA**

Address: H. Richards, 441 Salisbury House, London, E. C. 2, England. L. Gernet, chairman in Russia; M. Malozemoff, mine manager.

Inc. in Russia. **Cap.,** 33,000,000 rubles, increased from 11,100,000 R. in 1917 by issuing 110,000 shares of 150 R (par value) at 355 R. each. Lena Goldfields, Ltd., holds 8.85% of the Lenskoie's capital.

In 1915-'16, Lenskoie made an operating profit of £954,191. Of this, £582,479 was absorbed in writing down capital expenditures at the mines, leaving a net profit of £371,712. From this sum, £251,981 was written off for depreciation, and £78,616 for taxes, bonuses, etc., leaving £41,114 carried to special reserve.

No accounts for 1916-17 were available up to June, 1919; but for that year the gold output was valued at £1,445,014.

In November, 1917, the Bolshevik regime brought serious trouble to the Lenskoie Co. The exorbitant demands of workmen and dealers increased to 200% above pre-war prices, while labor efficiency, never satisfactory, dropped 50%. The selling price of gold was raised six times by the Government, but it was still insufficient to meet expenses. The Soviet Government then agreed to meet the loss provided the company yielded to all demands. In October, 1918, the mines were nationalized and the offices in Petrograd confiscated by the Soviet authority. In June, 1918, this Government was expelled from Bodaibo, the region in which the mines are situated, and since then little news has been received. In March, 1919, only 3 drift-mines were being worked, yet these are capable of yielding 237,000 oz. of gold annually for at least 6 years. The first dredge is not expected to be operating before the spring of 1922.

For further particulars see Lena Goldfields, Ltd.

ORSK GOLDFIELDS, LTD. SIBERIA

Office: 65 Broad St. Ave., London, E. C., England. Thos. Mallinson, sec.

G. W. W. Mackinnon, chairman of board of directors; G. S. Dyer, gen. mgr.; Hooper, Speak & Co., cons. engrs.; B. K. Pavlovsky, agent at Ekaterinburg, Russia.

Inc. March 1, 1906, in Great Britain. **Cap.,** £920,000 in 531,000 ordinary £1 shares (530,907 issued), 876,000 preference shares 5s. (318,000 issued), and 170,000 priority shares, £1 (80,000 issued).

Financial Statement, years ending January 13, converted from rubles into sterling.

Year	Revenue	Expense in Siberia	Expense in London	Profit or loss	Dividends
1918	£53,010	£21,609	£37,573	—£6,171	.....
1917	55,421	31,439	37,701	—11,719	.....
1916	105,611	51,323	24,460	+26,944	£16,827

London charges include difference in exchange, a large sum.

Dividends: about £13,500 in 1915, and £16,827 in 1916; none since.

Property: 6,700 acres of alluvial ground, 50 miles N. W. of Nikolaievsk, Okotsk province, eastern Siberia. Two dredges are operated, one having 3½ and the other 7½ cu. ft. buckets. The boats work from April to November.

Production, years ended January 13:

Year	Yardage	Gold yield including tribute
1919	705,013	.....
1918	893,386	£51,426
1917	864,052	53,565
1916	784,552	97,000

The revolution in Russia has not interfered seriously with operations.

RUSSO-ASIATIC CONSOLIDATED SIBERIA

An amalgamation of the Irtysh, Kyshtim, Russo-Canadian, and Tanalyk corporations, formed late in 1919.

Office: J. P. R. Webster, sec., Pinners Hall, Austin Friars, London, England.

Inc. 1919, in England. **Cap.,** £12,000,000; £1 par. Shares to be issued in exchange for present holdings amount to £8,456,972; £3,442,838 for Irtysh, £2,520,000 for Kyshtim; £1,768,152 for Russo-Canadian, and £725,982 for Tanalyk. Shareholders in Irtysh, Kyshtim, and Tanalyk received 2 new shares for each old one held; Russo-Canadian stockholders get one new share for each preference share, and one new share for every 2 shares common held. Russo-Asiatic assumes the Irtysh and Tanalyk debentures and the Irtysh options.

RUSSO-ASIATIC CORPORATION, LTD. SIBERIA

Office: J. P. B. Webster, Pinners Hall, Austin Friars, London, E. C. England.

C. J. C. Scott, chairman of board of directors; R. G. Brown, cons. eng. Leslie Urquhart, managing director.

Is an exploration company acquiring and developing mining properties in Russia and Siberia. In 1914 it formed the Irtysh Corporation, Ltd. (which see) to operate the Ridder Concession and Ekibastus coal field.

RUSSO-CANADIAN DEVELOPMENT CORPORATION, LTD.

Office: Basildon House, Moorgate St., London, E. C. 2, England, and Montreal, Canada.

Inc. 1917, in Canada. **Cap.,** 1,000,000 7% non-cumulative preferred, and 2,000,000 common shares; $5 par; all issued. Company organized to acquire from the Irtysh, Kyshtim, and Tanalyk Corporations all the issued capital of the Ridder, Kirgiz, Kyshtim Mining Works, and the South Urals M. & S. companies, registered in Russia; also the capital of the Mining & Metallurgical Bank, the Trading Company and the Prospecting Co. Late in 1919, company was merged with the Russo-Asiatic Consolidated, which see.

SIBERIAN PROPRIETARY MINES, LTD. **SIBERIA**

Office: T. Mallinson, sec., 65 Broad St. Ave., London, E. C. 2, England. E. Hooper, chairman of board of directors.

Inc. Aug. 8, 1905, in Great Britain. **Cap.**, £135,000; shares £1 par.

Company has an interest in Orsk Goldfields, Ltd., in oil companies in Europe and California, and in the Foldal Copper & Sulphur Co., Norway. Options on gold-bearing lands in Orenburg, Russia, were dropped in 1918.

SIBERIAN SYNDICATE, LTD. **SIBERIA**

Office: J. A. Clark, 60 London Wall, London, E. C. 2, England.

Sir A. Fell, chairman of board of directors.

Inc. June 3, 1902, in Great Britain, but reconstructed three times, last in July, 1913. **Cap.**, £100,000; shares £1 par; 52,062 issued.

Company has large interest in Russian Anthracite Collieries, Ltd.; in a copper mine in Asia Minor; copper, lead, and zinc areas in eastern Siberia, and in an oil-shale deposit.

SISSERT COMPANY, LTD. (THE) **SIBERIA**

Office: 1 Broad Street Place, London, E. C. 2, England.

Sir J. B. Dale, chairman of board of directors.

Inc. June 26, 1912. **Cap.**, £1,000,000; shares £1 par; issued 755,000 shares, fully paid. Shares are listed on the London Stock Exchange. An option expiring two years after peace, on 166,000 shares treasury stock has been granted. Title to property is held through the Sissert Mining District Co., Ltd., registered in Russia, which the company controls through ownership of entire share capital.

Profit in 1916 was £2,544.

Dividends: 5% in 1913 and 1914; none since.

Property: about 340,000 acres, held under a perpetual lease, in the Urals, 0 miles S. of Ekaterinburg, on the Ekaterinburg-Cheliabinsk railway. The roperty includes many old copper, gold, and iron mines, and extensive forests. 'he principal copper properties are the Degtiarsky, Polefskoy, and Gumeshevsky ines, which have been worked since 1727, and the Sysselsky, opened in 1906. 'here are also about 100 iron mines, yielding limonite of 40 to 53% iron content, ith other mines yielding chrome and manganese. Iron ore reserves are estimated at 6,000,000 tons. The annual output of iron ore was 40,000 tons.

Development: the Sysselsky copper mine is opened by 3 shafts, deepest 45', showing ore of about 5% copper tenor. Mine has a plant with a productive capacity of 1,500 tons per annum. Reserves are estimated at 70,000 ons of 4¼% ore.

The Gumeshevsky and Polefskoy mines, discovered in 1716 have been operated almost continuously since 1727. These mines are about 500' deep, and up o 1870 produced a total of about 63,500,000 lb. fine copper, though only oxidized re was mined. The orebody is a contact deposit, genetically related to augitic ocks, and lying between between limestone and augitic biotite syenites, the xidized ore occurring in a decomposed irony and calcareous clay belt, fully 2 iles in length and about 1,000' wide. The sulphide ores carry chalcopyrite in nses of garnet-magnetite rock. The old ore dumps at the Gumeshevsky, consting of clay material with fine ore that escaped hand-picking in earlier operaons, were worked with excellent results. They still contain 400,000 tons. The e has been leached at the rate of 80,000 tons yearly.

Old slag dumps at Polefskoy are also to be reworked. These dumps, estimated 640,000 tons, are said to contain 1% copper, about 75% of which is thought to recoverable by pyritic smelting.

Fifty drill-holes at the Degtiarsky mine showed 3,530,000 tons of 2.77% pper ore, with 3s. (72c.) gold and silver. The orebody is about 10,000' long, 00' being fully proved. Over 5,000,000 tons is ultimately expected. Two afts to 150', with laterals, confirm drilling results.

At the Staro Poldnefskoy and Kadnakofsky iron mines the surface is a e gossan and the underlying sulphide is certain to be copper bearing and of mmercial value.

In the Krilatofsky mine, 6 miles from the Degtiarsky, are gold quartz veins

in granitic schist. Reserves to 280' are estimated at 371,000 tons of 1½ oz. ($3.18), and 227,000 tons of 10s. 6d. ($2.52) per ton ore. In the Blagoveshensky, near Sissert, is considerable 20s. ($4.80) gold ore. These ores will be used as a flux in reducing the copper ores.

The Degtiarsky and Sysselsky mines also contain several million tons of iron pyrite.

From the Bgorshinsky and Isyhks mines a large quantity of coal is available.

Annual production was normally 40,000 tons of iron ore, 17,500 tons of pig iron, 10,000 tons of pyrite and some coal.

In 1912 the mines produced 3,280,200 lb. of copper; 2,895,200 lb. in 1913; 2,140,600 lb. in 1914; 506,000 lb. in 1916. In the last two years operations were intermittent.

SPASSKY COPPER MINE, LTD. SIBERIA

Office: J. A. Clark, sec., Finsbury House, Bloomfield St., London, E. C. 2, England.

Sir A. Fell, chairman of board of directors; Ernest Carnot, v. c.; H. C. Bayldon, gen. mgr., at Spassky Zavod, Akmolinsk, Siberia; H. C. Robson, smelter supt.; D. G. Smith, supt. at Yuspenssky; C. Farmer, mine supt. at Spassky; J. R. Horsley, mgr. at Atbasar; E. T. McCarthy, cons. eng. Henri Puzely, mgr., Miasnitzskaia 17, Moscow, Russia.

Inc. July 9, 1904, in Great Britain. **Cap.** £1,250,000; shares £1 par; 1,031,940 issued.

Statement for 1915, published November, 1916, showed a net profit of £126,453 earned in Siberia. The remittance of funds from Russia is not permitted, so money will accumulate there. Assets included cash, £162,316; supplies, £150,256; and metals, etc., £163,039. Creditors, etc., amounted to £100,202. No financial statement is available since.

Dividends: 15% in 1910, 17½% in 1911, 25% in 1912, 10% in 1914, declared in October, 1915. Further dividends postponed on account of revolution.

Property: in the Kirghiz Steppes, in 2 main groups, about 300 miles apart, 250 and 500 miles, respectively, from the nearest point on the Trans-Siberian railway. After the revolution the government is to construct a line that will pass near the mines.

The Spassky group, comprising about 100 sq. miles, in the Akmolinsk district, includes the Yuspenssky copper mine and the Karagandy and Saran coal mines; also lands carrying iron and limestone.

Geology: the Yuspenssky mine has a network of veins at and near the contact of slate and arcose sandstone, in sedimentaries, of Permian age. The veins, known as the Annensky and Vladimir, or Yuspenssky, are about 200' apart and substantially parallel, and it is thought they may join at depth. Principal development is on the Annensky vein, which is 10 to 60' in width, carrying a hanging-wall paystreak of massive chalcocite, succeeded by bornite, largely massive, with silicious gangue, followed by small quantities of chalcopyrite and occasional tetrahedrite, the vein growing gradually leaner in copper toward the footwall, which is imperfectly defined and carries low-grade copper impregnation. The gangue is mainly quartz and barite, and the ore is estimated by the company to average 12 to 20% copper. The upper workings show some native copper, cuprite, azurite and malachite. The mine was gouged for rich ore by the former owners, who left a large amount of low-grade material unstoped.

Development: the Yuspenssky mine is opened by 3 shafts, the Annensky being 700' deep. Chalcopyrite is taking the place of bornite in the enrichment zone, while the mineral contents are becoming more evenly distributed. Reserves at the end of 1915 were 10,000 tons of 19% and 429,475 tons of 7% ore. Considerable diamond drilling was done in 1915 and 1916, with fair results.

Equipment: includes 900-h. p. steam plant, hoists, compressors, pumps, 150-ton concentrator and smelter, 26-mile railway and quarters for employees.

The Karagandy coal mine, 24 miles by rail from the Spassky smelter, produced 90,215 tons in 1913; 80,001 in 1914, and 63,984 in 1915. It contains about 400,000,000 tons of coal.

The Atbasar group, 36 sq. miles, 250 miles N. E. of Djoumlin, the nearest

station on the Orenburg-Tashkent railway, includes the Kresto, Pokrofsky, Annensky and Nadiozhdenski mines, and a coal area of about 9 sq. miles, 65 miles from the mines.

Geology: the Atbasar shows sedimentary sandstones, shales and conglomerates, on a plateau of about 20 sq. miles, lying about 70′ above the level of the district, carrying numerous outcrops of malachite, and at depths of 50 to 70′ from surface, are found sandstone beds mainly 18″ to 8′ thick and of 3′ estimated average thickness, carrying bornite, claimed to average about 13% copper.

Development: work at Atbasar is under way and reserves were estimated at 543,900 tons of 10.7% ore.

Equipment: includes mining machinery, buildings and smelter of 6,500-ton capacity of copper per annum, this being erected between the coal and copper mines.

Production at Spassky:

Year	Ore, tons	Copper, pounds
1906	.....	1,865,690
1907	.....	3,552,570
1908	.....	3,838,235
1909	15,551	3,675,840
1910	19,647	5,540,550
1911	31,302	6,401,920
1912	28,315	8,955,520
1913 (15 months)	43,591	14,000,000
1914	20,697	10,490,000
1915	20,847	7,728,000

Operations at the Spassky have been seriously hampered by war and revolution. In April, 1918, the Bolshevik faction nationalized the property, but it was handed back within a short time, and late in 1918 operations were resumed on a reduced scale.

VERK ISETZ CORPORATION — SIBERIA

Address: Kalata, Ural district, Russia.

Property: the Kalata mines, 145 miles N. of Kyshtim, eastern Urals, Russia, opened early in the last century mainly for pyrite for acid manufacturing.

Geology: copper-bearing schists similar to those worked by the Kyshtim and Sissert companies. Ore is a heavy sulphide, with bands of magnetite in the pyrite. Silica content is only 2%, other minerals being 2.3% copper, 43.5% iron and 50% sulphur.

Development: on the 406′, 455′ and 560′ levels the main shoot is 560′ long and 84′ wide, yielding 3,000 tons of ore per foot of vertical depth. This ore is nearly solid pyrite. Timbering must be done soon after extracting ore. Slag is used for filling stopes. The deepest of the 3 shafts is 770′. Mining in 1915 cost $1.80 per ton.

Equipment: electric hoist with 3½-ton skips, coarse crushing plant, compressors and smelter designed by F. W. Draper. The latter consists of two blast-furnaces, 287″ by 56″, producing a 12.5 to 13.5% copper matte, two 12′ Great Falls type converters, turbo-blowers, refinery and 3,000 kw. power plant. In 1915, there was reduced 169,760 tons of charge, equal to 530 long tons daily. Fuel consumption was 1.66% of the charge, or 2.49% of the ore, practically pyrite smelting. Slags contained 0.33% copper. No recent figures are available owing to the war and revolution.

AUSTRALASIA

Includes the Commonwealth of Australia and Dominion of New Zealand. The mines are described alphabetically by States.

NEW SOUTH WALES

The Broken Hill district has been idle since May, 1919, on account of labor troubles.

ABERCROMBIE COPPER MINES, LTD. N. S. W.

Although fully equipped, property is intermittently operated, and information as to results is not obtainable. See Vol. XIII for details.

AMALGAMATED ZINC (DE BAVAY'S), LTD. N. S. W.

Office: E. H. Shackell, sec., Collins St., Melbourne, Australia; London office, Lloyd, 1 London Wall Bldgs., London, E. C. 2, England.

Directors: Hon. W. L. Baillieu, chairman; M. Cohen, A. J. F. de Bavay (London Board; H. W. P. Clinton, F. A. Govett, G. W. W. Mackinnon, W. S. Robinson and J. L. Wharton, A. J. F. de Bavay, cons. chemist and metallurgist; A. D. Greenlees, works mgr.

Inc. 1909, in Australia. **Cap.,** £500,000; shares £1 par; all issued and fully paid.

Accounts are submitted semi-annually. Reports for 1st half of 1918 showed assets over liabilities, £151,055, and a net operating profit of £101,668.

Dividends: 5% in 1910; 20% in 1911; 27½% in 1912; 32½% in 1913; 20% in 1914; 45% in 1916; 20% in 1917; 20% in 1918. A dividend of 1s was paid in April, 1919, making total disbursements to date £925,000.

Company acquired the entire assets of the De Bavay Treatment Co., Ltd., and the patents of the Potter's Sulphide Ore Treatment, Ltd. To avoid litigation with the Minerals Separation, Ltd., the companies were merged into the Minerals Separation and De Bavays Processes Australia Proprietary, Ltd., capitalized at £300,000, shares £1 par, of which 101,750 shares were issued the Minerals Separation Ltd., and 83,250 the Amalgamated Zinc. The Amalgamated Zinc has the right to use all the Minerals Separation patents, but must pay the usual royalties.

Company also owns the following share interests: 119,250 shares Minerals Separation & De Bavay's Processes, Australia Pty., Ltd.; 960 shares Zinc Producers' Association Pty., Ltd., and 200,000 shares in Electrolytic Zinc Co. of Australia.

Amalgamated Zinc has no mines, but buys zinc-lead-silver tailings from the Broken Hill South, Broken Hill Proprietary Block 10, and North Broken Hill mines at Broken Hill, N. S. W. Material is treated in a flotation plant capable of handling 40,000 tons per month.

During first half of 1918, 164,719 tons of tailings were treated, yielding 47,184 tons of zinc concentrate and 1,834 tons of lead concentrate. The former assays 48% zinc, 6% lead, and 9.1 oz. silver; latter 53% lead, 12% zinc, and 8 oz. silver per ton.

BRITISH BROKEN HILL PROPRIETARY CO. LTD. (THE) N. S. W.

Offices: T. Mullett, sec., Salisbury House, London, E. C. 2, England; F. H. Clark, Australian sec., Steamship Buildings, Adelaide, South Australia.

Directors: J. S. Smith-Winby, chairman; F. S. Saunders, A. Sowden, W. H. Woodhead, F. V. Sanderson, W. J. Magarey, J. K. Samuel (last 3 form the Australian board), C. J. Rowley, gen. mgr.; G. C. King, asst. gen. mgr.; J. Beal, mill supt.

Inc. Nov. 11, 1887, in England. **Cap.**, £339,000, in 315,000 £1 ordinary shares, and 60,000 8/-privileged shares; all issued and fully paid.

Profit: for first half of 1918 was £114,783. Dividends amounted to £37,500, and £119,571 was carried forward. Liquid assets exceed liabilities by £265,825. The first half of 1919 resulted in a profit of £65,582, which was carried forward.

Dividends: since 1897 total £821,280, but have been irregular; 4/- in 1917, and 6/- in 1918.

Development: by shafts and extensive workings. Ore reserves in 1918 amounted to 1,095,015 tons, assaying 6.9 oz. silver, 13.3% lead, and 11.5% zinc. **Equipment:** complete for mining; also concentrating plant, using jigs and flotation (Minerals Separation and Lyster selective).

Production: the war caused a suspension of operations from August, 1914, to early in 1917. During 1918 the mill treated 222,662 tons of ore and produced 33,806 tons of lead concentrate assaying 27.95 oz. silver, 61.41% lead and 7.14% zinc; also 28,530 tons of zinc concentrates assaying 10 oz. silver, 9% lead, and 44% zinc. Production of 63,099 tons of ore for first half of 1919 made 9,903 tons concentrate carrying 60.7% lead, 7.3% zinc, and 26.4 oz. silver.

The flotation plant made 8,040 tons of concentrate, carrying 45% zinc, 9.1% lead, and 10.1 oz. silver; 1,953 tons carbonate ore running 23.6% lead was also mined.

BROKEN HILL JUNCTION LEAD MINING CO. N. S. W.

Office: A. D. Young, Brookman's Bldg., Adelaide, South Australia.

Directors: J. G. North, chairman; J. Bembrick, R. T. Edwards, W. A. Freeman, and C. H. Smith, W. Quale, mgr.

Inc. 1914 in South Australia. **Cap.**, £150,000; shares 10s. par; 72,567 issued fully paid and 200,000 issued 6/5 paid.

Property: 51 acres of mining ground at Broken Hill, N. S. W., developed by shafts and extensive workings.

Equipment: includes complete mine and mill equipment with concentrating plant. An arrangement was made in 1918 with Amalgamated Zinc for the treatment of 300,000 tons of ore at the rate of 1,500 tons per week.

BROKEN HILL PROPRIETARY BLOCK 14 CO., LTD. N. S. W.

Office: J. Brandon, 31 Queen St., Melbourne, Victoria, Australia.

Directors. Alex. Campbell; B. A. Moulden; V. J. Saddler, Clive Bailleu, and J. L. Wharton. F. V. Smith, gen. mgr.

Inc. Feb. 19, 1887, in Victoria. **Cap.**, £155,000, in 100,000 10% cum. pfd. 6s. shares and 100,000 ord. 25s shares; all issued.

Reports are issued half-yearly, and in the period ended March 31, 1919, the profit was £7,807. Surplus of cash assets was £47,977.

Dividends: 19s. per share from 1896 to 1901, after which 34s. on pfd. and 26s. on ord. shares, the last being in March, 1919.

Property: at Broken Hill, N. S. W. Though the company has a mill, the carbonate ore is all sold to smelters and the sulphide ore is treated at the Block 10 mill. Recent exploration work developed much new ore, but the old stopes are still productive. Company also has an interest in the King Island Scheelite Co., which see.

Production, in 1918:

Class of ore	Tons	Lead per cent.	Silver, Oz.	Zinc, per cent.	Total cost per ton
Carbonate	3,817	22.32	13.62	....	65/- ($15.60)
Sulphide	13,447	13.58	10.13	11.2	28/6 ($ 6.78)

BROKEN HILL PROPRIETARY BLOCK 10 CO., LTD. N. S. W.

Office: J. Brandon, 31 Queen St., Melbourne, Victoria, Australia.

Directors: A. Campbell, chairman, Clive Bailleau, William Jardine, V. J. Saddler, and B. A. Moulden. A. W. Wincey, gen. mgr.

Inc. March 14, 1888, in Victoria. **Cap.**, £1,000,000; shares £10 par; all issued and £ 9 13s paid.

Reports are issued half-yearly, and during the period ended March 31,

1919, the profit was £22,130. Dividends absorbed £15,000. Surplus of cash assets was £75,431.

Dividends: from 1890, total £14 3s. per share; including 3s. in 1918-19.

Property: mines at Broken Hill, N. S. W., and an interest in the Block 10 Misima Gold Mines, operating on St. Aignan island, near New Guinea. The Broken Hill mine contains estimated reserves of 228,900 tons to a depth of 1,000'.

Development: recent development work has been confined to the 1,015', 715', 615', 515' and 415' levels. Mining costs are 27/4 ($6.52) per ton.

Equipment: includes concentrator with flotation plant, which also treats ore from Block 14 mine.

Production: Block 10 only; for 6 months ended March 31, 1919, was 27,762 tons of ore containing 9.65 oz. silver per ton, 11.03% lead, and 10.8% zinc ore. This output yielded 6,731 tons of concentrates assaying 63.1% lead and 40.38 oz. silver and 1,373 tons of zinc concentrate assaying 47.2% zinc and 12.7 oz. silver, per ton. Recoveries averaged 86.9% of the silver, 92.9% lead, and 84.4% zinc. Milling costs were 12/7 ($3.02) per ton, and total costs were 44/6 ($10.62) per ton. There were 333 men employed.

BROKEN HILL PROPRIETARY CO., LTD. N. S. W.

Head office: F. M. Dickenson, 320 Collins St., Melbourne, Victoria, Australia. **Mine office:** Broken Hill, N. S. W. **Steel works:** Newcastle, N. S. W.

Directors: Bowes Kelly, chairman; D. E. McBryde, v. c.; with R. C. Blackwood, H. G. Darling, W. Jamieson, H. V. McKay and D. W. H. Patterson. G. D. Delprat, gen. mgr.; E. J. Horwood, works mgr. at Broken Hill; R. T. Sloss, mine mgr.; D. Baker, steel works mgr. at Newcastle; J. A. Lindsay, chief engr.

Inc. Aug. 13, 1885, in Victoria, Australia. **Cap.,** originally £320,000 shares £20 par; subsequently sub-divided, but increased to £600,000; shares £1 par, in 1912; finally increased to £3,000,000 shares £1, of which 2,100,000 are issued. Debentures £1,000,000 of 6% authorized; £848,700 outstanding. Company has a large interest in Broken Hill Associated Smelters Proprietary.

Profit for half-year ended May 31, 1919, was £642,350, compared with £706 for same period of 1918.

Dividends: total about £12,000,000, inclusive of shares in other companies distributed. From 1886 to 1889, each £2 share received 15s; in 1890 each £2 share received 10s. and each 8s share 22s; from 1891 to 1913 each 8s share (960,000) received 55s; and from 1913 to 1916 each 8s (1,181,000) received 6d; 3s. each in 1917 and 1918; and 1s. in 1919, up to February.

Property: the Broken Hill, one of the world's largest and most famous silver-lead-zinc mines now past the zenith of its career. Company also owns iron mines at Iron Knob, S. Australia.

Development: by shafts down to 1,300', huge open-cuts and many miles of workings. The mine still has fairly large ore reserves which contain 20% lead, 8 oz. silver, and 12% zinc. Tailings on hand are also in large quantity.

Equipment: at Broken Hill; power plant, hoists, compressors, tramways, crushing plants, 1,000-ton ore concentrator, flotation plant, etc. At Port Pirie, S. Australia, up to June, 1915, company operated a large smelter with roasters, Huntington-Heberlein and Dwight-Lloyd sintering machines, lead-refining plant, blast-furnaces, lead-silver refinery. This plant was transferred to the Broken Hill district in June, 1915. At Iron Knob, company has plant for extraction of iron ore, which is shipped by boat to Newcastle, N. S. W., and by rail to Waratah, near Newcastle, a distance of 170 miles, to the company's blast-furnaces and steel mills.

Production: has lately been curtailed by labor troubles. During first [illegible] yielding 11,958 tons of 65% lead concentrates; 1,373 tons of zinc concentrates; and 55,833 tons of 50% zinc concentrates.

Company's metal output to end of 1914, returned at £37,421,721. Since then, the figures include coal and iron.

At Newcastle the production was 67,803 tons of pig iron, 89,011 tons of steel, ingots, 74,025 tons of coke, 1,120 tons of ammonium sulphate, and 777,324 gallons of tar.

BROKEN HILL SOUTH, LTD. **N. S. W.**

Head office: J. R. Edwards, sec., Collins House, 360 Collins St., Melbourne, Victoria, Australia. R. N. Kirk, agent in Sydney; A. W. Lewis, sec. *in* Adelaide; E. E. Garner, sec. in London.

Directors: B. A. Moulden, chairman; W. M. Hyndman, Colin Fraser, L. K. S. MacKinnon, and Hon. D. J. Gordon, G. W. W. MacKinnon, director in London. W. E. Wainwright, gen. mgr.

Inc. Oct. 11, 1893, in Victoria. **Cap.,** £800,000; shares £1 par; all issued and paid up otherwise than in money; increased from £200,000 in September, 1918. Debentures: £200,000 of 6%, issued in bonds of £100; £176,600 outstanding at June 30, 1919.

The company owns an interest in the following companies: Broken Hill Associated Smelters Pty., Ltd., 200,000 £1 shares; Zinc Producers Association Pty., Ltd., 720 £1 shares; Barrier Roaster Co. Pty., Ltd., 10,000 £1 shares; and Electrolytic Zinc Co. of Australasia Pty., Ltd., 80,000 £1 shares, a total of £290,720 it cost.

Statement for the year ended June 30, 1919, shows that the value of the production was £709,392, of which £384,999 was operating profit, less £40,886 for general charges, interest, taxes, and depreciation. Dividends paid amounted to £120,000. The appropriation for income taxes, new plant, development, etc., was £160,000 and £64,113 was carried forward. Investments, supplies, metals and concentrates, cash on hand and on deposit, totaled £984,325; while current liabilities, exclusive of debentures, were £31,386.

Dividends: since 1902 total £12 1s. per share, including 21s. in 1918 [illegible] by old company). Last distribution in March, 1919, of 1/6 per share.

Property: 69 acres of mineral ground at Broken Hill, N. S. W.

Development: to 1,500′ depth by six shafts and extensive workings. [illegible] lowest stoping level, 1,270′ below the surface the ore averages 15.2% [illegible] oz. silver, and 14.7% zinc. In 1918-'19, company did 3,349′ of diamond-[illegible] and 3,595′ of new underground work. All underground work is by con-[illegible] during 1918-19 miners averaged 21/3 ($5.07), and trackers 18/11 [illegible] 8-hour shift. There are 639 men employed in the mine. Reserves [illegible],000 tons.

Equipment: includes a modern steam power-plant, ventilating fans, [illegible]ists, compressors, crushing plant, an 1,100-ton concentrating mill, and [illegible] flotation plant; etc. In July, 1919, fire destroyed machinery, [illegible] crushing plant valued at £70,000 and a years time is lost before it is [illegible]aced. Zinc tailing is treated by the Amalgamated Zinc (DeBavay's) Ltd., joint account, at the rate of 200,000 tons per annum. The old tailing dumps sold to the Zinc Corporation, Ltd., at the rate of 80,000 tons per annum. [illegible] on hand totals 700,580 tons, and slime, 406,787 tons. All the lead concentrate produced is sent to the B. H. Associated Smelters Pty., Ltd., Port Pirie, South Australia, for smelting. About 555 men are employed on surface work.

[illegible] ending June 30:

	Concentrates	Lead	Lead	Metals in products	Zinc
	[illegible]	[illegible]ved, %	tons	Silver, Oz.	tons
	[illegible]	[illegible]3.6	22,671	1,031,440	3,272
	[illegible]	[illegible]	.....	.....	.....
	[illegible]	[illegible]	18,695	1,880,792	.....
	[illegible]	[illegible]	.....	.....	.....

[illegible] costs have risen [illegible] 7,48) in 1918, and to $8.94) in 1919. [illegible]ther lead-silver-zinc [illegible] of Australia, but [illegible]

BROKEN HILL SOUTH SILVER MINING CO. N. S. W.

Reorganized in 1818 as Broken Hill South Ltd., which see.

BUTLER'S TIN MINE N. S. W.

Address: C. Lonsdale Smith, mgr., Torrington, N. S. W.; or James Mackay, legal mgr., Melbourne, Victoria.

Property: 7 miles from Torrington, N. S. W. Lode is in granite, and ore carries tin, wolfram, and lead.

Development: by 920′ adit, shaft, and workings reaching a depth of over 300′.

Equipment: includes steam power, engines, and mill with 10 stamps, jigs, tables, vanners, flotation unit, and magnetic separator. The first section of the mill makes a recovery of 80% tin, 68% tungsten, and 66% lead; while the final treatment takes out 98% of the lead, making the zinc concentrates saleable. No production figures are obtainable.

COBAR-GLADSTONE MINING CO. N. S. W.

Mine office: Wrightville, Robinson county, N. S. W., Australia. Mine is opened by a 400′ vertical shaft, and in 1917 was making weekly shipments of 35 tons of concentrates to the E. R. & S. Co. smelter at Port Kembla, assaying from 20 to 23% copper.

Equipment: includes rolls, jig and concentrating tables.

No recent returns received; probably idle.

ELECTROLYTIC REF. & SM. CO. OF AUSTRALIA, LTD. THE

Office: 118 Pitt St., Sydney. **Works office:** Port Kembla (50 miles south of Sydney), County of Camden, New South Wales, Australia.

Directors: R. G. Casey, chairman; Kelso King, P. V. McCulloch, J. M. Niall, W. L. Baillieu, and J. L. Wharton. S. W. Thornton, sec.; E. A. White, mgr.

The plant covers an area of approximately 53 acres and contains a sampling mill, blast furnaces and converter plant, anode furnaces, electrolytic tank house, refining furnace, etc., etc. 33,950 tons ore were treated in 1918, and 24,700 tons blister copper handled.

Production: 21,300 tons of electrolytic copper (registered brand "E. S. A."); 8,969 tons of fire-refined copper, (registered brand "ESA F. R."); and 371 tons of bluestone (registered brand "ESA Bluestone").

These works are an important adjunct to the copper industry of Australia.

GREAT COBAR, LIMITED N. S. W.

Head office: 4b Fredericks Place, Old Jewry, London, E. C., England. **Mine office:** Cobar, N. S. W., Australia.

Officers: Sir John Taverner, chairman; C. H. Wayte, Sir E. V. Evans, directors; E. Hogan Taylor, mgr.

Inc. May 22, 1906, in England. **Cap.**, £1,000,000, in 200,000 shares of £5 each; 186,542 issued. Also 6% first mortgage debentures totaling £750,000, of which £667,300 are outstanding.

Property: copper mines, smelters, coal mines, coke works and refining plant, at Cobar and other parts of New South Wales. The price paid the Great Cobar Copper Mining Syndicate, which had operated profitably for years, was £800,000 cash, £55,000 in paid-up shares, and £151,000 in cash, shares, or debentures. Several well-known engineers examined the Cobar mine, including C. M. Rolker, J. D. Kendall, W. J. Barnett, and Pellew-Harvey.

A new shaft was sunk to 1,540′, and new 1,200-ton smelter erected. In 1913 reserves were estimated at 2,705,161 tons, 2,081,735 tons of which contained 2.5% copper. In that year, the yield was 13,016,640 lb. copper, 27,136 oz. gold, and 127,542 oz. silver. No returns since.

Many troubles arose in the mine and plant, and in April, 1914, operations ceased and receivers (A. F. Whinney in England and W. H. Fletcher in Australia) were appointed. An independent report was made, which gave 3 years' ore opened. At £65 per ton for copper, the profit would be £88,800, and if no more ore were found, the plant might realize £63,700. The total profit of £152,500 would yield debenture-holders 23%. To enable the new scheme to be worked out, £62,000 was borrowed from debenture-holders, and £40,000 from

the New South Wales Government. Net proceeds in 1916, 1917, and 1918 went to certificate-holders on certain terms.

Mining and smelting were resumed during 1917 under the new arrangement.

Production: from 1876 to 1906, inclusive, the Great Cobar mine yielded 1,592,895 long tons of ore, returning 138,593,280 lb. fine copper. Production, under the former ownership, was 7,000,000 to 9,000,000 lb. copper yearly, having been 9,027,200 lb. fine copper in 1906; and production by present company was about 10,000,000 lb. in 1907; 10,586,240 lb. copper, 64,949 oz. silver, and 13,002 oz. gold in 1908; 12, 762,080 lb. copper, 83,208 oz. silver, and 14,452 oz. gold in 1909; 13,847,680 lb. copper, 107,932 oz. silver and 21,524 oz. gold in 1910. Production for the year ending June 30, 1912, was 339,494 tons of ore from the company's own mines and 88,924 tons of custom ore, producing 15,089,760 lb. copper, 178,760 oz. silver and 37,696 oz. gold. 1913 returns are given above.

From the results it is evident an error was made in original estimates of the mine, the new smelter was unsuitable, and the capitalization was too heavy.

In November, 1918, debenture-holders decided to continue operations until the end of 1920. In April, 1919, shares had dropped to 1/ each.

JUNCTION NORTH BROKEN HILL MINE N. S. W.

Office: E. V. Nixon, 360 Collins St., Melbourne, Victoria, Australia.

Directors: J. S. Palmer, chairman; K. G. Brooks, F. H. Reynolds, W. Clarke, H. B. Ludlow, and A. Rigby. J. F. Stephen, gen. mgr.

Inc. August, 1912, in Victoria. **Cap.,** $375,000; shares £1 10/- par; 225,000 issued.

Accounts are presented half-yearly, and for the period March 31, 1918, there was a profit of £ 36,669. Dividends amounted to £31,500. Current assets exceed liabilities by £170,899.

Dividends: 1/- in 1917; 3/6 in 1918.

Property: 45 acres at Broken Hill, N. S. W. The mine which is fully developed and equipped, contains 192,000 tons of ore that averages 12.3% lead, 8.9 oz. silver, and 6% zinc.

Production: 8,989 tons of 60% lead and 10,435 tons of 50% zinc concentrates, in 1917-18.

MAMMOTH MOLYBDENITE CO., LTD. N. S. W.

Address: Yetholme, New South Wales, Australia.

Property: company operates a molybdenite mine and mills the ore which assays 1.3%, making a concentrate of 85% MoS_2. No details are available, but mine was being worked at last accounts.

MINERALS SEPARATION & DE BAVAY'S PROCESSES AUSTRALIA PROPRIETARY, LTD. N. S. W.

Office: E. H. Shackell, Collins House, Melbourne, Victoria, Australia.

Directors: W. L. Baillieu, chairman; A. E. Bright, M. Cohen, H. H. Greenway, and J. L. Wharton.

Inc. June 27, 1912, in Victoria, to acquire the Australia and New Zealand rights to the Minerals Separation, Ltd., De Bavay's Sulphide Process Co., Ltd., Potter's Sulphide Ore Treatment, Ltd., and Amalgamated Zinc (De Bavay's), Ltd., patents. The foreign patents of these various companies were taken over by Minerals Separation, Ltd., which is the parent of Minerals Separation North American Corporation (United States).

Cap., £300,000; shares £1 par; 265,000 issued.

Profit in 1917 was £24,511, of which all but £11 was distributed.

Dividends: 10% in 1912; 13¾% in 1913; 5% in 1914; 7½% in 1915; 10% in 1916.

Company grants licenses to use its processes, and starts suits against other systems of flotation.

MT. BOORALONG MOLYBDENITE MINES N. S. W.

Address: James Rankin, 97 Elizabeth St., Melbourne, Victoria, Australia. H. T. Wardle, supt.

Inc. May 31, 1916, in Victoria. **Cap.,** £150,000.

Property: 110 acres in New England district of N. S. W., containing

BROKEN HILL SOUTH SILVER MINING CO. % molyb-

Reorganized in 1818 as Broken Hill South Ltd., ... mill using

BUTLER'S TIN MINE

Address: C. Lonsdale Smith, mgr., Torr... N. S. W.
Mackay, legal mgr., Melbourne, Victoria. ...ondon, E. C. 4.

Property: 7 miles from Torrington, N... N., Australia.
ore carries tin, wolfram, and lead. ...3. J. Leverson, V

Development: by 920' adit, shaft ... & Sons, cons. engr.
over 300'. ... 30,000 pfd. and 12...

Equipment: includes steam po... e entitled to first cumu-
jigs, tables, vanners, flotation unit ...inary profits; after 10%
of the mill makes a recovery of 8...
final treatment takes out 98% o...
No production figures are obt... transferring £12,500 from reserve

COBAR-GLADSTONE M... ...uced to £16,880.

Mine office: Wright... ...¼% in 1902, 35% in 1903, 40% in 190...
is opened by a 400' verti... ...½% in 1907; 47½% in 1908; 27½% in 190...
35 tons of concentrate... ...nil in 1912 and 1913; 7½% in 1914; 5% in 1915; no...
from 20 to 23% copp...

Equipment: ir... ...acres in Cobar district of New South Wales. Compa...
No recent re... ...on the Occidental mine, which is nearby.

ELECTROLY... ...by shafts. Ore reserves estimated at 215,956 tons.

Office: 1... ...1915; besides 100,000 tons in shaft-pillars and 300,000 tons...
of Sydney) ...end of 1917 the total was 249,000 tons.

Direc... **Equipment:** includes mill with sixty stamps 4 tube-mills, and cyan...
Niall, W...
mgr.

T... **Production:** in 1918, 61,176 tons, yielding 15,511 oz. gold compared wi...
...tons yielding £119,508 in 1916. Operators have been intermittent s...
mill, ...owing to shaft sinking, remodelling the mill, and a shortage of wate...
refi... ...normally the mine is a steady and profitable producer.
bli...

NORTH BROKEN HILL, LTD. N. S. W.

Offices: G. Weir, gen. mgr., 360 Collins House, Melbourne, Victoria...
Broken Hill, New South Wales; and E. Habben, Palmerston House, London...
E. C. 2, England.

Directors: W. M. Hyndman, chairman; M. H. Baillieu, W. L. Bail...
T. B. Birbeck, A. Campbell and H. Sheppard.

Inc. Dec. 4, 1912, in Victoria, Australia. **Cap.**, £600,000; shares £1... all issued. Debentures: £250,000 of 6% authorized; £179,400 outstanding.
Company has interests in Broken Hill Associated Smelters, Zinc Produc... Association, Barrier Roasters, and Zinc Investigation.

Accounts are issued half-yearly, and for the period ended June 30, 1918... profit was £167,415; £120,000 was distributed, and £60,236 carried forward... serves totalled £557,025. Assets showed an excess of £599,851 above liabi... Profit for first half of 1919 was £111,337, of which £60,000 was distributed.

Dividends: 30% in 1913; 25% in 1914; 25% in 1915; 40% in 1916... and 1918, and 10% in 1919, to March.

Property: 452 acres at Broken Hill, New South Wales, developed... shafts, deepest 1,770', and extensive underground work which has blocked... 2,750,000 tons of ore mostly above the 950', 1,100', 1,250', and 1,400' levels.

Equipment: includes a concentrating plant whose tailings are so... Amalgamated Zinc (De Bavay's) for treatment by flotation.

Production, half-yearly periods:

Period	Ore treated, tons	Lead, %	Silver, Oz.	Zinc, %	Con-centrates, tons	Lead %	Silver Oz.
1919 (June 30)....	53,894	15.1	8.1	12.4	10,890	68.6	27.4
1918 (June 30)....	109,200	15.3	7.5	13.4	20,605	65.2	30
1917 (Dec. 31)....	64,030	....	....	....	11,499	....	

Costs total 24/8 ($5.84).

This is one of Australia's greatest and most profitable lead mines.

CORPORATION, LTD. **N. S. W.**

Fisher, sec., Finsbury House, London, E. C. 2, England.
n Hill, N. S. W., Australia.
Kintore, chairman; Hon. V. Gibbs, F. A. Keating,
mson, directors. C. F. Courtney, gen. mgr.; J. Hebbard,
gr. of smelter at Cockle Creek, N. S. W.; J. C. Moul-
ton Carew, Durham, England.
land. **Cap.**, £1,050,000; 600,000 pfd. shares at
par, all issued.
for period ended June 30, 1918, the profit
distributed. Reserve fund was £200,000,

which £308,508 was profit and £157,500

297% on pfd. and 240% on ord. shares; in
ach class of shares and in 1918-'19, 15%.
lead-silver-zinc mine at Broken Hill, N. S. W.
by shafts and extensive openings. Reserves amount to

ent: complete mining and 1,000-ton milling plants employing
at the mine, lead smelter at Cockle Creek, N. S. W., and zinc works
ton Carew, Durham, England. Company is a pioneer in flotation processes,
is said to have developed the frothing process prior to or simultaneously
with Minerals Separation.

Production: for year ending June 30, 1918, the mill output was 29,989
ons of galena concentrate averaging 63.7% lead; 42.3 oz. silver, and 9.3% zinc;
lso 42,761 tons of zinc blende concentrate assaying 47% zinc, 12 oz. silver, and
.9% lead.

In 1918-'19 the mill treated 115,401 tons of ore assaying 14.8% lead, 16.5%
inc. and 12.9 oz. silver, yielding 25,446 tons of concentrate carrying 63.7% lead,
.8% zinc, and 43.4 oz. silver; also 36,650 tons assaying 47.6% zinc, 6.2% lead,
nd 12.5 oz. silver. The smelter reduced 85,324 tons, yielding 22,935 tons of lead,
59 tons of antimonial lead, 2,484 tons spelter, 77 tons zinc dust, 17,599 oz. gold;
nd 2,127,082 oz. silver.

—WATER (EMMAVILLE) TIN CO. **N. S. W.**

Office: E. H. Shackell, 360 Collins St., Melbourne, Victoria, Australia.
Directors: J. L. Wharton, chairman Clive Baillieu, C. G. Lyon, and
. H. Hyndman. F. G. Wilson, gen. mgr.
Inc. in Victoria. **Cap.**, £90,000; shares £1 10/- par; £76,088 issued.

The half-year ended January 31, 1919, resulted in a loss of £3,046, compared
ith profits of £5,325, £2,776, and £1,272 in the previous periods. Current assets
ceed liabilities by £1,626. For the period ended July 31, 1919, there was a
ofit of £2,282. Cash assets were £3,858 net.

Property: alluvial tin areas at Emmaville, N. S. W., equipped with
draulicking apparatus.

Production, for half-years:

ar	Yardage	Yield per yard, lb. black tin	Total yield, tons
9	295,800	0.983	130
8-'19	284,700	0.701	89
8	296,300	0.663	88
7-'18	346,875	0.681	105
7	261,825	0.837	98

"Black tin" carries 71.8% metallic tin.

CORPORATION, LTD. **N. S. W.**

Smith, 20 Copthall Ave., London, E. C. 2, England; Col-
Victoria, Australia. Broken Hill, N. S. W., Australia.
; C. G. Hylton, supt.

a deposit of molydenite ore in pegmatite granite; the ore averages 1.9% molybdenum sulphide. Ore is mined by open-cut.

Equipment: includes an elevator, aerial tram, and 160-ton mill using flotation (the Rankin System). Concentrates carries 96% MoS_2.

MT. BOPPY GOLD MINING CO. N. S. W.

Office: W. F. Garland, sec., 5 and 6 Queen St. Place, London, E. C. 4, England. Mine office: J. Negus, supt., Boppy Mount, N. S. W., Australia.

Officers: S. F. Hoffnung-Goldsmid, chairman; with B. J. Leverson, V. H. Smith, E. Taylor, and R. Taylor, directors. John Taylor & Sons, cons. engrs.

Inc. Nov. 24, 1899, in England. **Cap.,** £151,000, in 30,000 pfd. and 121,000 ord. shares at £1 par, all issued. Preferred shares are entitled to first cumulative dividend of 10% per annum, plus share in ordinary profits; after 10% has been paid they rank as common.

In 1917 there was a deficit of £27,310. By transferring £12,500 from reserve fund (now £2,500) debit balance was reduced to £16,880.

Dividends: were 5% in 1901, 6¼% in 1902, 35% in 1903, 40% in 1904, 47½% in 1905; 45% in 1906; 47½% in 1907; 47½% in 1908; 27½% in 1909; 35% in 1910; 20% in 1911; nil in 1912 and 1913; 7½% in 1914; 5% in 1915; none since.

Property: 344 acres in Cobar district of New South Wales. Company also has an option on the Occidental mine, which is nearby.

Development: by shafts. Ore reserves estimated at 215,956 tons of $8.50 gold ore in 1915; besides 100,000 tons in shaft-pillars and 300,000 tons of residue. At end of 1917 the total was 249,000 tons.

Equipment: includes mill with sixty stamps 4 tube-mills, and cyanide plants.

Production: in 1918, 61,176 tons, yielding 15,511 oz. gold compared with 79,526 tons yielding £119,508 in 1916. Operators have been intermittent since 1917, owing to shaft sinking, remodelling the mill, and a shortage of water. Normally the mine is a steady and profitable producer.

NORTH BROKEN HILL, LTD. N. S. W.

Offices: G. Weir, gen. mgr., 360 Collins House, Melbourne, Victoria; Broken Hill, New South Wales; and E. Habben, Palmerston House, London, E. C. 2, England.

Directors: W. M. Hyndman, chairman; M. H. Baillieu, W. L. Baillieu, T. B. Birbeck, A. Campbell and H. Sheppard.

Inc. Dec. 4, 1912, in Victoria, Australia. **Cap.,** £600,000; shares £1 par, all issued. Debentures: £250,000 of 6% authorized; £179,400 outstanding.

Company has interests in Broken Hill Associated Smelters, Zinc Producers Association, Barrier Roasters, and Zinc Investigation.

Accounts are issued half-yearly, and for the period ended June 30, 1918, the profit was £167,415; £120,000 was distributed, and £60,236 carried forward. Reserves totalled £557,025. Assets showed an excess of £599,851 above liabilities. Profit for first half of 1919 was £111,337, of which £60,000 was distributed.

Dividends: 30% in 1913; 25% in 1914; 25% in 1915; 40% in 1916, 1917 and 1918, and 10% in 1919, to March.

Property: 452 acres at Broken Hill, New South Wales, developed by shafts, deepest 1,770′, and extensive underground work which has blocked out 2,750,000 tons of ore mostly above the 950′, 1,100′, 1,250′, and 1,400′ levels.

Equipment: includes a concentrating plant which [illegible] Amalgamated Zinc (De Bavay's) for treatment by flotation.

Production, half-yearly periods:

	Ore treated, tons	Lead, %	Silver, oz.	Copper, %
[illegible] (June 30)	53,894	15.1	[illegible]	[illegible]
[illegible] (June 30)	109,200	15.3	[illegible]	[illegible]
[illegible] (Dec. 31)	64,030	....	[illegible]	[illegible]

[illegible] 1/8 ($5.84).

[illegible] Australia's greatest

SULPHIDE CORPORATION, LTD. N. S. W.

Office: C. R. Fisher, sec., Finsbury House, London, E. C. 2, England. **Mine office:** Broken Hill, N. S. W., Australia.

Officers: Earl of Kintore, chairman; Hon. V. Gibbs, F. A. Keating, G. M. Reid and A. Williamson, directors. C. F. Courtney, gen. mgr.; J. Hebbard, mine mgr.; F. H. Evans, mgr. of smelter at Cockle Creek, N. S. W.; J. C. Moullen, mgr of zinc works at Seaton Carew, Durham, England.

Inc. Oct. 29, 1895, in England. **Cap.,** £1,050,000; 600,000 pfd. shares at £1 par, and 600,000 ordinary at 15s. par, all issued.

Accounts are issued yearly, and for period ended June 30, 1918, the profit was £326,400. Of this, £ 262,500 was distributed. Reserve fund was £200,000, and accumulated profit account £362,082.

Sales in 1918-'19 were £1,973,708 of which £308,508 was profit and £157,500 was distributed.

Dividends: since 1898 total 297% on pfd. and 240% on ord. shares; in 1917-'18, 25% was paid on each class of shares and in 1918-'19, 15%.

Property: a large lead-silver-zinc mine at Broken Hill, N. S. W.

Development: by shafts and extensive openings. Reserves amount to 1,608,500 tons.

Equipment: complete mining and 1,000-ton milling plants employing flotation at the mine, lead smelter at Cockle Creek, N. S. W., and zinc works at Seaton Carew, Durham, England. Company is a pioneer in flotation processes, and is said to have developed the frothing process prior to or simultaneously with Minerals Separation.

Production: for year ending June 30, 1918, the mill output was 29,989 tons of galena concentrate averaging 63.7% lead; 42.3 oz. silver, and 9.3% zinc; also 42,761 tons of zinc blende concentrate assaying 47% zinc, 12 oz. silver, and 5.9% lead.

In 1918-'19 the mill treated 115,401 tons of ore assaying 14.8% lead, 16.5% zinc, and 12.9 oz. silver, yielding 25,446 tons of concentrate carrying 63.7% lead, 9.8% zinc, and 43.4 oz. silver; also 36,650 tons assaying 47.6% zinc, 6.2% lead, and 12.5 oz. silver. The smelter reduced 85,324 tons, yielding 22,935 tons of lead, 359 tons of antimonial lead, 2,484 tons spelter, 77 tons zinc dust, 17,599 oz. gold; and 2,127,082 oz. silver.

Y—WATER (EMMAVILLE) TIN CO. N. S. W.

Office: E. H. Shackell, 360 Collins St., Melbourne, Victoria, Australia.

Directors: J. L. Wharton, chairman Clive Baillieu, C. G. Lyon, and W. H. Hyndman. F. G. Wilson, gen. mgr.

Inc. in Victoria. **Cap.,** £90,000; shares £1 10/- par; £76,088 issued.

The half-year ended January 31, 1919, resulted in a loss of £3,046, compared with profits of £5,325, £2,776, and £1,272 in the previous periods. Current assets exceed liabilities by £1,626. For the period ended July 31, 1919, there was a profit of £2,282. Cash assets were £3,858 net.

Property: alluvial tin areas at Emmaville, N. S. W., equipped with hydraulicking apparatus.

Production, for half-years:

	Yardage	Yield per yard, lb. black tin	Total yield, tons
	295,800	0.983	130
	284,700	0.701	89
	296,300	0.663	88
	346,875	0.681	105
	261,825	0.837	98

...8% metallic tin.

N. S. W.

...all Ave., London, E. C. 2, England; Col-
...ralia. Broken Hill, N. S. W., Australia.
...Hylton, supt.

Directors: F. A. Govett, chairman and managing director; J. A. Agnew, H. W. P. Clinton, W. C. C. Romaine, R. W. Skipwith, T. White, P. L. Gell, T. B. Birkbeck, and W. M. Hyndman.

Inc. July 8, 1911, in Great Britain. **Cap.,** £575,000, in 245,792 pfd. £1, and 658,616 com. 10s. shares, all issued. Company is interested in the Broken Hill Associated Smelters Proprietary, Zinc Producers Association Proprietary, Electrolytic Zinc Co., and Barrier South, Ltd.

Profit for 1917 was £225,154, plus balance of £25,971 from previous year. Dividends amounted to £228,905. Current assets exceed £500,000.

Dividends: 15% on pfd. and 10% on ord. in 1911; 37½% and 35% in 1912; 35% and 30% in 1913; 20% and nil in 1914; 25% and 10% in 1915; 37½% and 35% in 1916; 40% on each in 1917; 27½% and 15% in 1918.

Property: the South Blocks mine and claims, a total of 160 acres in Broken Hill.

Development: to depth of 1,590' by two vertical shafts (one 1,210' deep), and extensive underground workings. Reserves given as 1,887,000 tons, containing 14.3% lead, 2.6 oz. silver and 9.2% zinc.

Equipment: includes a complete and modern mill using rolls, tables and flotation plant with Minerals Separation, and the Lyster and Horwood selective processes, described in Mining Magazine (London), of November, 1918.

Company buys tailings from other Broken Hill mines besides treating its own ores.

Summary of operations:

Year	Zinc plant tailings, tons	Lead plant, ore, tons	Zinc concentrate, tons	Lead concentrate, tons
1918	257,300	135,580	61,470	33,581
1917	257,590	134,618	63,700	31,993
1916	200,510	136,901	45,464	37,376

Galena concentrate carries 66% lead, and blende concentrate 48% zinc. Costs are about 33/– ($7.92) per ton.

ZINC PRODUCERS' ASSOCIATION PROPRIETARY, LTD. N. S. W.

Offices: E. H. Shackell, Collins House, Melbourne, Victoria, Australia, and A. J. M. Sharpe, Pinners Hall, London, E. C. 2, England.

Directors: W. L. Baillieu, chairman; A. Campbell, M. Cohen, J. G. North, J. S. Palmer, F. A. Govett, F. C. Howard, W. M. Hyndman, F. A. Keating, Bowes Kelly, D. E. McBryde, B. G. Moulden, J. L. Wharton, and W. H. Westhead. Sir J. M. Higgins represents the Federal Government.

Inc. May 20, 1916, in Victoria, to market all the zinc concentrate or ore produced in Australia, the various companies contracting to deliver their output to the Association for a period of 50 years. An agreement was also made with the British Government to handle these products.

Cap., £100,000; shares £1 par; all held by the Broken Hill companies, the Broken Hill Associated Smelters, and the Mt. Lyell companies.

PAPUA (New Guinea)

BLOCK 10 MISIMA GOLD MINES

Controlled by Broken Hill Proprietary Block 10 Co.

Office: 31 Queen St., Melbourne, Australia.

Officers: J. Brandon, sec.; R. Williamson, mgr.

Inc. December 1916, in Victoria, Australia. **Cap.,** £250,000; shares £5 par, [illegible] issued.

[illegible] made in second half of 1917; loss of £340 in first half [illegible] 300 in first half of 1919.

[illegible] gold-b[illegible] claims on the island of St. Aignan, [illegible] 25,250 tons of 38s. ($9.12) ore. Mine [illegible] plant of 50 tons daily capacity, which [illegible] the first six months' run produced

7,045 tons of 30/10 ($7.40) ore. Extraction by cyanidation was 88.7% in the 6 months of 1919; 5,580 tons of 26/1 ($6.25) ore were mined, and the ore reserve increased.

LALOKI (PAPUA) COPPER MINES

Address: C. R. Baldwin, Port Moresby, Papua.

Property: a copper mine of considerable promise 18 miles from Port Moresby, once owned by the Great Fitzroy Copper Company of Queensland. Country is rough, and transportation expensive, though costs have recently been reduced from £6 ($28.80) to 15s. ($3.60) per ton by constructing a new road and using steam tractors.

A shoot of 8% ore has been opened, which experiments show can be cheaply roasted, the calcined material leached, and the copper and zinc extracted by electrolytic methods, with a high extraction of the metal.

QUEENSLAND

CHILLAGOE, LIMITED **QUEENSLAND**

Property sold to the Queensland Government. Fully described in Copper Handbook, Volume XI.

CORELLA COPPER CO. **QUEENSLAND**

Operations ceased in 1917. Stock valueless. See Vol. XIII.

GREAT FITZROY MINES, LTD. **QUEENSLAND**

A dormant corporation. See Vol. XIII for organization and former operations.

HAMPDEN-CLONCURRY COPPER MINES, LTD. **QUEENSLAND**

Offices: E. H. Shackell, Collins House, Melbourne, Australia; and E. Habben, sec., Palmerston House, London, E. C. 2, England.

Directors: J. L. Wharton, chairman; W. L. Baillieu, F. G. Hughes, W. Orr, H. H. Schlapp, and B. M. Turner. London directors: W. D. Reid, G. W. W. Mackinnon, and G. W. Staples. Earle Huntley, gen. mgr., Friezland, via Cloncurry, North Queensland. D. Wentworth, metallurgist.

Inc. July 31, 1909, in Australia, as a reorganization of a company of same name. **Cap.,** £400,000; shares £1 par; 350,000 issued.

Profit for half-year ended August 31, 1918, was £61,016, against £67,550 in the previous period. Balance forward was £38,593. Current assets exceed liabilities by £215,948.

Dividends: in 1913, 40%; 1914, nil; 1915, 20% 1916, 40%; 1917, 15%; 1918, 10%.

Company owns 4,000 shares of the Electrolytic Ref. & Sm. Co. of Australia, Ltd., and 18,750 shares of Metal Manufacturers stock; both having works at Port Kembla, New South Wales; and 1,000 shares in the Copper Producers' Association.

Property: about a dozen mines, with 450 acres mineral claims, in the Cloncurry mining district, North Queensland. Mines are connected by 2′ gauge railway with the Cloncurry Copper Mines, Ltd. The mines contain auriferous copper ores, the combined reserves being 133,000 tons of smelting ore averaging 4%, and 231,000 tons of 6.8% concentrating ore, plus over 60,000 tons of mixed ores in the McGregor and other mines.

Equipment: includes railways, complete mining plant, mill and flotation plant, and 375-ton smelter with converters.

Production, half-years to August, 1919:

Period	Ore smelted, tons	Copper, Lb.	Silver, Oz.	Gold, Oz.
1918	56,603	7,616,000	9,716	2,302
1918	49,565	7,176,960	21,854	1,202
1917	.....	.....	.....	.....
1917	46,443	6,948,480	23,418	1,028
1916 (year)	104,476	16,856,000	59,119	2,234

Custom ore is smelted, but the product is not included in the above figures.

IRVINEBANK MINING CO., LTD. **QUEENSLAND**

Office: J. H. Reid, managing director, 18 Bridge St., Sydney, N. S. W. **Works office:** Irvinebank, Queensland.

Property: company owns tin mines and tin concentrating works at Irvinebank, Koorboora and Watsonville; copper mines at Watsonville and wolfram mines and mill at Mt. Carbine, all in North Queensland. The tin smelter includes a reverberatory furnace and is the only tin works in the State.

MANY PEAKS COPPER MINING CO., LTD. **QUEENSLAND**

Office: J. D. Murray, sec., East St., Mt. Morgan, Queensland. James Hill, mgr.

Inc. 1906, in Queensland. **Cap.**, 81,640 shares, 6d. (12c) par, originally 2,041 shares £1 par, changed in 1911 to present amount.

Company owns a cupriferous pyrite deposit from which the Mt. Morgan G. M. Co. drew its supply of fluxing material at a royalty of 2s. 6d. (60c.) per ton. The lease called for not less than 25,000 tons annually. In August, 1918, the Mt. Morgan company terminated the lease.

Receipts for year ending June 30, 1917, amounted to £6,222, plus credits of £2,535, making £8,757. Of this £6,803 was distributed in dividends. Cash on hand was £1,165. For 1918, revenue was £4,156, of which £3,742 was distributed.

Dividends: total £56,383 or 13/6 ($3.18) per share to June, 1918.

Property: 320 acres, well timbered, on terminus of Boyne Valley railway. The property shows promising vein up to 90′ in width, having no secondary sulphides, the zone of oxidation being succeeded by chalcopyrite ore of about 3.5% copper tenor. Development is exclusively by tunnels, the main tunnel being on the 470′ level, with 3 levels above, at 100′ intervals. A winze opens the deposit to 570′ depth. The ore is very pyritic and was all used by the Mt. Morgan company as a flux. Its copper content is about 1½%. Reserves are about 1,000,000 tons.

Production: 33,245 tons in the year ended June 30, 1918, making 497,95[illegible] tons to date, on which royalties totalled £62,241.

MOUNT CUTHBERT, N. L. **QUEENSLAND**

Offices: W. B. Arnold, sec., 39 Queen St., Melbourne, Australia: Edwin Habben, sec., Palmerston House, London, E. C. 2, England; and Mount Cuthbert, Queensland.

Officers: P. Pigott, chairman; Robert Philp, T. P. Power, F. E. Power, John G. Robertson and J. Forsyth, directors. Stephen Harris, gen. mgr.

Inc. Feb. 21, 1907, in Victoria, Australia. **Cap.**, £240,000; shares £1 par. Reorganized October, 1909, and August, 1916, in Victoria. Capital increased to £419,394; shares £1 10s. par. Original 7% debentures outstanding £55,500. At the reconstruction in August, 1916, £50,000 7% prior lien debentures were created to secure creditors; these debentures expired in September, 1917.

Profit for half-year ended August 31, 1917 was £29,173. Of this £15,00[illegible] was put into reserve. Accumulated deficit was £87,131. Liabilities exceeds assets by £36,556.

The year ended August 31, 1919, resulted in a loss of £12,308.

Property: 575 acres at Mount Cuthbert in the Cloncurry district, 3 miles from Cloncurry, Queensland.

Geology: the orebodies occur in veins cutting a schistose formation and as intimately disseminated sulphides in the schists. In some places the veins cut dolomitic limestone and carry good ore. The vein outcrops are distinctly traceable through the various claims. Reserves amount to 130,000 tons of 9.5% ore.

The ores contain glance, chalcopyrite, pyrite, and bornite at depth. Deepest workings are 484′. Considerable chalcotrichite (a hair-like form of copper) occurs in places.

In 1919 company had opened an orebody in the Kalkadoon mine, varying from 15 to 40′ wide.

Equipment: includes 200-ton smelter, started in March, 1917. The Cuthbert and Kalkadoon mines have equipment to mine at a depth of 2[illegible]. The Government railway from Cloncurry runs to Mount Cuthbert, and also

have been built to connect with several of company's mines. The mines were fully described in "Chem. Eng. & Min. Review" of Melbourne, for November 5, 1917.

Production: to Feb. 28, 1919, a total of 91,855 tons of ore had been smelted, yielding 5,026 tons (11,258,250 lb.) of blister copper. Of this, 13,099 tons were treated at Mount Elliott, the remainder at Mount Cuthbert.

MOUNT ELLIOTT, LTD. **QUEENSLAND**

Offices: E. Habben, Palmerton House, Old Broad St., London, E. C. 2, England; F. G. Hughes, Collins House, Melbourne, Victoria, and Mt. Elliott, Selwyn, via Townsville, Queensland, Australia.

H. J. Hill, chairman of board in London. W. L. Baillieu, general representative in Australia, and W. H. Corbould, cons. eng.

Inc. June 14, 1907, in Great Britain. **Cap.,** £1,250,000; shares £5 par; 237,518 issued.

Operations for the year ended June 30, 1918, showed a loss of £56,890. Liabilities exceeded assets by £37,000. In 1918-'19, loss was £41,034.

Dividends: 10% in 1910-'11; 15% in 1911-'12; 27½% in 1912-'13; and 5% in 1913-'14; none since; a total of £425,000.

Property: a group of copper mines situated in the Cloncurry copper district of Queensland, covering approximately 4,600 acres, about half of which can be classed as good and probable copper area. The holdings include those of the Dobbin and Cloncurry Mines, Ltd., transferred to Mount Elliott, the undertakings of the two companies now being operated as a unit. The vendors of the original Dobbin & Cloncurry Mines, Ltd., receive a proportion of profits equal to about £200,000, which makes approximately £1,450,000 on which the company must pay dividends.

Development: is not deep nor very extensive, including shafts of various depths, at the different mines whose reserves are given in the table below:

Mine	Reserves in tons	Copper, %
Mount Elliott	600,000	3.0
Mount Elliott	10,000	10.0
Consols	450,000	4.0
Great Australia (limestone)	110,000	2.5
Great Australia (silicious)	93,000	4.0
Dobbin	70,000	5.0
Mount Oxide	300,000	10.0
Argylla	200,000	4.0
Lady leases	28,000	5.0
Total and average content	1,861,000	4.6

In this estimate, no allowance is made for possible ore below 600′ in Mount Elliott, 480′ in Consols., 300′ in Great Australia, 305′ in Dobbin, 300′ in Mount Oxide, 100′ in Argylla, and 200′ in Lady leases. If the developed ore of the smaller mines be included, the total reserve would aggregate 2,500,000 tons; underground conditions indicate that the downward limit of the orebodies have not been reached.

The Mount Oxide property has steeply dipping shales containing an interbedded lode 60′ thick, overlaid by 70′ of hematite. Next to this iron ore here is 18′ of 4% copper ore, with 50,000 tons of 20% ore and a total of 00,000 tons of 12½% copper ore.

Equipment: a 300-ton plant treating 5% ore and actually recovering ½%. Company needs a large modern plant to place the project on a profitable asis.

Production: to date 327,175 tons of ore yielding 28,264 tons of 63,311,360 . copper. The output for 1917-'18 was 5,201,280 lb. copper recovered from 1,952 tons of ore. In 1918-'19 (7½ months) the yield was 6,460,160 lb. from 1,[illegible] tons of ore.

[illegible] management states the 10% ore treated in former years gave good profits, but

the grade of present reserves is too low to warrant operations, as the output is too small to carry the overhead charges.

MOUNT MORGAN GOLD MINING CO., LTD. **QUEENSLAND**

Offices: E. W. Moran, sec., Mt. Morgan, Queensland; S. W. Thornton, sec., 118 Pitt St., Sydney, New South Wales; T. H. Williams, sec., 125 William St., Melbourne, Victoria; E. Habben, sec., Palmerston House, Old Broad St., London, E. C. 2, England.

Directors: (Australia) R. G. Casey, chairman; Kelso King, J. L. Wharton, J. M. Niall, John Sanderson, W. L. Baillieu, K. deL. Cudmore, R. S. Archer, W. G. Thompson. (England): E. V. Reid and A. J. Pugh, W. G. Thompson, A. A. Boyd, gen. mgr.; J. Horsburgh, asst. gen. mgr.

Inc. Oct. 1, 1886, in Queensland. **Cap.,** £1,000,000; shares £1 par; fully issued and fully paid.

Financial Statement:

Period	Revenue	Profit	Dividends	Balance	Excess of current assets
1918 (½ year, Dec. 1)....	£548,486	£86,485	£50,000	£135,221	£507,23
1918 (Year, June 2).....	1,233,983	252,749	250,000	98,736	465,17
1917 (Year, May 27).....	1,301,377	309,205	250,000	95,986	522,10

Dividends: paid quarterly, have ranged from a minimum of 8d., at the beginning, 1886, to a maximum of £1 2s., in 1889. To end of 1916 the company had paid about 825% in dividends, which were 6s. yearly, 1892-97; 6s. 6d. in 1898; 7 s. yearly 1899-1900; 5s. 10d. in 1901; 5s. 9d. in 1902; 3s. yearly 1903-06; 4s. 6d. yearly 1907-08; 4s. yearly 1909-13; 3s. in 1914; 4s. in 1915; 5s. in 1916; 5s. in 1917; 3s in 1918, and 1s. in January, 1919. The total is £9,229,166.

Property: 90 acres perpetual leasehold, and 640 acres freehold; also flux quarries, coal beds, and magnesite deposits. Lease on the pyrite deposits at Many Peaks was given up late in 1918.

Company has a large interest in the Electrolytic Refining & Smelting Co. of Australia, Ltd., which refines Mt. Morgan and custom copper and in the recently organized Metal Manufacturers, Ltd., which is to make copper products from Australian metal. Mt. Morgan is about 25 miles west of Rockhampton, and the mine has been, since 1890, one of the greatest gold producers of the world.

Geology: the Mount Morgan gold deposit proved to be the siliceous gossan of a great copper deposit. As the ore showed increased copper content at depth the company wisely began extensive diamond-drilling, which proved immense tonnage of copper ore. The mine has been operated as 2 connected mines, the upper section being worked open-cut. The oxidized ores were exhausted in 1910, and only sulphide ores are now mined. The sulphide ore is known locally as "mundic," being an auriferous and slightly cupriferous pyrite.

Development: is done through 2 principal shafts, known as the Kent of 1,050′ depth, and the Lynda incline, about 1,500′ deep. Underground extraction is from the 360′ to 950′ levels. Depleted stopes are filled with waste in the pigstye system, some of the stopes being of great size. New openings amount to a thousand feet or so per annum, which does not seem extensive when the character of the deposit is considered such footage is considerable.

Ore reserves have been estimated as follows:

Date	Tons	Copper, %	Gold
June, 1918.....	3,622,892	2.58	
December, 1918.....	3,706,964	2.58	
June, 1918.....	3,825,685	2.58	
June, 1917.....	4,176,795	2.59	

This includes concentrating and smelting ore.

Equipment: is very complete and up-to-date, having undergone changes during the past 5 years. It includes a concentration plant, and large power plant. The smelter has blast furnaces.

Experiments are being made in treating some of the ore.

The district being arid, [illegible] have been built for

here being 7 dams, of which 5, in commission, have an aggregate capacity of 87,000,000 gal., No. 7 holding 270,000,000 gal.

Production: the total from 1883 to October, 1918, was 4,637,421 oz. of old and 86,678 tons (194,158,720 lb.) of copper. Recent returns were:

	Ore concentrated, tons	Ore smelted, tons	Copper, tons	Gold, Oz.
919 (½ yr. June 1)....	75,138	90,687	2,688	50,042
918 (½ yr. Dec. 1)....	115,466	105,264	3,580	42,942
918 (½ yr. June 1)....	123,854	102,872	3,505	38,138
917 (year May 27)....	141,430	278,380	8,042	98,950

During the last 12 years, product of the mine realized £12,153,362. The ncome was absorbed in the following proportions: wages, 46.36%; Government, 1.14%; royalties, etc., 7.29%; stores, etc., 14.45%; dividends, 10.65%; and balance, 11%.

Mount Morgan is one of the great mines of the world, but it has passed the :nith of its production. The decreased amount of ore treated in the past few :ars is, however, said to be due to scarcity of labor, and not to scarcity of ore.

IUNGANA MINING CO., LTD. **QUEENSLAND**

Company now out of existence. See Vol. XIII.

COTTISH GYMPIE GOLD MINES, LTD. **QUEENSLAND**

Head office: Dunlop & Murray, secs., 188 St. Vincent St., Glasgow, :otland. **Mine office:** Mary St., Gympie, Queensland, Australia.

Officers: G. B. Hoggan, chairman; R. G. Campbell, J. B. Hilliard, and . Walker, directors. D. E. Reid, gen. mgr.; T. Jobling, mine mgr.; H. Walker, rveyor.

Inc. June 11, 1902, in Scotland. **Cap.,** £700,000; shares £1 par; 600,000 ued.

The year ended May 31, 1918, resulted in a loss of £2,074. A debit balance £4,448 was carried forward.

Dividends: since 1898, total about £6 2s. per share; £5 8s. to 1902, ce when profits have been small. The total to July, 1917, was £597,742.

Property: 126 acres, at Gympie, Queensland.

Equipment: complete for treatment of about 9,000 tons per month.

Production: in year 1915-'16, 83,800 tons of ore and 27,950 tons of tail- cy anided for $6.44 per ton. In 1917-'18, 72,300 tons of ore and 29,100 tons of ing yielded 20,285 oz. of gold, at a cost of 22/– ($5.28) per ton. In July, 9, 1,500 tons yielded 635 oz. of gold.

Property has been a large producer, but now makes little profit, and is near **end.**

VER SPUR, LIMITED **QUEENSLAND**

Office: Parburg House, Eagle St., Brisbane, Queensland, Australia.

Alexander Corrie, chairman of board of directors; Edgar Hall (mgr.), M. Corrie, sec.; H. I. Stey, supt.

Inc. November, 1917, in Queensland, as reorganization of the Silver r Mining Co., **Cap.,** £75,000; shares 10s. par. **Dividends:** paid by old pany totaled £25,000.

Property: 49 acres at Silverspur, 6½ miles from the border of New h Wales. A 44-mile railroad to the mine has been authorized by the Gov- ent. Examined by Lionel C. Ball, Government Geologist, in 1918. Ore ins galena, sphalerite, and chalcopyrite, averaging 12% lead, 25% zinc, 1% er, $1 gold, and 26 oz. of silver per ton.

Development: by 520' shaft and extensive workings. Dumps are re- d to have a recoverable value of £500,000.

Equipment: includes hoist, compressor, crushing plant, roasters, and eratory furnaces.

Production: by old company £310,000. Late in 1918 a few hundred of or[illegible] smelted each month, and the resulting matte shipped to e C[illegible]fining.

WONBAH MOLYBDENITE MINING CO., LTD. QUEENSLAND

Address: Mt. Perry, Queensland, Australia.

Property: a molybdenite mine equipped with a concentrating plant which had made 5,000 lb. of concentrate from 400 tons of ore up to January, 1918.

SOUTH AUSTRALIA

BROKEN HILL ASSOCIATED SMELTERS PROP., LTD. S. A.

Office: H. L. Shackell, sec., 360 Collins St., Melbourne, Victoria, Australia.

Directors: W. L. Baillieu, chairman. C. Fraser, Bowes Kelly, F. A. Govett. Gilbert Riggs, chief met. eng.; H. St. J. Somerset, plant supt.; D. E. McBryde, Victoria, and W. S. Robinson. W. Robertson, gen. mgr.

Inc. May 7, 1915, in Victoria. **Cap.,** £1,000,000; shares £1 par; 730,000 issued and held by the Broken Hill Proprietary (£200,000), Broken Hill South (£200,000), North Broken Hill (£200,000), Zinc Corporation (£100,000), and British Broken Hill (£30,000).

Works: the largest lead smelting plant in the world, formerly owned by the Broken Hill Proprietary Co. at Port Pirie, S. Australia. The plant includes railroads, blast-furnaces of 6,000-ton per week capacity on 60% lead concentrates, roasting furnaces, Dwight-Lloyd and H. H. sintering machines, a 3,000-ton per week lead refinery, and 200-ton per week spelter works, limestone quarries in S. Australia and coke works at Bellambi, N. S. W. The ore supply for these works comes from 9 Broken Hill companies, also from outside sources. The smelters can produce 165,000 tons of lead, 5,000 tons spelter, and 6,500,000 oz. silver per year. The coke plant makes 100,000 tons yearly. Antimonial lead, assay lead, litharge, zinc dust, lino metal, and bar and granulated silver are made. The brand is B H A S in a diamond.

MT. LYELL CONSOLS WALLAROO COPPER MINES, N. L. S. A.

Reorganized as New Lyell Consols. Copper Mine, which see.

NEW LYELL CONSOLS. COPPER MINE S. A.

(Formerly Mt. Lyell Consols. Wallaroo Copper Mines).

Offices: T. Rollason, sec., 31 Queen St., Melbourne, Australia; 17 Coleman St., London, E. C. 2, England. **Mine office:** Kadina, Daly county, S. Australia. John Woolcock, gen. mgr.

Directors: T. C. Dunster, chairman; S. Cherry, George Dunkan and Cecil Bain.

Inc. November 20, 1911. **Cap.,** £250,000; shares 10s. par; 350,000 issued.

Operations were suspended on account of the War, but in September, 1918, a head-frame, hoist and pump had been installed, and operations resumed on termination of a coal miners' strike.

Property: 150 acres, leasehold, including the Wallaroo Central mine, 7 acres, adjacent to the Wallaroo mine, shows schists and slates carrying several parallel veins including the famous Wallaroo Blue lode.

Development: by a 260' shaft, showing 2 lodes of 18' and 7' average width, carrying ore with about 6% copper and $8 gold per ton. Shaft being sunk to 350'.

Equipment: includes 250-h. p. steam plant with hoist, compressor, pump, and necessary mine buildings.

WALLAROO & MOONTA MINING & SMELTING CO.

Head office: Steamship Bldg., Currie St., Adelaide, S. A. Wallaroo mines and Moonta mines. Works office, Port Wallaroo, South Australia.

Sir J. L. Stirling
H. Lipson Hancock
Inc. 1889, in
ssued.

Financial Statement, years ending December 31:

Year	Revenue	Net profit -	Dividends	Surplus cash assets
1919*	.....	£53,265**	.....	£330,218
1918	£755,918	69,907	£80,000	381,144
1917	857,000	126,736	80,000	421,945
1916	852,670	231,505	120,000	250,851

* Half year. ** Loss after paying £29,083 for taxes.

Dividends: to end of 1918 totaled £2,614,254, of which £996,000 have been paid by the present company, the remainder by the old Moonta and Wallaroo companies.

Property: the famous Wallaroo mines at Kadina and the Moonta mines, at Moonta, S. A., which have yielded 723,172,800 lb. copper valued at 19,590,192 up to June 30, 1919.

R. L. Jack states that the Wallaroo lodes traverse schistose rocks of sedimentary origin, while the Moonta lodes are found in a mass of hard and brittle feldspar-porphyry. Minerals at Wallaroo are chalcopyrite, pyrite, pyrrhotite, with a little galena, blende, and gold; at Moonta, chalcopyrite, bornite, chalcocite, pyrite, a little gold and silver, etc. During the past 11 years copper content averaged 3.8%.

Development: at Wallaroo the main lode has been opened for a length of over 3,400′ and a depth of nearly 3,000′; at Moonta the main lode is opened for 3,840′ and to a depth of 2,500′. During 1918 new openings, including 464′ of diamond-drilling, totaled 4,455′, less than half of that in 1916. Total openings in the Wallaroo mines amount to over 39 miles, and in the Moonta mines to 40 miles. At Wallaroo, there are 2 main and 2 ventilating shafts. Owing to swelling ground, part of shafts is lined with concrete, which is also used in underground storage-bins.

Equipment: includes electric power plant, steam plants, complete mine and pumping plants, ore sorting and concentrating works, tailing leaching plant, smelter, sulphuric acid works, electrolytic refinery, etc.

Production: 1,758,038 tons of 15% ore (sorted) up to 1909, after which, 1918, 599,825 tons of dressed ore, yielding a total of 723,172,800 lb. copper.

Ore mined, tons	Dressed ore Smelted, tons	Copper, lb.	Gold, oz.	Silver, oz.	Sulphuric acid, tons	Price received per lb. copper	Cost per ton, copper
.....	30,567	3,295,040	.....	.....	.....	.....	.....
219,873	63,283	15,957,760	2,992	1,608	6,745	22.236 cts.	£93 (20.09c.)
194,907	57,731	16,988,480	2,970	1,675	6,190	24.90 cts.	.....
251,078	67,754	19,248,320	3,100	3,014	6,930	24.24 cts.	80 (17.22c.)

Half year.

Costs from 1909 to 1915 varied between 11 and 12 cents per lb., rising 17 to 20 cents in 1916-'18, due to high cost of wages, material, and About 2,000 men are employed.

TASMANIA

EIS TIN & GENERAL MINING CO., LTD. **TASMANIA**

ffice: T. P. Husband, Royal Bank Chambers, Collins St., Melbourne, ia, Australia.

irectors: (in London) F. S. E. Drury, chairman; W. Clarke, D. Currie, ng., and H. W. Lake (in Melbourne; Sir A. J. Peacock and F. G. J. C. Clark, gen. mgr.

England. **Cap.,** £600,000; shares £1 par; all

plus balance of £10,420 from 1916. Divi- of assets was £40,000.

WONBAH MOLYBDENITE MINING CO., LTD.
Address: Mt. Perry, Queensland, Australia.
Property: a molybdenite mine equipped with
which had made 5,000 lb. of concentrate from 400 ton

inclusive,

ounty, Tas-

is at the m

SOUTH AUST

BROKEN HILL ASSOCIATED SM
Office: H. L. Shackell, sec., 360
tralia.
Directors: W. L. Baillieu, c
Govett. Gilbert Riggs, chief met
McBryde, Victoria, and W. S.

		Gold, Oz.
		6,015
	20	5,125
	40,080	5,538
	539,840	3,650
...	672,000	1,054

Inc. May 7, 1915, in Vic
issued and held by the Bro
(£200,000), North Broken
British Broken Hill (£30

nia tract amounted to 6,557,000
black tin; the Victorian area is n
een acquired in New South Wales.

Works: the large
by the Broken Hill Pr
railroads, blast-furn
roasting furnaces
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Australia and
comes from
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year. T
litharge
brand
MT.

OF AUSTRALASIA PROP., LTD.
Zinc (De Bavay's), Ltd.; Broken H
st.
Collins St., Melbourne, Victoria.
J. Meredith, asst. mgr.; Gilbert Rigg, c
Victoria. **Cap.,** £1,000,000; shares £1 f
at Risdon, near Hobart, in Tasmania for t
concentrate from Broken Hill, and pr
The first unit producing 15 tons daily
to 100 tons. Hydro-electric power is us
plant treated 20,979 tons of concentrate
ons of spelter, valued at £152,880.

N

ELITE CO. **TASMANIA**
sec., 31 Queen St., Melbourne, Victoria.
hairman of board of directors. J. V. Brown
ictoria. **Cap.,** £50,000; shares 6/- par; all issu
March 31, 1919, resulted in a profit of £11,28
, and £7,347 was carried forward. Assets ev

at Grassy, King island, Bass Strait, between V
stralia. The orebody consists of scheelite
ceous limestone and schist, and is somewhat
nyo county, Calif. The ore as mined averages
ad.
300' tunnel, with a 190' back at the face. Mi
ses a 2½-yard steam-shovel. Reserves are est
aden is moved at cost of 1/11 (46c) per cubic yard
ludes a 100-ton gravity concentrating plant, cos

half-year ended March 31, 1919, was 12,602 tons o
O, yielding 111 tons of 69.96% concentrate. Re
ipped, 347 tons of concentrate. Costs total 13/

NING CO. **TASMAN**
mania.
d mine in northwestern part of Tasma
the hanging-wall portion of a
own as websterite-porphyry. The
lode is made up of a
ecite and dolomite. I
maximum width

ings have three parallel drifts on each level, in order to vstreaks or veins. The galena contains some blende. ontent was high in the upper part of the lode—aver- nd 4 oz. of silver for each unit of lead. This zone nward to considerable depth, fading into leaner d amount of blende. Siderite, dolomite, and tz being absent. The ore carries some of ls.

t with 14 levels. Shaft sinking was

ower plant, two 75-h. p. motor- hour capacity on No. 13 level, one 150 men are employed.

duced 10,455 tons of ore yielding 2,099 1,686,726 lb. of lead, and 136,166 oz. silver, ,942 net.

NDED TIN MINING CO. **TASMANIA**

nburn, sec., 17 Queen St., Melbourne, Victoria, Aus- Waratah, Tasmania.

. W. C. Smith, chairman; A. T. Robb, D. McRorie, M. J. J. H. Gillies. C. W. Gudgeon, supt.

pril 20, 1905, in Tasmania and Victoria. **Cap.**, £16,000; shares all issued. Revenue in 1918 was £33,499, and profit £8,114.

vidends: total 4/- per share, equal to £6,400.

Property: 433 acres at Waratah, Tasmania, containing a tin-bearing sure vein cutting through slate, quartzite, and porphyry. Ore carries 1% of tin, and occurs in a 12" streak.

Development: by 3 crosscut tunnels, 1,600, 1,200 and 720' long, the lowest with a 1,000' back. Total work aggregates 26,978'. Reserves total 31,000 tons of ore blocked out, plus 24,000 tons probable ore, assaying 0.96% tin.

Equipment: includes steam power plant, two 450 cu. ft. compressors, 3 centrifugal pumps, 1,900' incline haulage tram, a 20-stamp mill, with 4 concentrating tables treating 100 tons of ore daily, with a recovery of 69-72% of the tin content.

Production:

Year	Ore, tons	Tin oxide,* ton
1918	14,690	165
1917	13,723	182
Total to date	145,458	1,807

* The oxide contains 70.76% tin.

MT. BISCHOFF TIN MINING CO. **TASMANIA**

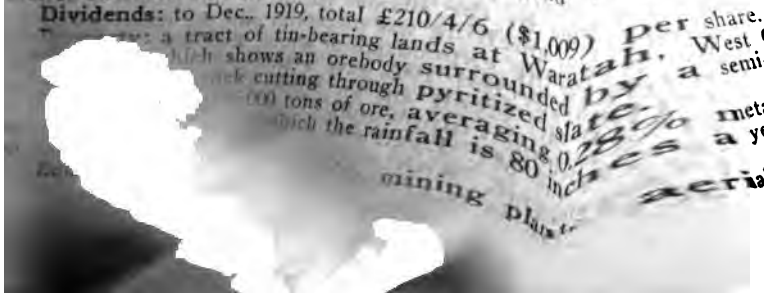
Offices: H. Ritchie, sec., 51 George St., Launceston; and Waratah, Tasmania.

Officers. L. G. Thompson, chairman; A. Evans, F. P. Hart, E. M. King, J. B. Waldron, Jr., directors. C. W. Gudgeon, gen. mine mgr.; F. B. ackson, smelter mgr.

Inc. 1872, in Tasmania. **Cap.**, £60,000; shares £5 par; all issued; 400 fully paid, and £7,600 £1 paid-up, making paid-up capital £29,600.

Profit for half-year ended June 30, 1919, was £5,108, plus previous alance, etc., making £83,909 available. Dividends absorbed £7,500, and 74,202 was carried forward. Profit for second half was £12,114. Net alance forward was £75,022.

Dividends: to Dec., 1919, total £210/4/6 ($1,009) per share.


a tract of tin-bearing lands at Waratah, West Coast region
shows an orebody surrounded by a semi-circular dike
cutting through pyritized slate,
tons of ore, averaging 0.28% metallic tin. Min-
the rainfall is 80 inches a year, is by open-
mining plant aerial trams, electric

Dividends: 16/9 per share, or £502,500, from 1906 to 1918, inclusive, 1s. being paid in 1918.

Property: 180 acres alluvial tin claims at Derby, Dorset county, Tasmania; also 2,112 acres alluvial gold claims in N. E. Victoria.

Equipment: includes ditch lines and full hydraulic plants at the tin mine and 4 gold dredges at the Victoria property.

Production:

Year	Tin, Lbs.	Gold, Oz.
1914	311,160	6,015
1915	611,520	5,125
1916	1,046,080	5,538
1917	539,840	3,650
1918	672,000	1,054

In 1917 total reserves in the Tasmania tract amounted to 6,557,000 c. yd. of gravel containing 4,405 tons of black tin; the Victorian area is nearly exhausted, but new properties have been acquired in New South Wales.

ELECTROLYTIC ZINC CO. OF AUSTRALASIA PROP., LTD.

Controlled by Amalgamated Zinc (De Bavay's), Ltd.; Broken Hill South Limited has a 20% interest.

Office: E. H. Shackell, 360 Collins St., Melbourne, Victoria.

H. W. Gepp, gen. mgr.; D. Meredith, asst. mgr.; Gilbert Rigg, cons engineer.

Inc. May 16, 1916, in Victoria. Cap., £1,000,000; shares £1 par; £250,000 issued.

Works have been erected at Risdon, near Hobart, in Tasmania for the electrolytic treatment of zinc concentrate from Broken Hill, and production of high-grade spelter. The first unit producing 15 tons daily is at work, but is being enlarged to 100 tons. Hydro-electric power is used at the plant. During 1918 the plant treated 20,979 tons of concentrate from Broken Hill, yielding 3,822 tons of spelter, valued at £152,880.

KING ISLAND SCHEELITE CO. TASMANIA

Office: John Brandon, sec., 31 Queen St., Melbourne, Victoria, Australia. Alex. Campbell, chairman of board of directors. J. V. Brown, mgr.

Inc. March, 1917, in Victoria. Cap., £50,000; shares 6/- par; all issued.

The half-year ended March 31, 1919, resulted in a profit of £11,280. A dividend absorbed £5,000, and £7,347 was carried forward. Assets exceed liabilities by £12,201.

Property: 153 acres at Grassy, King island, Bass Strait, between Victoria and Tasmania, Australia. The orebody consists of scheelite and garnet in a metamorphosed limestone and schist, and is somewhat similar to that near Bishop, Inyo county, Calif. The ore as mined averages 0.8 to 1.1% tungstic acid.

Development: by 300' tunnel, with a 190' back at the face. Mining is by open-cut work, using a 2½-yard steam-shovel. Reserves are estimated at 78,000 tons. Overburden is moved at cost of 1/11 (46c) per cubic yard.

Equipment: includes a 100-ton gravity concentrating plant, cottages, school, etc.

Production: for half-year ended March 31, 1919, was 12,602 tons of ore averaging 0.79% WO_3, yielding 111 tons of 69.96% concentrate. Recovery was 77.2%. Total output, 347 tons of concentrate. Costs total 13% [illegible] per ton.

MAGNET SILVER MINING CO. TASMANIA

Address: Magnet, Tasmania.

Property: a large silver-lead mine in northwestern part of Tasmania.

Geology: the Magnet lode is the hanging-wall portion of a [illegible] ltra-basic igneous rock which is known as websterite-porphyry. The [illegible] ms N. E.-S. W. and dips N. W. The lode is made up of a number [illegible] trallel bands of galena, alternating with siderite and dolomite, forming lode or belt that averages 40' in width with a maximum width of [illegible]

The mine workings have three parallel drifts on each level, in order to mine the three paystreaks or veins. The galena contains some blende. The precious metal content was high in the upper part of the lode—averaging $2 gold per ton, and 4 oz. of silver for each unit of lead. This zone of enrichment persisted downward to considerable depth, fading into leaner primary ore, with an increased amount of blende. Siderite, dolomite, and calcite compose the gangue, quartz being absent. The ore carries some of the rarer lead and antimony minerals.

Development. by 1,000′ main shaft with 14 levels. Shaft sinking was continued during 1919.

Equipment: 650-h. p. hydro-electric power plant, two 75-h. p. motor-driven centrifugal pumps of 12,500 gal. per hour capacity on No. 13 level, one 155-h. p. hoist, and concentrator. Over 150 men are employed.

Production: in 1918 mine produced 10,455 tons of ore yielding 2,089 tons of concentrate containing 1,686,726 lb. of lead, and 136,166 oz. silver, worth £49,436 gross, or £31,942 net.

MT. BISCHOFF EXTENDED TIN MINING CO. TASMANIA

Offices: John Ditchburn, sec., 17 Queen St., Melbourne, Victoria, Australia; and Box 4, Waratah, Tasmania.

Directors: H. W. C. Smith, chairman; A. T. Robb, D. McRorie, M. J. Sheehan, and J. H. Gillies. C. W. Gudgeon, supt.

Inc. April 20, 1905, in Tasmania and Victoria. **Cap.,** £16,000; shares 10/- par; all issued. Revenue in 1918 was £33,499, and profit £8,114.

Dividends: total 4/- per share, equal to £6,400.

Property: 433 acres at Waratah, Tasmania, containing a tin-bearing fissure vein cutting through slate, quartzite, and porphyry. Ore carries 1% of tin, and occurs in a 12″ streak.

Development: by 3 crosscut tunnels, 1,600, 1,200 and 720′ long, the lowest with a 1,000′ back. Total work aggregates 26,978′. Reserves total 31,000 tons of ore blocked out, plus 24,000 tons probable ore, assaying 0.96% tin.

Equipment: includes steam power plant, two 450 cu. ft. compressors, 3 centrifugal pumps, 1,900′ incline haulage tram, a 20-stamp mill, with 4 concentrating tables treating 100 tons of ore daily, with a recovery of 69-72% of the tin content.

Production:

Year	Ore, tons	Tin oxide,* ton
1918	14,690	165
1917	13,723	182
Total to date	145,458	1,807

* The oxide contains 70.76% tin.

MT. BISCHOFF TIN MINING CO.

Offices: H. Ritchie, sec., 51 George St., Launceston; and
mania.

Officers. L. G. Thompson, chairman; A. Evans, F
King, J. B. Waldron, Jr., directors. C. W. Gudgeon, gen.
Jackson, smelter mgr.

Inc. 1872, in Tasmania. **Cap.,** £60,000; shares £5
4,400 fully paid, and £7,600 £1 paid-up, making paid-up ca
Profit for half-year ended June 30, 1919, was £5,1
balance, etc., making £83,909 available. Dividends abso
74,202 was carried forward. Profit for second half
balance forward was £75,022.

Dividends: to Dec., 1919, total £210/4/6 ($1,009) per sh

Property: a tract of tin-bearing lands at Waratah, We
f Tasmania, which shows an orebody surrounded by a se
f barren eruptive rock cutting through pyritized slate.

Ore reserves: 1,066,000 tons of ore, averaging 0.28% meta
ng in this wet region, in which the rainfall is 80 inches a yea
ut work.

Equipment: includes a compl plant, aerial t

railway, power-plant, concentrating mill, shops, sawmill, and reverberatory smelter at Launceston, which treats both company and custom ore.

Production: during the first half of 1919 the smelter handled 216 tons of concentrate yielding 291,200 lb. of tin; also 1,168 tons of custom ore yielding 1,814,400 lb. tin. Second half yielded 284,480 lb. metal. At the end of 1918 (48 years of operation) the total output was 75,553 tons of metallic tin, valued at £5,149,916.

Mt. Bischoff is one of the great tin mines of the world and its operations very profitable to its shareholders.

MOUNT LYELL MINING & RAILWAY CO., LTD. TASMANIA

Head office: Collins House, Melbourne, Australia. **London office:** Palmerston House, Old Broad St., London, E. C. 2, England. **Operating and works office:** Queenstown, Tasmania. **Mine office:** Gormanston, Tasmania. **Chemical works:** Melbourne, Victoria; Fremantle, Western Australia.

Bowes Kelly, chairman of board of directors; A. Williamson, chairman of London board; D. G. Lumsden, sec.; W. G. Moss, asst. sec., Melbourne office. Edwin Habben, London, sec. **Staff:** Robt. C. Sticht, gen. mgr.; Basil Sawyer, local supt.; Robt. P. Roberts, chief metallurgist; R. M. Murray, mine supt.; G. F. Jakins, asst. mine engr.; G. W. Wright, mech. engr.; H. J. Clarke, engr. for supplies; Thos W. Haynes, business mgr. of chemical works.

Inc. August 11, 1903, in Victoria, as a merger of a former company of the same name, with the North Mount Lyell Copper Co., Ltd. Cap. £1,300,000; shares £1 par; 1,289,195 issued. Annual meeting in December.

Financial Statement, years ending September 30:

Year	Revenue	Net profit	Dividends	Current assets	Current liabilities
1919	£678,305	£130,233	£80,575	£1,070,553	£387,9[illegible]
1918	916,086	247,229	161,149	1,066,545	442,9[illegible]
1917	1,003,938	268,611	209,494	1,176,182	681,3[illegible]
1916	943,706	239,002	209,494	.....	.....

Dividends: began in 1904. In recent years were: £64,460 in 1914; £145,034 in 1915; £209,494 in 1916; £209,494 in 1917; £161,149 in 1918. Total, £2,640,055. The old company paid dividends of $996,574, making total dividends, to end of 1918, £3,636,629.

Operations of the company include mining and smelting copper ore in Tasmania, mining pyrite in Tasmania, with the manufacture of acid and superphosphates in the States of Victoria and Western Australia, and the manufacture of coke in New South Wales. The operations of the company are of a high technical order.

Mt. Lyell controls the Mt. Read & Rosebery Company, which see.

Property: 2,124 acres, inclusive of 5 consolidated claims, leased for 21 and 30-year periods, and 565 acres of mill and smelter sites, in the Mt. Lyell district, with mineral lands in other parts of Tasmania, where prospecting and mining work is in progress. The principal mining operations at Gormanston, in the Mt. Lyell district, on the west coast of Tasmania, 14 miles in an air line from the port of Strahan, on Macquarie harbor.

The Mt. Lyell pyritic orebody was discovered 1883, but its value for copper was not then recognized. Other mines in the same district were unsuccessful, though the value of the North Mt. Lyell mine was recognized in 1897, but it was not profitable until it was merged in the present company in 1903. Owing to the silicious nature of the North Lyell ores neither concentration nor smelting was successful and the undertaking was a failure financially after the expenditure of about £800,000. The amalgamation of the 2 mines, effected 1903, gave a single magnificent property, the pyritic ore of the Mt. Lyell and the silicious ore of the North Mt. Lyell being natural smelting complements.

Geology: rocks of the Mt. Lyell mine are hydro-mica schist conglomerate quartzite and sandstone, with mineralization occurring along a [illegible] conglomerate contact that is a crush-zone formed by an overthr[illegible]

The orebody is a huge lenticular mass, measuring 270′ wide by 660′ long, on the 4th level, a vertical depth of 750′. This lens originally contained 6,500,000 long tons of ore, but about two-thirds of it has been extracted. The ore as now mined averages 0.54% copper, 1.96 oz. silver and 0.04 oz. gold per ton; it is a very clean pyrite, carrying but 6% silica, 2% alumina, and 2.5% barium sulphate, with a very little zinc and a trace of lead.

The copper content occurs as chalcopyrite and tetrahedrite, disseminated through the pyrite. On the southern end of the orebody there was an enrichment, consisting of chalcopyrite and bornite, with some chalcocite, in a silicious gangue, which commenced 350′ below the surface and persisted to within 150′ of the bottom of the lens. In about the center of the footwall side a second enrichment was found, commencing 100′ below the surface, and extending downward for 75′. In 1894 this high-grade ore streak yielded 850 tons of this ore, which was enriched by stromeyerite, and ran 21% copper, 1,010 oz. silver and 0.1 oz. gold per long ton. This bonanza oreshoot netted the old company £105,000.

Development: the orebody is opened by shafts with 9 levels, in which crosscuts and contour drifts encircle it. The upper levels are obliterated by an enormous open-cut, from which the ore is extracted in a series of benches with simultaneous removal of overlying or underlying country rock, the ultimate bottom of the quarry being the fifth level, 450′ below the surface. Only underground extraction is feasible below the fifth level. A vertical 400′ shaft sunk underground from the fifth level and an incline shaft open up the lower levels. The daily output from the mine is about 1,000 long tons of ore. Depleted stopes are filled with waste from the schist and conglomerate overburden. The removal of 2,000,000 cu. yd. of capping has exposed 1,200,000 cu. yd. of ore.

The South Lyell orebody, though much smaller and without outcrop, is similar to that of Mt. Lyell. Its top is 350′ below the surface and it is proven for 500′ downward, or 150′ below the lowest level in the Mt. Lyell mine; its further extension has not been explored. The orebody has been developed from the Mt. Lyell workings on each of the 5 lower levels, and is now worked as a part of that mine. South Lyell reserves total 400,000 tons.

Combined reserves in the Mt. Lyell and South Lyell mines are:

Year	Tons	Copper, %	Silver, oz.	Gold, oz.
1919	1,910,388	0.50	1.50	0.04
1918	2,028,747	0.49	1.48	0.04
1917	2,013,439	0.50	1.60	0.04
1916	1,815,505	0.53	1.96	0.04

The daily production during 1918 was 400 tons, compared with 700 tons previous years; South Lyell contributed 120 tons.

During the year ended Sept. 30, 1919, the mines produced 118,358 tons ore, principally from underground workings, the lower benches of the open-cut supplying only a minor amount.

Equipment: all machinery is electrically operated, with current from company's Lake Margaret hydro-electric power station, 7 miles distant. The incline shaft raises all ore from the mine by an electric hoist geared to a 200-h. p. induction motor, current 550 volts, having capacity of 1,000 tons in 8 hours. Self-dumping skips containing 3 tons of ore are used. Compressed air is supplied by 3 high-speed compressors with an aggregate capacity of 3,600 cu. ft. of air per minute at 90-lb. pressure, direct coupled to 300-h. p. synchroneous motors taking current at 3,000 volts. The air supply is diverted, when required, to the North Lyell mine by means of 8000′ pipe-line. Mine water is lifted by 3-throw electrically-driven pumps, each 100 g. p. m. There are 2 units in the station, though one is sufficient to handle the normal flow of water. The drill shop is equipped with [illegible] sharpeners.

North Mt. Lyell Mine.

Geology: the North Lyell ore occurs as large nuclei in pyritic disseminations in quartzite and to some extent in schist. Copper occurs as bornite and chalcopyrite with some chalcocite and occasional tetrahedrite, all associated with a small amount of pyrite. The ore is found at the contact between schist and conglomerate, these rocks being intensely silicified and pyritized on each side of the rather indistinct contact plane. This alteration usually ends abruptly against normal schist, but fades out into normal conglomerate. Very rich ore, carrying up to 60% copper, as bornite and chalcocite frequently occurs. Only one of many closely-associated orebodies—more properly called enrichments in the mineralized contact zone—outcropped at surface. This was a vertical pipe-like deposit, now worked out, which was 1,100′ long and of very irregular cross section. The other and more important bodies, are first seen on the 500′ level, where the dip of the conglomerate is reversed from west to east. The oreshoots follow the hanging wall, lengthening rapidly with depth, until at the 1,000′ level they form an almost continuous orebody some 1,500′ long, and varying in width up to 100′. The character remains unchanged down to 1,200′, the present lowest level, except perhaps that the amount of chalcocite is increasing. The North Lyell ore as broken, averages 6% copper and 1.33 oz. silver per long ton, with a trace of gold. The gangue averages 66% silica, 7% iron, and 7.5 to 11% alumina.

Development: the mine is worked by tunnels and shafts. The upper tunnel, or 200′ level, is the main entry. The lower tunnel is the 300′ level. There are 9 other levels, opened from the shaft at intervals of 75, 100, and 150′, the lowest being at the 1,200′ horizon. Filling for depleted stopes is brought from surface by means of 3 main waste pass systems, each comprising a trunk pass, and numerous branches.

Ore reserves:

Year	Tons	Copper, %	Silver, oz.	Gold, oz.
1919	960,242	6.0	1.33	0.005
1918	1,036,300	6.0	1.33	0.005
1917	997,900	6.0	1.33	0.005
1916	1,140,340	6.0	1.33	0.005

The North Lyell has excellent prospects of further orebodies, and the ore is not only persistent to the greatest depth yet reached, but is high in copper, and although too silicious for straight smelting, blends with the pyritic ore of the Mt. Lyell to make an ideal smelter charge. Part of the output is treated in a flotation plant, erected in 1916.

Equipment: the main North Lyell shaft has a 400-h. p. electric hoist good for 1,500′ depth; the other shafts have air-driven hoists, at 90-lb. pressure. The mine water is very corrosive, and is lifted by 3-throw plunger pumps of 100 g. p. m. capacity, in 2 lifts of 400′ each.

Output during the year ended Sept. 30, 1919, North Lyell produced 76,058 tons of ore averaging 7.55% copper, 1.94 oz. silver, and 0.01 oz. gold. This was much below the normal quantity.

The Lyell Tharsis mine acquired when supposedly worked out, contains a large quantity of low-grade chloritic schist, carrying disseminated chalcopyrite and pyrite; this ore lies on the hanging-wall side of the old silicious orebody.

The South Tharsis and Royal Tharsis mines are idle. They carry chalcopyrite and pyrite, disseminated sparingly, though of low average grade and not amenable to concentration, can be profitably mined and concentrated. The Lyell Comstock property, 339 acres, is contiguous to and contains the northern extension of its orebodies. It will supply a flotation plant. The ore is chalcopyritic, producing 50 tons daily, averaging 2.17% copper.

Reduction Works and Accessories.

A 1½-mile aerial tram can transport 750 tons ore daily from the Mt. Lyell mine to the smelter. There also is a 4,500′ incline surface tram, connecting with a ¾-mile 2′ gage steam railway to the smelter, also serving for the delivery of North Lyell ore, and for general traffic.

The company owns a 22-mile railway that connects the Queenstown reduction works with the seaport of Strahan, giving rail connections with all parts of the State. A second line connects Gormanston with Kelly basin, near the head of Macquarie harbor, 25 miles from Strahan.

Power-plant: a model hydro-electric station at Lake Margaret is connected with the reduction work by 6 miles of 2′ tramway.

Smelter: the reduction works are at Queenstown on the Queen river, 1½ and 2½ miles from the Mt. Lyell and North Lyell mines, respectively. The first permanently successful pyrite smelting ever accomplished was done here in 1896, under the direction of Robert Sticht.

The smelter has four 54 and 210″ blast-furnaces, 29¾′ high from tapping floor to feed floor, with box type cast-iron water-jackets, and of solid construction, suitable for pyrite smelting. The furnaces have special mechanical feeders and lifts, hydraulically operated.

The charge, averaging 2.5% copper, is brought to a matte containing 42% in one operation. Slags average 0.40% copper, 35 to 38% silica, 42 to 48% iron protoxide, 6.5 to 7.5% alumina, 1.5 to 2% barium oxide, and 4% calcium oxide.

The amount of coke used was as low as 1% or less, but is now from 3 to 5% as the charge contains less sulphur than formerly.

Flotation concentrate and flue-dust are either sintered or treated in a nodulizing plant.

The furnaces have a stationary oval, sheet steel, chrome-brick lined forehearth, 19′ long, cooled by water sprays. This is followed by the older rectangular, uncooled cast-iron forehearths, from the last of which the slag flows into a stream of water for granulation.

A new converter plant, erected in 1918, contains Great Falls upright type vessels, 10′ in diameter and 11′ 7″ high, electrically operated.

The final product, blister copper carrying 98.86% copper, 42.89 oz. silver, and 1.11 oz. gold per long ton, is refined by the Electrolytic Smelting & Refining Co. at Port Kembla, New South Wales.

The flotation plant is treating about 100 tons daily of 3.43% copper ore, recovering 90.41% of this metal and making a 10% concentrate.

Company owns acid and fertilizer plants, all having Herreshoff calciners, sulphur burners, and the ordinary chamber process for making sulphuric acid. Crude phosphate rock is secured from Ocean and Christmas Islands. The products of these plants include a variety of superphosphates and commercial fertilizers, the demand for which is rapidly increasing in Australia. The raw material for acid is furnished by the Tasmanian mine, Spanish pyrite, and sulphur from Japan and Italy. Unfortunately, it is commercially impracticable to utilize the sulphurous acid fumes from the Mt. Lyell smelter, because of the high freight rates, either in carrying the acid away from Mt. Lyell, or bringing in the crude phosphate rock, but experiments are under way with a view of recovering sulphur from pyrite. Coal-dust firing is used in the [illegible] distillation retorts. The superphosphate works are in Victoria [illegible]

The company employs [illegible] about 850 men at the mines, 150 on the rail[illegible]

Costs: average cost [illegible] from 1896 to 1903 was 22/10 ($5.48) [illegible] ending 1902 the total mining [illegible] figure does not reflects great cr[illegible]

The past few years show the following

Year	Mining	Smelting
1919.....	16/4 ($3.88)	17/3 ($4.10
1918.....	13/1 (3.14)	14/1 (3.38
1917.....	12/3 (2.94)	12/3 (2.94
1916.....	10/5 (2.50)	11/6 (2.76

Recent advances are due to increased t supplies.

Production: the present output is less t treated. The total production from 1896 to tons of ore, yielding 162,600 tons of copper, oz. of gold. Of this ore tonnage, Mt. Lye Lyell, 1,713,000; Lyell Comstock, 29,000; c ores, 169,829, and metal-bearing fluxes, 170,47

Recent returns are as under:

	Ore Smelte tons
1919.....	185,177
1918.....	240,947
1917.....	239,940
1916.....	158,663

The Mt. Lyell enterprise has had to c financial, mining and metallurgical probler success. A serious handicap is the heavy r hampering a mine worked by open cuts. F ore averages even lower in copper-contents t ful native copper mines of the Lake Superio tions, treated the lowest grade copper ore in ble, but highly creditable record passed to th is excellent, in all departments, and the suc an effective combination of financial ability

MT. READ & ROSEBERRY MINES, LTI

Subsidiary of Mt. Lyell M. & R. Co.

Offices: D. G. Lumsden, sec.; W. G. M Melbourne, Victoria, Australia; and E. Hal London, E. C. 2, England.

Bowes Kelly, chairman of board of dire E. R. Crucher, metallurgist.

Inc. Sept. 21, 1916, in Victoria. **Cap.** 156,503 issued. Debentures of £240,000 are Meanwhile, Mt. Lyell is advancing money October, 1919, being £167,987.

Property: 2,066 acres, being a consolida the Hercules Gold & Silver Mining Co., Tas rose Mining Co., near the town of Rosebery, mania. The Hercules North Blocks were a paid shares.

Development: in recent years consisted old workings were retimbered. The mines ar ply a mill. Openings are entirely by adits.

Ore reserves:

Mine	Tons	Z
Hercules	411,836	30
Rosebery	652,331	2
Total	1,064,167	1

The ore is complex, being a dense intimate mixture of blende, galena, and iron pyrite, and the former owners had great difficulty in treating and in marketing it. Trial lots were sent to Broken Hill for flotation, and to Great Falls, Montana, for electrolytic treatment.

Electric power will be obtained from the Mt. Lyell plant, and from a 15,000-h. p. plant to be erected at Lake Rolleston, near Zeehan. Late in 1919 it was propesed to erect electrolytic works at Zeehan, with an initial capacity of 50 tons of zinc daily.

Production: total prior to 1916 was 280,000 tons of ore for £354,000.

PIONEER TIN MINING CO. **TASMANIA**

Address: C. G. Ryan, Bradshaw's Creek, Tasmania.

Property: the Argonaut and Pioneer mines, working alluvial tin ground by blasting and hydraulicking. Company has an hydro-electric plant, which generates power at 0.05 pence (0.1 cent) per unit.

Profit for year ended June 30, 1917, was £44,893, of which £44,342 was distributed.

Production:

Year ended June 30—	Yardage	Cost per yard	Stream tin recovered tons	Per yard
Pioneer Mine.				
1917	894,700	4.487d.	471	1.179 lb.
1916	996,000	3.846d.	444	0.999 lb.
1900-1917	8,676,900	5.930d.	6,446	1.664 lb.
Argonaut Mine.				
1917	142,000	6.074d.	51,998	0.893 lb.
1916	101,000	8.061d.	47,748	1.051 lb.
1913-1917	531,400	5.850d.	213,300	0.899 lb.

TASMAN & CROWN LYELL EXTENDED MINES **TASMANIA**

Office: W. B. Arnold, sec., 39 Queen St., Melbourne, Victoria, Australia.

F. S. Fitchett, chairman of board of directors; D. W. Welch, supt.

Inc. in Victoria. **Cap.,** £150,000; shares 10/- par; all issued.

Revenue from ore sales for 9 months, ending June 1, 1919, was £1,334, and expenses £3,690.

Property: in Mt. Lyell district, Tasmania, contains lenticular contact deposit in schist, the ore being a sulphide that assays 30% lead, 20 oz. silver, 8% zinc, with some iron.

Development: by 1,800′ of tunnels, reaching depth of 240′. Reserves are 30,000 tons.

Equipment: includes a concentrating plant, to which flotation is to be added.

TASMANIA GOLD MINE, LTD. **TASMANIA**

After producing gold of a total value of £3,607,807 this property at Beaconsfield, near Launceston, is being cleaned up and the company liquidated.

VICTORIA

BENDIGO AMALGAMATED GOLDFIELDS **VICTORIA**

Office: Bendigo, Victoria, Australia. A. H. P. Moline, gen. mgr.

Financial Statement: during the year ended July 2, 1918, receipts were £61,907 ($777,000) from gold, other items making a total of £165,789 ($797,000). Wages absorbed £108,032 ($518,000). Including the previous balance of £58,841 ($283,000) expenditures used up the total revenue. In the first half of the 1918-'19 year there was a loss of £10,718, but the second half yielded a profit of £2,934.

Property: this company was organized in 1917 to consolidate about 40 producers in the center of the Bendigo Goldfield (which has yielded

over 18,000,000 oz. since 1850), explore them systematically by new openings and diamond-drilling, and equip them, if warranted, with modern plant. Operations are concentrated at a number of central points. Eight lines of "reef" are included in the area, ranging from 4,500 to 22,000 ft. in length, totaling 93,900 ft. Most of the shafts are over 2,000 ft. deep, some being over 3,000 ft.

Development: 22,555' of prospecting and development, and 3,737' of drilling (shot and diamond). Fifty faces were being followed. Continuous geologic examination is made, as the structure of the field is complex. A number of minor discoveries were made, but no high-grade shoots of any extent were found. Tributors are at work in certain parts of the mines.

Equipment: includes 30 hoists, 3 compressor stations capable of generating enough air for 150 to 180 drills, and stamp-mills of 566 tons daily capacity.

Production: in 1917-'18 the mills crushed a total of 132,351 tons for the company, yielding, with concentrates, gold worth £134,390 ($643,000); and for tributors 14,418 tons for £27,517 ($136,000). In 1918-'19 the mills treated 112,977 tons yielding 41,022 oz. gold. Ore treatment—stamps, amalgamation, and concentration—is not difficult, and tailings assay only from 24 to 56 cents per ton. Report gives considerable details of underground work and drilling. In August, 1919, the output was 5,097 oz. of gold from 8,554 tons of ore. The Constellation contributed 1,295 tons of 1.7 oz. ore.

This is a bold and probably final attempt to resuscitate the Beaufo field.

BRISEIS TIN & GENERAL MINING CO., LTD. VICTORIA

See same title under Tasmania for office, etc.

Property: 2,112 acres of alluvial ground on Yackandandah and Sandy Creeks, N. E. Victoria. Four dredges were operated, but the area is nearly worked out.

Production: 6,015 oz. gold in 1914; 5,125 oz. in 1915; 5,538 oz. in 191 3,650 oz. in 1917, and 1,054 oz. in 1918.

COCK'S PIONEER GOLD & TIN MINES VICTORIA

Office: E. H. Shackell, Collins House, Melbourne, Victoria, Australia. J. L. Wharton, chairman of board of directors. H. Falconer, mgr.; H. H. P. Moline, cons. eng.

Inc. May 14, 1913, in Victoria. **Cap.,** £150,000; shares £1 par; 100,0 issued.

Profit for half-year ended May 31, 1919, was £6,674. Current a exceeded liabilities by £19,466.

Dividends: 5% in 1915; nil in 1916; 15% in 1917, 1918 and 1919. T to date is £45,000.

Property: 752 acres of alluvial ground on Eldorado creek, 13 mile from Wangaratta, Victoria. Equipped with hydraulicking plant.

Production, in recent half-years:

Period	Yardage	Gold, oz.	Tenor
1919 (May 31)	462,000	3,786	[illegible]
1918 (Nov. 30)	389,000	3,981	33
1918 (May 31)	371,000	4,056	36
1917 (Nov. 30)	364,000	4,064	[illegible]

Costs are 8.7 pence (17.4 cents) per yard.

SOUTH NEW MOON GOLD MINING CO. VICTORIA

Office: G. H. Green, Hon. Sec., Eaglehawk, Bendigo, Victoria, Australia.

H. R. Williams, chairman [illegible]

Inc. in Victoria. Cap.

Property: a gold

Development:

Equipment:

Production:

WESTERN AUSTRALIA

ASSOCIATED GOLD MINES OF WESTERN AUSTRALIA, LTD.

Office: R. Davidson, sec., 20 Copthall Ave., London, E. C., England. **Mine office:** Kalgoorlie, W. A.

Directors: E. Hooper, chairman; D. F. McAulay, gen. mgr.

Inc. Dec. 19, 1894, in England. **Cap.,** £500,000; shares £1 par; 495,364 issued. Company is largely interested in the Porcupine V. N. T. Gold Mines, Ltd., and owns the Keeley mine in Ontario.

Revenue for the year ended March 31, 1918, was £103,660, but there was an operating loss of £746, and debit balance is now £8,577. In 1919 the loss was £9,991.

Dividends: from 1898 to 1909 totaled 150%. In 1913 and 1914 2½% each; nothing since. The total is £703,833.

Property: 54 acres on the "Golden Mile," Kalgoorlie, W. A. It has produced a large amount of gold, especially from 1898 to 1904.

Development: by vertical shaft 2,200' and extensive workings. Reserves are difficult to estimate. Ore is a sulpho-telluride.

Equipment: complete mining, hoists, compressors, electric power, also 350-ton plant using crushers, ball-mills, roasters, pans, cyaniding equipment and filter-presses.

Production: for the year ended March 31, 1917, was £124,611 from 93,430 tons, compared with £103,579 from 81,528 tons in 1918; £101,510 from 71,603 tons in 1919. The total gold produced to September, 1919, was £4,167,752 from 2,035,121 tons of ore. Costs were $6.56 per ton.

BULLFINCH PROPRIETARY (1919), LTD. WESTERN AUSTRALIA

A reorganization of Bullfinch Proprietary (W. A.), Ltd.

Office: C. Hay, Worcester House, Walbrook, London, E. C. 4, England.

Sir G. P. Doolette, chairman of board of directors. A. L. Hay, mgr.

Inc. December, 1919, in Great Britain, as a reorganization of company formed in November, 1910.

Profit of old company in 1917 was £3,468, out of an income of £61,177. £3,000 was transferred to reserve for income tax. Assets exceeded liabilities by £11,000.

Dividends: 5% in 1913; 8¾% in 1914; 5% in 1915; 2½% in 1916; nothing since.

Property: 162 acres in the Bullfinch field, near Southern Cross; and leases at Wombola on Hampton Plains, 10 miles S. E. of the Celebration lease on Block 50, acquired late in 1919.

Development: at Bullfinch by shaft to 510'. Reserves were estimated to be 80,000 tons, averaging 21/- ($5.04) per ton.

Equipment: hoist, compressor, shops, 20 stamps, 2 tube-mills, cyanide plant.

Production, years ended December 31:

Year	Tonnage	Gold yield	Profit	Cost per ton
1918	58,609	£60,412	£4,638	17/- ($4.08)
1917	62,004	61,266	3,468	16/5 (3.94)
1916	71,360	76,863	8,300	15/7 (3.67)
1915	76,886	100,035	40,000	16/2 (3.81)
1914	74,398	109,478	49,000	18/8 (4.40)
1913	52,679	143,809	94,700	

The above table indicates the end of a short and profitable career of the mine at Bullfinch. Directors are optimistic concerning the new prop-

BULLFINCH PROPRIETARY (W. A.), LTD.

Reorganized [illegible] as the Bullfinch Proprietary (1919), Ltd.,

over 18,000,000 oz. since 1850), explore them system... TERN AUSTRALIA
ings and diamond-drilling, and equip them, if warr... Proprietary Mine, Ka
Operations are concentrated at a number of ce...
"reef" are included in the area, ranging from ...ald, A. Francis, Richard Hamb
taling 93,900 ft. Most of the shafts are ove...d, mining engineers of Kalgoorlie
3,000 ft. ...a new mine on Block 50 of Hamp

Development: 22,555' of prospe...all description. Gold deposit was dis
drilling (shot and diamond). Fifty ...ovember the reserve was estimated a
geologic examination is made, a...ed by Lionel Robinson, Clark & Co., wh
number of minor discoveries w...called Hampton Celebration (W. A.), Ltd
extent were found. Tributor... was £50,000 cash and £100,000 in shares

Equipment: includes 3(...ING CO. WESTERN AUSTRALIA
erating enough air for 1...ams, gen. mgr., Westonia, near Southern Cross
capacity.

Production: in 1(... Cap., 42,850 shares of 10s. each.
company, yielding, ...ular of 1/- (25 cents) per month are paid, the total t
for tributors 14,41... £5,060, equal to £7 12/- per share.
112,977 tons yi... gold mine at Westonia, in the Southern Cross distric
tion, and conc...
56 cents per ...: by vertical shaft to depth of 480'. Water has been very
and drillin... and up to 60,000 gal. per hour has been pumped.
tons of r... steam power, pumps, hoist, compressor, shops, 10 stamps
Thi... plant.
field. ...: to September, 1919, was £728,003 from 191,493 tons of ore.
BRI... monthly tonnage was around 2,100 of 56/- ($13.40) value. Costs were
($8.04) per ton, mining being 24/- ($5.75).
...In October, 1919, operations ceased, owing to exhaustion of reserves.

C... FREMANTLE TRADING CO., LTD. WESTERN AUSTRALIA
...Office: E. H. Woolcott, Salisbury House, London, E. C. 2, England.
Directors: E. P. Jones, chairman; A. E. Lund, and J. A. Morris. W.
G. Sutherland, mgr.

Inc. July 28, 1909, in Great Britain. Cap., £75,000 in 45,000 pfce. and
30,000 ord. shares, £1 par, of which 26,100 pfd. and all ord. shares are issued
and fully paid.

Profit for first half of 1918 was £26,821, less £21,220 for depreciation
£5,610 was distributed. Current liabilities exceed assets by £28,419.

Dividends: from 1909 to 1918, a total of 108% on pfce. and 48% on
ord.; 10% on each in 1917-'18.

Property: 1,020 acres, near Northampton, W. A., including the Baddera
Narra Tarra, and Wheal Ellen lead mines.

Development: by 460' shaft at the Narra Tarra, with over 1,000' of work
along the lode. Ore is from 5 to 20' wide. Mine output is about 2,0
tons of ore per year. At the Baddera, the 455' main shaft opens up a lode
from 4 to 16' wide that averages 10.5% lead, but recent development is re
ported to be disappointing. The annual output is 21,000 tons of ore. The
Wheal Ellen shaft, 135' deep, is sunk on a lode 5' thick.

Equipment: includes a concentrator at the mines, and a smelter at
Fremantle, which when operating also handles custom ores. Output was
about 400 tons of lead monthly in 1918. Smelter was originally erected
to treat the rich gold ore from the Kalgoorlie mines.

GOLDEN HORSE SHOE ESTATES CO., LTD. W. A.
Office: A. Swanne, Salisbury House, London, E. C. 2, England.
Sir J. S. Purcell, chairman of board of directors. J. W. Sothe...
gen. mgr.; V. H. R. Murray, mine supt.; C. E. Blackett, metallurgist.

Inc. Feb. 28, 1899, in England. **Cap.**, £1,500,000; shares £5
issued. **Debentures:** £5,400 of 6% outstanding.

Profit in 1917 was £100,797, of which dividends absorbed £...
£6,494 was carried forward. Current assets exceed liabilities by £...
In 1918 the revenue was £... and ... £17,50...

Dividends: since 1...

acres of producing ground and 85 acres of other areas
Kalgoorlie, W. A.
2,242 and 3,140′ vertical shafts and extensive work-
' 1918 were 733,102 tons of 9¼ dwt. ore.
te and modern, including compressors, hoists,
mill with 5 tube-mills, concentrators and

September, 1919, was £11,033,686 from 4,594,698
years results were as under:

	Tons	Gold
.....	146,664	£332,620
.....	176,028	411,546
.....	162,316	345,529

. $11 per ton.

BOULDER PERSEVERANCE G. MNG. CO., LTD. W. A.
ıe being worked by tributers. Output to date is £6,737,614 from
,430 tons, and £1,531,250 paid in dividends. Company is being liqui-
ıed. See Vol. XIII.

GREAT BOULDER PROPRIETARY GOLD MINES, LTD. W. A.
Office: J. Gregory, 80 Bishopsgate, London, E. C. 2, England.
Sir G. P. Doolette, chairman of board of directors. Richard Hamilton, *gen. mgr.*
Inc. June 20, 1894, in England. **Cap.**, £175,000; shares 2s par; all sued.
Revenue during the year 1917 was £529,718, of which £257,641 was rofit. Dividends amounted to £262,500. Balance forward was £2,839, ompared with £5,488 brought forward from 1916. Net cash assets total bout £125,000. In 1918 the profit was £220,731, of which £196,875 was id in dividends.
Dividends: total 1,770% from 1895 to April, 1919, a total sum of 5,531,800.
Property: 85 acres on the "Golden Mile," Kalgoorlie, W. A.
Development: by vertical shafts, 2,844, 2,879, and 2,000′ deep, with ex-nsive workings. Ore is a sulpho-telluride. Reserves at end of 1918 were ıced at *345,719* tons, of 14½ dwt. ore. Deep exploration was not success-as the main lode passed into the adjacent Golden Horseshoe mine at ut 1,800′ in depth.
Equipment: complete and modern, with 600-ton dry crushing and roast-plant.
Production: to September, 1919, totals £11,904,695 from 3,518,805 tons re.

Year	Ore, tons	Gold yield
1918.....	152,196	£484,270
1917.....	182,265	529,718
1916.....	176,787	525,168
1915.....	195,524	583,367
1914.....	190,117	563,959

osts are around 32/- ($7.68) per ton.
his is one of the most regular gold producers and dividend-payers
, and is ably directed.

TON CELEBRATION (W. A.), LTD. W. A.
ecs: Lionel Robinson, Pinners Hall, Austin Friars, E. C. 2, London.
December, 1919, in Great Britain. **Cap.**, £250,000. Company ac-he Celebration lease from the Celebration Syndicate (which see), for cash and £100,000 in shares. The promoters got £25,000 in shares,
working capital.

CELEBRATION SYNDICATE **WESTERN AUSTRALIA**

Address: Richard Hamilton, Great Boulder Proprietary Mine, Kalgoorlie, W. A.

The Syndicate is composed of P. Fitzgerald, A. Francis, Richard Hamilton, John McDermott and J. W. Sutherland, mining engineers of Kalgoorlie.

Property: an option for £25,000 on a new mine on Block 50 of Hampton Properties, Ltd., which see for full description. Gold deposit was discovered about mid-1919, and by November the reserve was estimated at £1,000,000. The lease was acquired by Lionel Robinson, Clark & Co., who floated a company in London called Hampton Celebration (W. A.), Ltd. which see. The purchase price was £50,000 cash and £100,000 in shares.

EDNA MAY GOLD MINING CO. **WESTERN AUSTRALIA**

Address: M. T. Williams, gen. mgr., Westonia, near Southern Cross, Western Australia.

Inc. in Victoria. **Cap.,** 42,850 shares of 10s. each.

Dividends: regular of 1/- (25 cents) per month are paid, the total to April, 1919, being £325,660, equal to £7 12/- per share.

Property: a gold mine at Westonia, in the Southern Cross district, Western Australia.

Development: by vertical shaft to depth of 480'. Water has been very troublesome, and up to 60,000 gal. per hour has been pumped.

Equipment: steam power, pumps, hoist, compressor, shops, 10 stamps and cyanide plant.

Production: to September, 1919, was £728,003 from 191,493 tons of ore. The monthly tonnage was around 2,100 of 56/- ($13.40) value. Costs were 36/- ($8.64) per ton, mining being 24/- ($5.75).

In October, 1919, operations ceased, owing to exhaustion of reserves.

FREMANTLE TRADING CO., LTD. **WESTERN AUSTRALIA**

Office: E. H. Woolcott, Salisbury House, London, E. C. 2, England.

Directors: E. P. Jones, chairman; A. E. Lund, and J. A. Morris. W. G. Sutherland, mgr.

Inc. July 28, 1909, in Great Britain. **Cap.,** £75,000 in 45,000 pfd. and 30,000 ord. shares, £1 par, of which 26,100 pfd. and all ord. shares are issued and fully paid.

Profit for first half of 1918 was £26,821, less £21,220 for depreciation. £5,610 was distributed. Current liabilities exceed assets by £28,419.

Dividends: from 1909 to 1918, a total of 108% on pfd. and 48% on ord.; 10% on each in 1917-'18.

Property: 1,020 acres, near Northampton, W. A., including the Baddera, Narra Tarra, and Wheal Ellen lead mines.

Development: by 460' shaft at the Narra Tarra, with over 1,000' of work along the lode. Ore is from 5 to 20' wide. Mine output is about 2500 tons of ore per year. At the Baddera, the 455' main shaft opens up a lode from 4 to 16' wide that averages 10.5% lead, but recent development is reported to be disappointing. The annual output is 21,000 tons of ore. The Wheal Ellen shaft, 135' deep, is sunk on a lode 5' thick.

Equipment: includes a concentrator at the mines, and a smelter at Fremantle, which when operating also handles custom ores. Output was about 400 tons of lead monthly in 1918. Smelter was originally erected to treat the rich gold ore from the Kalgoorlie mines.

GOLDEN HORSE SHOE ESTATES CO., LTD. W. A.

Office: A. Swanne, Salisbury House, London, E. C. 2, England.

Sir J. S. Purcell, chairman of board of directors. J. W. Sutherland, gen. mgr.; V. H. R. Murray, mine supt.; C. E. Blackett, metallurgist.

Inc. Feb. 28, 1899, in England. **Cap.,** £1,500,000; shares £5 par, issued. **Debentures:** £5,400 of 6% outstanding.

Profit in 1917 was £100,797, of which dividends absorbed £94,303; £6,494 was carried forward. Current assets exceeded liabilities by £2,000. In 1918 the revenue was £332,620 and dividends £37,500.

Dividends: since 1899 total £10 15/- per share.

Property: 24 acres of producing ground and 85 acres of other areas on the Golden Mile, Kalgoorlie, W. A.

Development: by 2,242 and 3,140′ vertical shafts and extensive workings. Reserves at end of 1918 were 733,102 tons of 9¼ dwt. ore.

Equipment: is complete and modern, including compressors, hoists, crushing plants, a 170-stamp mill with 5 tube-mills, concentrators and cyanide plants.

Production: total to September, 1919, was £11,033,686 from 4,594,698 tons of ore. The past 3 years results were as under:

Year	Tons	Gold
1918	146,664	£332,620
1917	176,028	411,546
1916	162,316	345,529

Costs total $11 per ton.

GREAT BOULDER PERSEVERANCE G. MNG. CO., LTD. W. A.

Mine being worked by tributers. Output to date is £6,737,614 from 466,930 tons, and £1,531,250 paid in dividends. Company is being liquidated. See Vol. XIII.

GREAT BOULDER PROPRIETARY GOLD MINES, LTD. W. A.

Office: J. Gregory, 80 Bishopsgate, London, E. C. 2, England.

Sir G. P. Doolette, chairman of board of directors. Richard Hamilton, gen. mgr.

Inc. June 20, 1894, in England. **Cap.,** £175,000; shares 2s par; all issued.

Revenue during the year 1917 was £529,718, of which £257,641 was profit. Dividends amounted to £262,500. Balance forward was £2,839, compared with £5,488 brought forward from 1916. Net cash assets total about £125,000. In 1918 the profit was £220,731, of which £196,875 was paid in dividends.

Dividends: total 1,770% from 1895 to April, 1919, a total sum of £5,531,800.

Property: 85 acres on the "Golden Mile," Kalgoorlie, W. A.

Development: by vertical shafts, 2,844, 2,879, and 2,000′ deep, with extensive workings. Ore is a sulpho-telluride. Reserves at end of 1918 were placed at 345,719 tons, of 14½ dwt. ore. Deep exploration was not successful, as the main lode passed into the adjacent Golden Horseshoe mine at about 1,800′ in depth.

Equipment: complete and modern, with 600-ton dry crushing and [illegible] plant.

Production: to September, 1919, totals £11,904,695 from [illegible] ore.

Year	Ore, tons
1918	152,196
1917	182,265
1916	176,787
1915	195,524
1914	190,117

Costs are around 32/- ($7.68) per ton.

This is one of the most regular gold producers and [illegible]wn, and is ably directed.

MPTON CELEBRATION (W. A.), LTD.

Office: Lionel Robinson, Pinners Hall, Austin Friars, [illegible]gland.

Inc. December, 1919, in Great Britain. **Cap.** £250,000 [illegible]ed the Celebration lease from the Celebration Syndicate [illegible]0,000 cash and £100,000 in shares. The promoters got £ £75,000 is available for working capital.

Property: the Celebration lease on Block 50 of the Hampton Properties, Ltd., 20 miles south of Kalgoorlie.

By a new system of prospecting, called 'loaming', by which the gold in the soil and surficial material is traced to its source a gold vein was uncovered in June, 1919, which proved to be 20′ wide. Samples for a length of 200′, averaged £5 ($24) per ton. A shaft 100′ deep in November, proved that the value persisted downward. The lode is traceable for 1,400′ on the surface, and estimates based on a length of 1,400′, a width of 20′, a depth of 100′, and value of £5 per ton, at 20 cu. ft. per ton for this class of ore, give a total value of £700,000.

Geologic conditions at the Celebration are said to prove it to be a continuation of "The Golden Mile" of Kalgoorlie, which has yielded over $360,000,000 in gold. If the lode is in quartz-dolerite it should prove persistently rich, but if it is encased in calc-schist the outlook is not so good, judged by past experience at Kalgoorlie. This new mine and its geologic features have excited much interest in Australian mining circles; and the general feeling is that a big mine is likely to be developed.

HAMPTON GOLD MINING AREAS, LTD. WESTERN AUSTRALIA

Office: 4 London Wall Bldgs., London, E. C. 2, England.

Inc. March, 1920, in England. **Cap.,** £500,000; £1 par; all issued.

Property: 189,122 acres on Hampton Plains, 29 miles S. of Kalgoorlie, W. A. Block 48 adjoins Block 50 of Hampton Celebration, in which a good mine has recently been developed. Ground is considered promising.

HAMPTON PROPERTIES, LIMITED WESTERN AUSTRALIA

Offices: C. P. A. Williams, sec., 2 Tokenhouse Bldgs., London, E. C., England; and A. Francis, Macdonald St., Kalgoorlie, Western Australia.

W. A. Bevan, chairman of board of directors. E. H. B. Macartney surveyor.

Inc. Dec. 31, 1898, in Great Britain. **Cap.,** £500,000; £1 par; increased from £400,000 in October, 1919. Shares rose quickly from a few pence to over £2 11/- ($12.24 normal exchange), late in 1919.

Property: 27,000 acres (freehold) on Hampton plains, 20 miles south of Kalgoorlie, Western Australia.

Gold mining has been done from time to time on this tract, there having been several small stamp-mills operated at scattered points. In mid-1919, the deposit described under Hampton Celebration, was found, attracting considerable attention and causing a rush to the area.

HAMPTON URUGUAY, LIMITED WESTERN AUSTRALIA

Succeeded in 1920 by Hampton Gold Mining Areas, Ltd., which see.

IVANHOE GOLD CORPORATION, LTD. WESTERN AUSTRALIA

Head office: C. Lloyd, London Wall Bldgs., London, E. C. 2, England; J. McDermott, gen. mgr.; G. D. Murray, met.; James Drage, mech. eng.

Registered: Oct. 14, 1897, in London. **Cap.,** £1,000,000; shares £5 par.

Profit in 1917 was £106,092. Dividends amounted to £105,000. £7,8[illegible] was carried forward. Reserve fund is £140,000. In 1918 the profit was £79,418, of which £75,000 was distributed.

Dividends: from 1898 to March, 1919, a total of £3,733,750. Highest year was 1899 with 25/- per share; in 1918, 7/6 per share was paid.

Property: 95 acres in the "Golden Mile," Kalgoorlie, W. A., including the best producing mine of the district. Ore is silicious sulphide, 4 to [illegible] wide, 4 veins averaging 12′ being worked.

Development: by a 3,620′ main vertical shaft with levels opened at this depth. Exploration by drilling and sinking is kept well ahead of extraction. Ore reserves are estimated at 1,000,200 tons, averaging [illegible] ($8.16) per ton.

Equipment: includes steam and electric power, hoists, compressors, drills, shops, foundry, a 100-stamp concentrator with sand, slime, and concentrate cyanidation plants, capable of treating 700 tons daily.

Production: to September, 1919, totaled £9,678,514 derived from 4,[illegible]041 tons of ore. Recent yields have been:

Year	Tons	Gold	Cost per ton
1918	208,428	£345,586	.....
1917	233,719	391,429	22/10 ($5.38)
1916	238,514	381,984	21/ 9 (5.22)

Property has a profitable future for several years, and is managed with excellent technical ability.

KALGURLI GOLD MINES, LTD. **WESTERN AUSTRALIA**

Office: F. H. Carlton, 7 Crosby Square, London, E. C. 3, England.

C. S. Stafford, chairman of board of directors. F. G. Brinsden, gen. mgr. R. Black, cons. eng.

Inc. June 14, 1895, in England. **Cap.,** £120,000; shares £1 par; all issued.

Profit for year ended July 31, 1918, was £7,505, against £41,224 in 1917, and £45,947 in 1916. Dividends absorbed £12,000, reducing the reserve fund by £4,500. Cash assets exceed liabilities by £90,000.

Dividends: total £1,639,500 to April, 1919.

Property: 18 acres on the "Golden Mile," Kalgoorlie, W. A.

Development: by 1,900′ shaft. The lode is of peculiar shape, being a "chimney" which is wider than it is long, and has no defined walls, as values fade out; below the 1,800′ level the vein passed from quartz-diorite into calc-schist in which the ore became low-grade. Diamond drilling has thus far failed to reveal any other shoots of sulpho-telluride ore.

Equipment: complete with 350-ton dry crushing and a roasting plant.

Production to September, 1919, totaled £4,414,747 from 1,815,706 tons of ore. Recent yields have been:

	1918	1917	1916	1915
Ore, tons	73,022	103,210	119,180	125,990
Gold yield	£107,333	£179,837	£194,795	£249,878

Costs are around $6 a ton.

In company's last report it was stated that future operations would be unprofitable unless custom ore was received for treatment.

LAKE VIEW & OROYA EXPLORATION, LTD. **W. A.**

Office: C. Lloyd and G. G. Hay, secs., 1 London Wall Bldgs., London, E. C. 2, England.

F. A. Govett, chairman and managing director.

Inc. June 9, 1911, as the Lake View Consols., Ltd., and is a reconstruction of company of same name. **Cap.,** £450,000; shares 10s. par; 721,909 issued. Company announces its business to be the exploration and financing of mines; it holds large interests in Babilonia Gold Mines in Nicaragua; the Burma Corporation in Burma; General Petroleum in California; Granville Mining in the Yukon; Lake View & Star in Western Australia; Leonesa mine in Nicaragua; Mt. Morgan in Queensland; Natomas Co. in California; Nechi Mines in Colombia; Yuanmi Gold Mines in Western Australia; and Zinc Corporation in New South Wales.

Profit for year ended June 30, 1918, was £20,960. Property is valued at £424,740, and reserve is £100,000.

Dividends: 5% in 1912; 10% in 1913, 1914, and 1915; 5% in 1916; nothing since.

SONS OF GWALIA, LTD. **WESTERN AUSTRALIA**

Office: E. Pears, sec., 20 Copthall Ave., London, E. C. 2, England. **Mine office:** Leonora, Western Australia.

D. Richards, chairman and managing director. Bewick, Moreing & Co., gen. mgrs. J. Adam, supt.

Inc. Jan. 7, 1898, in England. **Cap.,** £350,000; shares £1 par; 325,000 issued.

In 1916 the net profit was £39,890, of which £40,625 was paid in dividends; £740 was carried forward. In 1917 the profit was £27,433. Divi-

Production: 325 tons of black tin in 1917, 328 tons in 1918, and 230 tons in 1919. Costs were £126 and average price received was £213 per ton.

JOS TIN AREA (NIGERIA), LTD. NIGERIA

Office: W. S. Griffin, 1 Giltspur St., London, E. C. 1, England.

J. G. M. Bronnjohn, chairman of board of directors; A. S. Williams, mgr.

Inc. May 3, 1910, in Great Britain. **Cap.,** £110,000; 5s. par; 300,000 issued. Profit was £12,978 in 1917. A dividend absorbed £7,500. In 1918 the profit was £15,268, of which £9,375 was distributed.

Dividends: 50% from 1912 to 1918.

Property: 1,412 acres of tin lands in the Jos and Ropp districts, Northern Nigeria, equipped with a bucket-dredge.

Production: 322 tons of black tin in 1917, and 267 tons in 1918.

LOWER BISICHI (NIGERIA) TIN MINES, LTD. NIGERIA

Office: W. S. Griffin, sec., 1 Giltspur St., London, E. C. 1, England.

H. T. Miller, chairman of board of directors; A. S. Williams, gen. mgr.; M. A. Bruce, mine mgr.

Inc. April 29, 1912, in Great Britain. **Cap.,** £40,000; 5s. par; 81,000 issued.

In 1917 the profit was £1,142, and £5,014 in 1918.

Dividends: 12½% for 1917, paid in November, 1918.

Property: 759 acres in Bauchi province, Northern Nigeria, equipped with hydraulic plant.

Production: 72 tons of black tin in 1916; 64 tons in 1917; and 87 tons in 1918.

NARAGUTA (NIGERIA) TIN MINES, LTD. NIGERIA

Office: A. J. Culley, Friars House, 39 New Broad St., London, E. C. 2, England.

F. N. Best, chairman of board of directors; F. O'D. Bourke, gen. mgr.; C. G. Lush, cons. engr.

Inc. January, 1910, in Great Britain. **Cap.,** £175,000; £1 par; all issued.

Profit for 1918 was £42,034, of which £26,250 was distributed. Balance forward was £11,401. Reserves are £20,000. **Dividends:** 70% in December, 1918.

Property: 19 sq. miles in Bauchi province, Northern Nigeria, equipped with hydraulic plant.

Production: 520 tons in 1916; 517 tons in 1917, and 430 tons in 1918. Costs were £133 per ton in 1917.

NIGERIAN TIN CORPORATION, LTD. NIGERIA

Office: E. J. Andrews, sec., Capel House, 54 New Broad St., London, E. C. 2, England.

O. Wethered, chairman of board of directors; R. T. Hancock, mgr.

Inc. Oct. 14, 1909, in Great Britain. **Cap.,** £100,000; £1 par; all issued.

Profit during 15 months ended March 31, 1918, was £12,340, of which £9,964 was distributed and £7,116 carried forward. **Dividends:** 20% in October, 1918.

Property: 2,424 acres and river leases in Northern Nigeria. Company has large interests in other properties in Nigeria, also in Cornwall.

Production: 161 tons in 1917 and 87 tons in 1918.

OFFIN RIVER GOLD ESTATES, LTD.

Office: W. N. Humphrey, Coventry House, South Place, London, E. C. 2, England.

F. N. Best, chairman of board of directors; T. J. Cullen, mgr.

Inc. Dec. 27, 1900, in Great Britain. **Cap.,** £300,000; 7% pfd. and 255,000 ord. shares of £1 par; of which 30,000 and 255,000 respectively are issued. Debentures: £22,850 of 7% authorized; £20,000 issued. No profits are being made or dividends paid.

Property: concession for gold, covering 100 [illegible] along the Offin river, where one of the comp[illegible]

several hundred acres of tin-bearing land in Northern Nigeria, from which the tin is recovered by sluicing and calabashing. Company also owns rubber plantations.

Production years ending December 31:

Year	Yield	tons	Year	Yield	tons
1918.....	£408	119	1916.....	14,253	164
1917.....	8,464	165	1915.....	18,610	29

Evidently the gold property is about worked out.

RAYFIELD (NIGERIA) TIN FIELDS, LTD. **NIGERIA**

Office: G. E. Bance, Capel, House, New Broad St., London, E. C. 2, England.

O. Wethered, chairman of board of directors; J. M. Iles, gen. mgr.

Inc. May 9, 1912, in Great Britain. **Cap.**, £500,007; £1 par; increased October, 1919, from £400,007; all issued. Also £17,175 of 6% debenture stock outstanding.

Profit in 1917 was £42,911, of which £20,000 was paid in dividends. Balance forward was £36,626. Cash assets exceeded liabilities by £64,000. Profit in 1918 was £36,917.

Dividends: 25% to December, 1918.

Property: about 5,500 acres in Bauchi province, Northern Nigeria, equipped for hydraulicking.

Production: 843 tons of black tin in 1916 (15 months), 679 in 1917, and 679 tons in 1918.

ROPP TIN, LTD. **NIGERIA**

Office: H. St. J. Hodges, 20 Copthall Ave., London, E. C. 2, England.

E. Davis, chairman of board of directors; J. Daniel, mgr.

Inc. Dec. 14, 1911, in Great Britain. **Cap.**, £68,750 par 5s; 301,726 issued; also £11,940 6% first-mortgage debentures outstanding, £15,000 5% second-mortgage debentures, and £8,000 6% loan.

In 1917 the profit was £36,099, plus £13,134 balance from 1916. Dividends absorbed £37,156. Balance forward was £12,077. Profit in 1918 was £52,150.

Dividends: total 260% from 1913 to 1918, inclusive.

Property: 61 sq. miles in Bauchi province, Northern Nigeria, worked by two 2¼-cu. ft. dredges, hydraulic plant, and natives with calabashes.

Production: 670 tons of black tin in 1917, and 837 tons in 1918.

RUKUBA (NIGERIA) TIN MINING CO., LTD. **NIGERIA**

Office: H. Dobbin, Friars House, 39 New Broad St., London, E. C. 2, England.

S. S. Bastard, chairman of board of directors; R. W. Hannam, cons. eng.

Inc. Jan. 30, 1912, in Great Britain. Cap. £[illegible], £1 par; all issued.

Profit in 1917 was £4,393. Divid[illegible]

Property: 21 sq. miles in B[illegible] Northern Nigeria, most of which has been leased on 22½%

Production: was 122 tons [illegible] 1917, and 32 tons in 1918.

TIN AREAS OF NIGERIA, LTD **NIGERIA**

Office: W. S. Griffin, 1 Gil[illegible]

J. G. M. Brownjohn, chairman [illegible]

manager.

Inc. March 8, 1910, in Great Br[illegible]

issued.

In 1918 the profit was £29,684, [illegible] was carried forward. Reserve [illegible]

to 1918.

Property: 2 sq. miles in Northern Nig[illegible]

and calabashing.

Production: 141 [illegible] tin in 1916,

TIN FIELDS OF NORTHERN NIGERIA, LTD. NIGERIA

Office: A. J. Culley, sec., Friars House, 39 New Broad St., London, E C. 2, England.

S. R. Bastard, chairman of board of directors; D. Clemens, mgr.; R. W. Hannam, cons. eng.

Inc. Oct. 7, 1909, in Great Britain. **Cap.,** £100,000; £1 par; 70,00[illegible] issued.

Profit for year ended March 31, 1918, was £12,199, £8,425 was carried forward. Profit in 1919 was £2,956.

Dividends: 15% in 1918.

Property: 12 miles in Northern Nigeria, equipped with hydraulic plant.

Production: 113 tons of black tin in 1917, 108 tons in 1918, and 118 tons in 1919.

PORTUGUESE EAST AFRICA

ANDRADA MINES, LTD. PORTUGUESE EAST AFRICA

Office: 286 Salisbury House, London, E. C. 2, England.

Directors: J. C. P. d'Andrada, J. L. Bergson, H. Bousquet, R. Burnay and F. G. C. E. Robellaz (managing).

Inc. Sept. 11, 1911, in Great Britain. **Cap.,** £250,000 in 235,000 ord. shares of £1 and 150,000 dfd. shares of 2s. par, all issued.

Last accounts show a total profit of £22,111 for 3 years ended Dec. 31, 1915.

Property: 614 lode and 75 alluvial claims in Manica district. The Bonganza lode mine is closed, but a dredge operating on the placer ground recovered 19,698 oz. of gold from February, 1914, to December, 1915, making a profit of £45,234.

MOZAMBIQUE CO. (COMPANHIA DE MOCAMBIQUE)

Office: S. H. Sharpe, act. sec., Thames House, Queen St. Place, London E. C., England. **Head office:** 10 Largo da Biblioteca Publica, Lisbon, Portugal.

Inc. March 8, 1888, given Royal Charter, Feb. 11, 1891, and reconstituted May 5, 1892. **Cap.,** £1,500,000; £1 par; issued and paid 1,399,998. A 5% dividend paid in 1911.

The company, which possesses sovereign rights over an area of 65,000 sq. miles, is also the owner of all unalienated land and mining rights in this area, which embraces the central and richest portion of Portuguese East Africa.

The Manicaland goldfield or mining district lies within a radius of 50 miles around Macequece. Geologically speaking, the field is part of the Umtali mining field of Rhodesia. It is a belt of schistose rocks traversed by gold-bearing quartz veins, the gold also being occasionally found in the schist wall rock. Dredging for alluvial gold is being successfully carried on.

Copper ores also exist in the district, the Edmundian mine being in this locality.

Company issues for £1 a mining license that gives the holder a right to prospect for 12 months. Each license gives the right to peg-off [illegible] a block of 10 mineral claims, each 100 m. square for lode and placer deposits and 500 by 1,000 meters for non-metallic minerals.

Claim rents, corresponding to claim licenses, in Rhodesia and the Transvaal, are 10 shillings per claim, in the second year, increasing 5 yearly to a maximum of £3. Rent for a non-metallic claim is £5.11 in second year, doubling each year thereafter up to £55.11 per claim annually. Royalties payable to Companhia de Mocambique for gold are on a sliding scale on the gross output, in the case of monthly outputs up to 500 oz. of fine gold, and vary from 1 to 4%. Above 800 oz. gold output the royalty is 10% of the net profits. For all other metals and non-metallic substances the royalty is 10% of the net profit.

RHODESIA

ANTELOPE GOLD MINE (RHODESIA), LTD.

Office: 8 Old Jewry, London, E. C. 2, England.

Directors: J. C. Prinsep, chairman of board of directors; H. A. Piper, cons. engr.

Inc. Nov. 25, 1908, in England. **Cap.,** £400,000; shares 5s. par; 1,393,128 issued.

Revenue in 1918 was £79,565, of which £1,389 was profit.

Property: 170 claims, 1½ acres each, 60 miles S. of Bulawayo, Rhodesia. Reserves were estimated in September, 1916, at 110,987 tons, assaying $10.10 per ton, reduced to 76,000 tons of $9.90 ore, due to shortage of labor.

Development: by vertical and incline shaft 1,400' deep. The 14th level showed the orebody to be of undiminished size and value, but a dike, encountered in mid-1919, cut off the ore.

Equipment: complete for mining, also 150-ton mill using 2 Krupp ball-mills, 4 furnaces, tube-mill, 12 pans, and 2 filter-presses.

Production: Year	Ore treated, tons	Gold, oz.	Average value per ton
1918	39,830	18,224	.....
1917	46,334	22,096	35/ 6 ($8.46)
1916	45,927	21,580	34/10 (8.26)

BRITISH SOUTH AFRICA CO., THE — RHODESIA

Head Office: 2 London Wall Bldgs., London, E. C., England. A. P. Fillar, act. sec. **Administrator of Southern Rhodesia:** Sir D. Chaplin, Salisbury. **Administrator of Northern Rhodesia:** Sir L. A. Wallace, Livingstone. **Res. Mining eng.:** A. H. Ackermann, Bulawayo.

Board of Directors: R. Maguire, P. Lyttelton Gell, Hon. Sir L. Michell, Sir H. Birchenough, Marquess of Winchester; Otto Beit, H. W. Fox, M. P.; Baron E. B. d'Erlanger, D. O. Malcolm, Br.-Gen. E. Baring, Duke of Abercorn.

Inc. Oct. 29, 1889. Present authorized capital is £9,000,000 in 9,000,000 shares of £1 each, having been increased at intervals from £1,000,000 in 1890; 8,937,533 shares are issued and fully paid. Bonds, £1,250,000 5% mortgage debentures.

Lands: about 400,000 sq. miles. The company acquired: (a) from the Central Search Association, Ltd., the Rudd-Rhodes Concession, consisting of the mining rights over the territory of the King of Matebeleland; the Central Search Association being entitled to one-moiety of the net receipts, which right was subsequently merged in the United Concessions., Ltd., and capitalized in 1894 by the issue of 1,000,000 fully-paid shares of the company; (b) mining rights over the territory of the chiefs Khama and Ingunhana; (c) administrative power over the whole British sphere north of the Zambesi and west of Nyasaland; (d) rights of the African Lakes Co. (acquired in 1894); (e) and also through the Victoria Falls Power Co., in which this company holds a large interest, the right to develop electrical energy at Victoria Falls.

The company adopted the name "Rhodesia" to describe all the territories under its administration; the portion south of the Zambesi being known as Southern Rhodesia. Company controls Bwana M'Kubwa and other important South African copper properties by ownership of stock interest. Company is a gigantic corporation and is the owner of mineral rights throughout its territory.

BWANA M'KUBWA COPPER MINING CO., LTD. — RHODESIA

Office: sec., 19 St. Swithin's Lane, London, E. C. 4, England.

Board of directors.

Inc. March 16, 1910, in England. **Cap.,** £600,000; 10s. par; 925,053 issued. On June 30, 1918, company had an excess of £41,595 over liabilities.

Property: 47,097 acres, containing the Bwana M'Kubwa mine, 1,450 miles by rail from Beira, Portuguese East Africa, in northern Rhodesia. Reserves are estimated at 23,000 tons of 10% copper ore, 3,000,000 tons of 4.5%, and 1,200,000 tons of low-grade material. A 100-ton concentrator using Minerals Separation flotation is in operation.

Production: during the year ended June 30, 1918, the mill treated 16,736 tons of ore, yielding 1,419 tons of 40% copper concentrates.

Mine has been a long time reaching the stage of profitable operation, but from now on should yield a satisfactory return despite its large capitalization.

CAM & MOTOR GOLD MINING CO., LTD. RHODESIA

Office: Palmerston House, London, E. C. 2, England; and Salisbury, Rhodesia.

J. Weil, chairman of board of directors; C. B. Kingston, cons. eng.

Inc. Sept. 3, 1910, in England. **Cap.,** £617,500; £1 par; 599,043 issued. Reorganized in June, 1919, reducing the shares to a par of 7/6 each.

Revenue for year ended June 30, 1918, was £210,630, but expenditure exceeded this by £11,878. Debit balance, £20,709. Current assets total £89,829, and liabilities, £121,461, exclusive of the £50,000 debentures due in December, 1919.

Property: 286 claims, 429 acres, in the Hartley district of Southern Rhodesia.

Development: by 1,100′ steel-lined main shaft at the Motor mine. During 1917-18, 4,338′ of new work was done.

Reserves at the Cam mine, 107,300 tons, worth 39/2 ($9.38) per ton; at Motor mine, 384,700 of 37/3 ($8.91) ore; at Cam Good Shepherd mine, 107,300 tons of $9.38 ore.

Equipment: steam power, hoists, compressors, shops, and 500-ton mill employing 6 Krupp ball-mills, 6 Edwards roasting furnaces, tube-mills and cyanidation plant. As ore contains antimony and arsenic, its treatment is difficult.

Production: 142,766 tons of ore, yielding £208,772 in 1917-'18. In 1918, 162,922 tons yielded £219,374, at a cost of $6.25 per ton, compared with $6.99 per ton in 1917-18.

This is a group of 3 good gold mines, containing reserves valued at £940,000. Owing to expensive development and plant-alterations profits have been small, but it is now proposed to increase the output to 700 tons daily if additional development warrants it. Company reports are admirable for their detail.

ELDORADO BANKET GOLD MINING CO., LTD., THE

Office: 8 Old Jewry, London, E. C. 2, England.

H. L. Sapte, chairman of board of directors. Local directors (Rhodesia): T. G. McDonald, G. Mitchell. The Gold Fields Rhodesian Development Co., Ltd., managers at Bulawayo and Salisbury, Rhodesia. C. E. Parsons, sec.

Inc. Nov. 27, 1906, in Great Britain. **Cap.,** £300,000; £1 par; all issued.

Profit: for year ended March 31, 1918, was £51,297, plus £6,000 balance from previous year. Dividends absorbed £45,000, and £12,795 was carried forward. Cash assets totaled £46,941, and liabilities, £7,572.

Dividends: 227% from 1909 to January, 1919, 15% being paid in 1918.

Property: 161 claims (1½ acres each) in Lomagundi district of Rhodesia.

Development: to depth of 2,500′ on the auxiliary shaft below the 16th level.

Reserves were 31,700 tons of 27.6 dwt. ore. Pillar pointing, the mine is rapidly being worked out.

Equipment: complete mining plant, including pans, and a cyanide plant.

Production: 48,629 tons yielding £53,000 in 1918; 41,948 tons during 9 months ended March 31, 1919.

FALCON MINES, LTD.

Office: Gold Fields Rhodesian Development Co., London, E. C. 2, England.

J. C. Prinsep, chairman of board of directors; H. T. Brett, gen. mgr.; E. Parsons, cons. engr.

Inc. Feb. 26, 1910. **Cap.**, £600,000; £1 par; 400,000 shares issued and lly paid. **Cap.** originally £400,000, increased August, 1912, to provide for nd redemption. Bonds, £250,000 authorized, 6%; £158,078 outstanding.

In 1917-'18 profit was £75,310, plus £106,894 balance from previous year. 1918-'19 the profit was £56,320, and credit balance carried forward was 59,907.

Dividends: 20% in 1916-1917; none since.

Property: comprises 380 claims, 578 acres farm lands near the Falcon ne; also the Athens mine, acquired from the Falcon (Rhodesia) Development ., Ltd., by Rhodesia Cons. Ltd.

The orebodies are large, increasing from 17′ in width on the 3rd level to 50′ the 9th level. Metal contents also increase from 2.45% copper and $3.68 gold r ton on the 3rd to 2.3% copper and 6 dwt. gold on the 9th level.

Development: by 1,100′ shaft and over 6 miles of workings. On No. level the orebody is 180′ long, 70′ less than on No. 9, but the width and value e similar. Reserves amount to 800,000 tons, averaging $5.40 gold and 2% copper. Development work on No. 11 level proved disappointing 1919.

Equipment: crushing plant, equipped with 3 jaw-breakers and 4 trom-els, separating the fine and coarse ores. Sorted ore of 5½% copper content d 9% of total output is sent to furnaces. The 500-ton mill, installed in 1915, s 36 Nissen stamps, tube-mills, Dorr thickeners, vanners and a 9-cell Minerals paration flotation plant.

The *smelter equipment* includes 12 hemispherical blast roasting pots, two ast-furnaces, each of 300-ton daily capacity, two 12,500 cu. ft. turbo-blowers, ectric crane and 12 converters of 15-ton copper capacity. Copper is cast into rs of 360 lb., containing 10 oz. gold and 20 oz. silver. The plan of treatment similar to that of the standard plants in the United States.

See article "Ore Treatment at Falcon Mine," by H. R. Adams, S. African ng. Journ., December 30, 1916, p. 421.

Production, years ended June 30:

er	Tons Ore treated,	Copper, lb.	Gold, oz.	Silver, oz.	All costs
.....	150,961	5,934,000	33,597	68,794	47/7 ($11.42)
.....	170,074	7,064,000	37,701	80,528	46/8 (11.20)
.....	203,049	7,647,000	35,248	70,876	.....
.....	218,792	7,640,000	39,569	73,862	30/7 (7.27)
.....		[illegible]	34,461	53,303	.....

IKA GOLD MINING CO., LTD. RHODESIA

Office: 8 Old Jewry, London, E. C. 2, England.

Directors: A. Davidson, chairman, J. C. Prinsep, and G. R. Saunders.

Inc. Dec. 19, 1902, in Great Britain. **Cap.**, £300,000; £1 par; 273,495 ed.

The year June [illegible] a profit of £13,775. Dividends ab- ed £13,675, £13,624, of which £8,204 was ibuted. Di[illegible] including 5% in 1917-'18, 3% in 1918

Property: [illegible] Shakwe district of Mata- and, Rhode[illegible]

Developmen[illegible] of 12.40 dwt. ore, a ase of 20,000 [illegible] No. 16 shaft, f 35.5 dwt. ore [illegible] [illegible]

Equipment. compl[illegible] [illegible] Chilian and cyanide plant.

Production: Year	Ore treated, tons	Gold yield	Cost per ton
1919	36,789	£66,860	.....
1918	38,554	76,568	29/10 ($7.07)
1917	38,320	84,007	29/ 6 (6.99)

GLOBE AND PHOENIX GOLD MINING CO., LTD. RHODESIA

Office: T. Priest, sec., 35 Old Jewry, London, E. C. 2, England.

Earl Russell, chairman of board of directors; T. Haddon, gen. mgr.; J. Macarthur, mine mgr.

Inc. Oct. 18, 1895, in England. **Cap.**, £200,000; 5s. par; all issued.

Profit for 1917 was £347,280, of which £300,000 was distributed. Profit in 1918 was £114,065, and dividends £120,000. Reserves total £123,812.

Dividends: total 1107%, 40% being paid in 1918

Property: 70 mining claims (1½ acres each) in Rhodesia, 140 miles N. of Bulawayo.

Development: by 3,149′ incline and 2,300′ vertical shafts.

Reserves: at beginning of 1919 were 143,333 tons, averaging 29.9 dwt. per ton.

In the apex suit, started by the Amalgamated Properties of Rhodesia, the Globe and Phoenix won in every court, the final decision being given in 1919.

Equipment: complete, with 40-stamp mill, roasting and cyaniding plant.

Production: in 1918 was 66,383 tons of ore yielding 81,244 oz. gold, compared with 75,465 tons in 1917, yielding gold valued at £403,371, and 77,49[illegible] tons yielding 102,473 oz. gold in 1916.

LONELY REEF GOLD MINING CO., LTD. RHODESIA

Office: A. D. Owen, 34 Bishopsgate, London, E. C. 2, England.

Officers: C. F. Rowsell, chairman of board of directors; C. B. Kingston, gen. mgr.

Inc. Jan. 13, 1910, in Rhodesia. **Cap.**, £325,000; £1 par; 271,007 issued.

A profit of £106,143 was made in 1917, of which £60,977 was paid in dividends. Balance forward was £14,192. Revenue in 1918 was £209,712, and dividends £48,273.

Dividends: 10% in 1911; 30% in 1912; 30% in 1913; 20% in 1914; 15% in 1915; 20% in 1916; 30% in 1917; 25% in 1918.

Property: 234 claims, 351 acres, 40 miles N. of Bulawayo, Bubi district, Rhodesia.

Development: by 3,240′ shaft. Reserves are estimated as 176,097 tons worth 24.1 dwt. per ton, an increase of 31,000 tons and 5.31 dwt. per ton.

Equipment: 20 stamps, 3 tube-mills, and cyanide plant.

Production: in 1918 was 54,320 tons yielding £208,396; compared with 57,870 tons in 1917, yielding £221,299 and 59,320 tons yielding £174,857, with a profit of £70,314 in 1916.

REZENDE MINES, LTD. RHODESIA

Office: F. M. Ward, sec., 4 London Wall Bldgs., London, E. C. 2, England.

Sir A. Bailey, chairman of board of directors; Sir P. B. S. Wrey, [illegible] Farrar, L. E. B. Hanan, and Sir E. M. Clarke. L. H. Blackbeard, mine mgr.

Inc. Dec. 11, 1908. **Cap.**, £120,000; £1 par; 118,435 issued.

Profit in 1917 was £8,352; total credit balance, £45,545. In 1918 profit was £46,620. **Dividends:** 74% from 1912 to 1918, inclusive.

Property: 583 claims (1½ acres each) in Penhalonga valley, Umtali, Rhodesia.

Development: by shafts, the deepest being 1,400′ on incline. Reserves are estimated at 447,690 tons by directors, and 175,374 tons of 12.5 dwt. ore by consulting engineer S. R. Jameson.

Equipment: complete at mines, and stamp mill with cyanide plants.

Production: 54,000 tons in 1918, yielding £125,528; 59,500 tons in [illegible] yielding £94,532.

RHODESIA BROKEN HILL DEV. CO., LTD. **RHODESIA**

Office: T. Donald, 19 St. Swithin's Lane, London, E. C. 4, England.

E. Davis, chairman of board of directors; R. K. Macartney, mine mgr.; Hooper, Speak & Co., cons. engr.

Inc. Aug. 19, 1910. **Cap.,** £350,000; 5s. par; 991,083 issued.

Property: 1,690 claims (1½ acres each), 374 miles from Victoria Falls, Rhodesia. Fully described by S. J. Speak in "Mining Magazine," October, 1919.

Geology: the ground contains a number of "kopjes," ("buttes" or hills), carrying lead and zinc ores. No. 1 and 2 kopjes are 65 and 90′ high, respectively; No. 2 contains zinc ore with iron ore and a little lead. Over 300,000 tons of 32% zinc ore have been exposed, which tonnage was increased by drilling operations carried on in 1919. No. 1 kopje shows, in section, a block of dolomite replaced by oxidized ore containing numerous boulders of zincified dolomite; many caves and vugs with bone remains. A sand-filled central core adjoins oxidized ore, grading into replaced dolomite, high in zinc but low in lead.

Development: by open quarry work which is hampered by a large inflow of water, as much as 170,000 gal. per hour being pumped 40′ to surface.

Equipment: mine pumps, tramways, 2 blast-furnaces for lead ore and 2 more to be erected. A plant for treating zinc ore is under consideration.

Production: 26,000 tons of lead to October, 1919, when the output averaged 1,000 tons per month.

Property is as yet in its infancy, and is thought to have a prosperous future.

RHODESIA CHROME MINES, LTD. **RHODESIA**

Office: T. Donald, sec., 365 Salisbury House, London, E. C.

Inc. June 27, 1908. **Cap.,** £60,000; shares £1 par; 59,457 issued.

Dividends: 10% in 1911; 20% in 1912; 20% each in 1913 and 1914; nil in 1915; 45% in 1916; 20% in 1917.

Property: 885 acres, in the Gwelo and Selukwe districts, Southern Rhodesia.

Production of chromic-iron ore:

Year	Tons	Value	Year	Tons	Value
1918.....	28,628	.....	1914.....	48,207	£107,612
1917.....	72,962	£327,347	1913.....	63,383	141,481
1916.....	88,871	333,170	1912.....	69,260	154,600
1915.....	60,581	175,792			

Company is a close corporation, and reports are not issued.

RHODESIA COPPER & GEN. EX'N & F. CO., LTD. **RHODESIA**

Office: T. Donald, 365 Salisbury House, London, E. C. 2, England.

Sir E. Davis, chairman of board of directors.

Inc. March 5, 1909, in England. **Cap.,** £352,793, in 1,398,046 shares of 5s. 6d. and 101,954 of 7s. 6d. par, of which 1,173,405 of the former are issued. On May 31, 1918, there were cash assets amounting to £228,540.

Dividends: were 5% in 1910-'11; 3% in 1913-'14; 3% in 1915-'16; 2% 1916-'17; nil in 1918.

Property: 640 sq. miles near the Kafue river, 64,733 acres of farm lands, 10 mining claims, 1½ acres each, also ½ interest in 130 and ⅛ interest in 150 claims, all in Northern Rhodesia. On some of the claims fair quantities of copper ore have already been opened. To develop some of the claims the Rhodesia Broken Hill Development (lead-zinc), Kafue Copper Development, and Bwana M'Kubwa Copper companies have been organized.

SHAMVA MINES, LTD. **RHODESIA**

Offices: 8 Old Jewry, London, E. C. 2, England, and Bulawayo, Rhodesia.

E. S. Bikenruth, chairman of board of directors; J. G. McDonald and G. Mitchell in Rhodesia. W. Wallace, mine mgr.

Inc. April 5, 1910, in England. **Cap.,** £600,000; £1 par; all issued.

In 1918 the profit was £101,436, compared with £164,893 in 1917. **Dividends:** 27½% in 1915; 30% in 1916; 26¼% in 1917; 20% in 1918.

Property: 243 acres, 1½ a
velopment: by tunnels. Res
4.3 dwt. ($4.30) per ton. **Eq**
stamps, 10 tube-mills, and cyani

Production:

Year	
1918	
1917	
1916	

Total costs are about 9s. (
in Rhodesia. Reserves are lar
has been increased 300,000 ton
grade ore, the value per ton of
in 1916 estimates.

ZAMBESIA EXPLORING

Office: L. Scotland, sec.,
2, England.

Tyndale White, chairman c
director; R. Williams & Co., n

Inc. March 26, 1891. **C**
1900, 1903, 1905, 1909 and 191
687,860, fully paid. Debenture
before February 28, 1918, or si
the later date, £213,009 outstanc

A dividend of 100% was p
ganyika Concessions, Ltd., whi

Property: consists of ab
interest in 20 mining claims; a
one-half interest in 10 mining
Tanganyika Concession, Ltd.;
Miniere du Haut Katanga sh
Tanganyika Concessions, Ltd.,
Railways.

SOUT

OTAVI MINES & RAILWA
(Otavi Minen & Eisenbahn
Fully described in Coppe

Property formerly owne
ing the war by the S. A. Go
west Africa Co., Ltd.

SOUTHWEST AFRICA C

Secretary and offices: C.
E. C. 2, England.

E. Davis, chairman of boa
fontein, S. W. Africa.

Inc. Aug. 18, 1892, in E
to £400,000, £500,000, £1,000,000,
issued.

Dividends: were 5% in
5% in 1912 and 1913, none sinc
ing £26,418 dividends on inve
end of the year. These consis
A profit of £95
In 1918
to £474
£733 7
Prop

ıg rights, and about 1,600,000 acres of unsold freehold land in Damaraland; a ne-half interest in mining rights to 23,000 sq. miles in Ovamboland; a two-ıirds interest in the South African Co., Ltd., owning about 66,000 sq. miles of ıining rights, in Angola, Portuguese S. W. Africa, nearly one-half interest in ıe Hanseaticer Mining Co., owning mining rights covering about 15,000 sq. ıiles; a large share interest in the Otavi Mines & Railway Co., small interests ı the Southwest African Mining Syndicate and the Otavi Exploring Syndicate, td. The Otavi Mines & Railway shipped 51,000 tons of ore and matte in 1913-14.

In March, 1920, a mandate was given the Union of South Africa over "German outhwest Africa," by the Allied powers. Operations at the mines can therefore ; resumed.

TRANSVAAL

NGLO-AMERICAN CORP'N. OF SO. AFRICA, LTD. TRANSVAAL

Offices: C. W. Moore, sec., 5 London Wall Bldgs., London, E. C. 2, ıgland; and 120 Broadway, New York.

Ernest Oppenheimer, chairman of board of directors.

Inc. Sept. 25, 1912, in the Transvaal. **Cap.,** £1,000,000; £1 par; all ıued. Directors possess power to double the capital, if necessary.

Business: company has interests in the Rand Selection Corporation, akpan Mines, Springs Mines, Daggafontein Mines, and New Geduld Deep. ; tender for operating the western portion of Farm De Reitfontein No. 14 ıs accepted by the Union Government, and the West Springs, Ltd., was organ-d to work the property.

In March, 1920, it was proposed to amalgamate this and the Rand Selection rporation, the Anglo to issue 1,320,000 new shares.

Company is primarily an exploration and holding company.

AKPAN MINES, LTD. TRANSVAAL

Offices: J. H. Jeffreys, sec., 5 London Wall Bldgs., London, E. C. 2, gland, and 409 Corner House, Johannesburg, Transvaal.

E. R. Lynch, chairman of board of directors; C. R. Davis, mine mgr.; M. J. rner, asst. mgr.; J. Erving, cons. mech. eng.; C. E. Knecht, cons. mining eng.

Inc. Feb. 16, 1903, in the Transvaal. **Cap.,** £850,000; £1 par; 791,000 ıed.

Revenue in 1917 was £1,168,455; £482,120 was profit and £367,525 ; distributed. Respective figures for 1918 were £1,089,957, £366,010, and 7,107.

Dividends: from 1912 to 1918, inclusive, total 267½%, 32½% being paid 1918.

Property: 3,387 claims in the Far East Rand goldfield.

Development: by 5 shafts, deepest 3,800', one being an incline. New k in 1917 amounted to 18,451'. Reserves are estimated at 2,718,000 tons of dwt. ore, the reef having a thickness of 67".

Equipment: electric power, complete with hoists, compressors, ven-ing fans, tramways, shops, 160 stamps, 12 tube-mills, and cyanide plant of 0 tons monthly capacity, assay-office, and dwellings. Plant is to be doubled 922.

Production, years ended December 31:

Ore treated, tons	Gold, oz.	Average p. t. dwt.	Extract., %	Total cost
..... 617,100	258,272	8.31	.....	25/5 ($6.10)
..... 677,500	276,738	8.17	96.70	20/3 ($4.86)

This is one of the new mines of the Rand.

TRAL MINING & INVESTMENT CORPORATION, LTD.

London, E. C. 2, England; J. L. Siddall, ...d of directors.

E. G. Izod, mgrs. at Johannes-

burg; F. Geim, P. Troquet, and A. W. Rogers, mgrs. in London. H. F. Marriott, cons. eng. in London; E. Dew, con. mech. and elec. eng.

Inc. May 9, 1905, in England. **Cap.**, £3,400,000; shares £8 par; all issued.

Profit in 1917 was £349,090, and £397,000 in 1918. Reserve fund is £450,000.

Dividends: 1918, 5% per share; 1917, 5% (8s. per share); 1916, 5%, £2 16s. per share from 1908 to 1911, inclusive; 5% in 1912; 2½% in 1913 and 1914; nil in 1915; 5% in 1916, 1917 and 1918.

Company is a holding concern, interested in the Bantjes, City Deep, City & Suburban, Crown Mines, Daggafontein, Durban Roodepoort Deep, New Heriot, New Modder, Nourse Mines, Robinson Deep, Robinson Gold, Rose Deep, Village Deep, Village Main Reef, Rand Mines, Ferreira Deep, Geduld Prop., Geldenhuis Deep, Modder B., Modder Deep, and East Rand Proprietary companies, all large gold producers on the Rand.

Corporation is responsible for the initiation of and holds a controlling interest in Trinidad Leaseholds, Ltd., a highly successful oil company in the island of Trinidad. It also possesses a substantial interest in the Magadi Soda Co., Ltd., and is actively connected with the base metal industry in Great Britain through its interests in the British Metal Corporation, Ltd., Williams, Foster & Co., and Pascoe, Greenfell & Sons, Ltd.

CITY DEEP, LTD. TRANSVAAL

Office: A. Moir & Co., sec., 1 London Wall Bldg., London, E. C. 2, England.

Sir E. A. Wallers, chairman of board of directors; P. W. Sherwell, mgr.; E. H. Clifford, cons. eng.

Inc. Feb. 15, 1899, in the Transvaal. **Cap.**, £1,250,000; £1 par; all issued.

The profit in 1917 was £682,020, plus £211,214, balance from previous year. Dividends absorbed £562,500. Balance forward was £210,[illegible]. Profit in 1918 was £447,718.

Dividends: from 1912 to 1918, inclusive, 205%, 27½% being paid in [illegible].

Property: 1,081 claims on the Rand, worked by 3 vertical shafts 4,[illegible] 4,340′, and 227′ deep; and another being sunk. Reserves at beginning of [illegible] were 3,342,700 tons, averaging 9.6 dwt. per ton.

Equipment: complete for mine and for mill of 80,000 tons monthly capacity, with 190 ordinary and 4 Nissen stamps, 9 tube-mills, and cyanide plant.

Production, year ended December 31:

Year	Ore treated, tons	Gold Yield	Working Profit
1918	670,100	£1,274,969	£447,718
1917	744,100	1,468,104	635,[illegible]

CONSOLIDATED GOLD FIELDS OF SOUTH AFRICA

Offices: H. C. Porter, sec., H. D. Sidgraves, asst. sec., 8 Old Jewry, London, E. C. 2, England. E. C. Goodhart, mgr., 12 Rue des Pyramides, Paris, France; 233 Broadway, New York.

Lord Harris, chairman of board of directors; Johannesburg staff: Christopherson, mgr; F. L. Brown and C. Hele-Hutchinson, asst. mgrs. **Engineering staff:** David Wilkinson, cons. engr.; [illegible] in America; de Ropp, agt.; Amor F. Keene and H. H. Wa[illegible], agt. in Rhodesia.

Inc. Aug. 2, 1892, in England. **Cap.** [illegible] in 1,250,000 6% first-cumulative preference shares; [illegible] cumulative preference shares; total [illegible] total £50,000 of 5½%.

Company is a holding concern [illegible] many important mines and other [illegible] American Trona, Cam & Motor [illegible] Gold Fields American Development [illegible] derfontein) Consolidated, Lone[illegible]

Power, Robinson Deep, Shamva Mines, Simmer Deep, South American Gold & Platinum, and Victoria Falls & Transvaal Power Co., all described under their respective titles. Company also owns considerable real estate in the Transvaal, Rhodesia, and London.

Financial statement for year ended June 30, 1918, shows an income of £432,081, of which £412,540 was profit; £300,000 was paid in dividends. After writing down investments and providing for contingencies, etc., the balance out of £1,070,954 available after allowing £705,808 for depreciation of investments, and £150,000 for preference dividends, etc, was £210,095.

Dividends: on first preference shares is paid Jan. 1 and July 1; on second preference, April 1 and October 1; on ordinary, since the Boer War, 25% in 1901-02; nil in 1902-03; 12½% in 1903-04; 15% in 1904-05; nil in 1905-06; 12½% in 1906-07; 20% in 1907-08; 35% in 1908-09; 30% in 1910-11; 17½% in 1911-12; 10% in 1912-13; 5% in 1913-14; 7½% in 1914; 7½% in 1915-16; 7½% in 1916-17; 7½% in 1917-18.

CONSOLIDATED LANGLAAGTE MINES, LTD. TRANSVAAL

Officers: 10-11 Austin Friars, London, E. C. 2, England, and Cons. Investment Co., Ltd., Consolidated Bldg., Johannesburg, S. A.

Directors: J. Munro, chairman; W. L. White, cons. engr.; A. E. Payne, mine mgr.

Inc. September, 1902, in Transvaal. **Cap.,** £950,000; £1 par; all issued and fully paid; £300,000 in 5½% debentures authorized; outstanding, £75,000. Company was formed to acquire the New Croesus Gold Mining Co., Ltd., and the Langlaagte Star Mining Co., Ltd.

Annual report for years ending December 31, shows:

Year	Revenue	Profit	Dividends	Balance from Last Year	Balance Forward
1919 (last quarter)	£151,115	£78,485	£71,250	.....	.....
1918.....	637,122	159,232	47,500	£59,082	£77,431
1917.....	729,938	228,553	166,250	98,627	59,082
1916.....	785,637	279,662	213,750	75,196	98,627

Dividends: for 1913, 10%; 1914, 20%; 1915, 25%; 1916, 22½%, 1917, 17½%; 1918, 5%.

Property: 343 claims, and 210 deep level claims, on farm Langlaagte, **No.** 13, 4 miles west of Johannesburg. Also 30 claims under lease for erecting **plants** and 3 water-rights.

Development: on the southern end of the property, the East and West shafts have been sunk 4,057' and 3,752' (incline depth), to work the deep levels. New openings in 1918 totaled 13,814'. There were 125 drills operated. The flow of water was as much as 16½ million gallons in a month. Ore reserves are estimated at 2,132,778 tons, valued at 6 dwt. per ton, with a stoping thickness of 49".

Equipment: includes 100-stamp mill with 1,900-lb. stamps, 10 tube-mills and cyanide plant with capacity of 53,000 tons monthly.

Production:

Year	Tons	Gold, oz.	Cost per ton
1919 (last quarter).....	114,000	35,300	$5.42
1918.....	503,300	148,730	4.55
1917.....	585,650	171,326	4.10
1916.....	627,050	184,938	3.88
1915.....	636,500	184,839	3.50

CONSOLIDATED MAIN REEF MINES & EST., LTD. TRANSVAAL

Office: Dowson ... Salisbury House, London, E. C. 2, England, and Rand ... House, Johannesburg, Transvaal.

M. Honnet, ... Wallers, cons. engr.; E. Healey, ...

Inc. July, ... erties of the Main Reef Gold M... d Mining Co.,

Ltd. **Cap.**, £950,000; £1 par, increased to £1,247,602 in January, 1928; all issued.

Property: 1,976 claims and an estate of 7.66 sq. miles six miles west of Johannesburg.

Development: ore reserves to below 4,000' in depth are 1,425,870 tons averaging 7.3 dwt. per ton.

Equipment: includes 240-stamp mill, 6 tube-mills, cyanide plant and necessary surface equipment.

Production, years ended December 31:

Year	Ore treated, tons	Gold Yield	Cost per ton
1918	539,760	£760,496	22/7 ($5.55)
1917	342,895	501,281	19/6 (4.62)
1916	294,766	442,649	.....

Increase of tonnage in 1918 is due to absorption of two other mines and mills.

CROWN MINES, LTD. TRANSVAAL

Offices: A. Moir & Co., 1 London Wall Bldgs., London, E. C. 2 England; and The Corner House, Johannesburg, Transvaal.

S. Evans, chairman and managing director; H. C. Boyd, director; H. S. Martin, cons. eng.; A. J. Brett, gen. mgr.; A. V. Lange, and T. Simpson, joint managers; and S. H. Pearce, reduction officer.

Inc. March 31, 1892, in the Transvaal. **Cap.**, £1,000,000; 10s. par; 1,880,212 issued. **Debentures:** £1,000,000, 5% first mortgage authorized £572,500 outstanding.

Profit in 1917 was £628,898, of which £376,042 was distributed; and £410,642 and £188,020 respectively in 1918.

Dividends: totaled 727% from 1898 to 1910; 120% in 1910; 110% in 1911, 1912 and 1913; 85% in 1914; 65% in 1915; 50% in 1916; 40% in 1917; 30% in 1918.

Property: 2,339 claims, 3,508 acres, on the Rand, Transvaal.

Development: by 14 shafts. Ore is hoisted through No. 5 and 7 shafts, which are connected by two main haulage-levels.

Ore reserves estimated as follows:

Year	Tons	Gold per ton, dwt.
1918	8,298,100	6.30
1917	11,429,000	5.90
1916	9,938,000	6.25

Equipment: immense mining and reduction plants, including 855 stamps, 26 tube-mills, sand and slime plants, capable of treating 7,600 tons of ore daily.

Production, years ending December 31:

Year	Ore treated, tons	Gold Yield	Working Profit	Cost per ton
1918	1,861,000	£2,528,760	£410,704	22/9 ($5.46)
1917	2,100,000	2,700,096	670,000	19/4 ($4.52)
1916	2,666,000	2,887,777	815,620	16/8 (4.00)

This company is probably the largest gold producer in the world.

EAST RAND PROPRIETARY MINES, LTD. TRANSVAAL

Offices: The Corner House, Johannesburg, Transvaal; and 4 London Wall Bldgs., London E. C. 2, England.

Sir Evelyn Wallers, chairman of board of directors; The Central Mining & Investment Corporation, manager at mine; E. C. J. Meyer, sec. Rand Mines, Ltd.

Inc. May 6, 1893 in the Transvaal. **Cap.**, £2,514,000; £1 par; 2,445,000 issued.

Debentures: £1,500,000 authorized; £835,630 outstanding.

Company controls the Angelo, Cason, Driefontein Cons., Blue Star and Comet companies, operating on the Rand, covering an area of 4,273 claims.

During 1915 a net profit of £514,940 was made. Dividends absorbed £275,163, and there was carried forward £193,354. In 1918 the profit was only £2,926. Cash assets totaled £326,485.

Dividends: since 1903 total 350%, but from 1913 to 1916 they dwindled from 25 to 5%; with none in 1917 and 1918.

Property: 4,273 claims, 1½ acres each, on the Rand, Transvaal.

Development: by numerous shafts and extensive workings. Reserves in 1916 were estimated at 4,800,000 tons of $6.40 and 9,800,000 tons of $4.40 ore, but were only 2,732,000 tons of $6.20 in 1917, and 2,200,000 tons of $6.50 ore at end of 1918. Recent development work has been unsatisfactory.

Equipment: full complement for mining; 440 stamps, 19 tube-mills and cyanide plants.

Production, years ending December 31:

Year	Ore treated, tons	Gold Yield	Working Profit
1918	1,372,300	£1,597,075	£52,915
1917	1,741,300	1,910,384	188,951
1916	1,936,326	2,365,107	514,940

In 1914, the directors thought that 20 years' profitable work was ahead of the company, but, like several other great consolidations on the Rand, the predicted estimates were not realized. While this is one of the world's great gold producers, it is very probable that a large production cannot be continued for more than a year or two longer.

FERREIRA DEEP, LTD. **TRANSVAAL**

Offices: The Corner House, Transvaal, S. A.; and 1 London Wall Bldgs., London, E. C. 2, England.

H. C. Boyd, chairman of board of directors; P. Cazalet, cons. engr.; P. Selby, mine mgr.

Inc. Aug. 25, 1898, in the Transvaal. **Cap.,** £1,000,000; £1 par; 980,000 issued.

Accounts for year ended Sept. 30, 1916, showed: net profit, £452,699; cash balance, £117,461, after payment of £379,750 in dividends. In 1918 the profit was £211,716, and £147,984 was carried forward, after distributing £220,500.

Dividends: 1902 to 1918, inclusive, 627%, 22½% being paid in 1918.

Property: 207 mining claims at Witwatersrand, formerly owned by the Barnato Cons. Mines, Ltd., the Rand Mines, Ltd., and the Ferreira Gold Mng. Co., Ltd., each of these companies receiving a stock interest in the Ferreira Deep Ltd., in payment for the claims.

Development: by extensive workings. Ore reserves were estimated on Sept. 30, 1916, at 1,632,600 tons, averaging 8.3 dwts. gold; 1,305,500 tons of 7.6 dwt. in 1917; and 932,400 of 8 dwt. in 1918.

Equipment: complete power and mining plants, with 280 stamps, 7 tube-mills and cyanide unit.

Production, years ending September 30:

Year	Ore treated, tons	Gold Yield	Cost per ton
1918	508,200	£806,487	23/ 5 ($5.57)
1917	586,320	957,973	.....
1916	643,460	1,130,227	20/11 (5.07)

GEDULD PROPRIETARY MINES, LTD. **TRANSVAAL**

Office: H. Rogers, Pinners Hall, Austin Friars, London, E. C. 2, England.

H. Newhouse, chairman of board of directors; S. Macphail, gen. mgr.; P. M. Anderson, cons. eng.

Inc. March 28, 1899, in the Transvaal. **Cap.,** £1,500,000; £1 par; 1,150,-

[redacted] in 1917 £187,143. Dividends paid were £97,000. In 1918 [redacted] **Dividends:** 5% in 1914; 10% in 1915, 1916 and 1917;

Property: 2,481 claims in the Heidelberg district, East Rand.

Development: by 7 shafts. Reserves were 2,510,000 tons of 7.5 dwt. ore at end of 1918, an increase of 310,000 tons.

Equipment: complete with 100 stamps, 7 tube-mills, and cyanide plant.

Production: 425,550 tons yielding £631,364 in 1917; 513,200 tons yielding £745,818 in 1918. Costs are around £1 ($5) per ton.

GENERAL M'G & FINANCE CORP'N, LTD. TRANSVAAL

Head office: H. W. Dalton, sec., General Mining Bldg., Johannesburg, Transvaal.

Sir G. Albu, chairman of board; A. French, mgr.; E. Hay, tech. advisor; E. Farrar, mechanical engr.; H. W. Clayden, electrical engr.; R. Heymann, cons. chemist.

Inc. Dec. 30, 1895, in the Transvaal. **Cap.,** £1,875,000; shares £1 par; all issued.

Company has large interests in and manages the Aurora West United, Meyer & Charlton, New Goch, Roodepoort United, Van Ryn, and West Rand Cons. mines, all producers. Also owns the Cinderella Cons., New Steyn, and Rand Collieries, partly developed.

Profits in 1916 were £35,616, an increase of £20,509; £44,144 in 1917, and £25,434 in 1918.

Dividends: have been irregular, amounting to 67% up to 1911; nothing since 1910.

GOV'T GOLD M'NG. AREAS (MODDERFONTEIN) CONS., LTD.

Offices: 10 and 11 Austin Friars, London, E. C. 2, England; and Consolidated Bldg., Johannesburg, Transvaal.

S. B. Joel, chairman of board of directors; M. J. Turner, mgr.; W. L. White, cons. eng.

Inc. Feb. 26, 1910, in the Transvaal. **Cap.,** £1,400,000; £1 par; all issued.

Profit in 1915 was £160,612, of which £111,599 was carried forward; and in 1917 £693,916, with £146,332 carried forward.

Total revenue in 1918 was £2,162,584 yielding, £876,326 profit, of which the government's share was £369,982. Dividends amounted to £385,000.

Revenue for last quarter of 1919 was £611,719, of which £246,226 was profit, plus £206,400 gold premium.

Dividends: 5 paid to end of 1919, the last of 20%, on December 31.

Property: 2,633 claims, 1½ acres each, on the Far East Rand, Transvaal.

Development: four 7-compartment shafts, 2,538', 2,433', 3,893', and 3,[illegible] deep, two 3,100' apart and two 4,000' apart. Main "reef" was cut in N.-E. shaft in 1912 at depth of 2,395', where it was 31" wide, and worth $7.15 per ton. The dip is 15° S. W. In N.-E. shaft reef was cut at 2,275', being 21" wide, worth $7.70; at 3,579' in the S. E. shaft it was 57" wide, worth $[illegible] and in the S.-W. shaft at 3,608', 30" wide, worth $3.80 per ton.

Ore reserves. 3,665,000 tons of 6.9 dwt. in 1915; 4,930,000 of 7.2 dwt. in 1916; 7,016,000 tons of 7.5 dwt. in 1917; and 9,445,000 tons of 8 dwt. in 1918.

Equipment: complete, with 200 (2,000 lb. each) stamps, 25 tube-mills and cyanide plants, with monthly capacity of 135,000 tons. There are 5[illegible] natives employed.

Production, years ending December 31:

Year	Ore treated, tons	Gold Yield	Working Profit	Cost per ton
1919 (last quarter)	338,000	£611,719	£246,226	21/9 ($5.32)
1918	1,303,500	2,162,585	876,327	19/7 [illegible]
1917	1,298,000	1,930,657	693,916	18/— [illegible]
1916	744,000	1,008,643	204,688	21/6 [illegible]
1915	576,100	720,000	156,210	19/6 [illegible]

The above table shows the progress of this great [illegible]

JOHANNESBURG CONS. INVESTMENT CO., LTD. TRANSVAAL

Office: T. Honey, 10 Austin Friars, London E. C. 2, England.

S. B. Joel, chairman of board; G. Imroth, mgr. in South Africa; W. L. White, cons. eng. in Johannesburg.

Inc. September, 1889, in the Transvaal. **Cap.,** £4,500,000; £1 par; 3,950,000 issued.

Profit for year ended June 30, 1918, was £200,739, plus £159,557 from previous year. Dividends absorbed £197,500; £161,796 was carried forward. Investments are valued at £3,317,058.

Dividends: 157½% from 1894 to 1918, inclusive; 3% in 1918.

Company carries on a general agency, real estate, and investment business, but has large interests in the following mines: Consolidated Langlaagte, Ginsberg, Government Gold Mining Areas (Modderfontein), Langlaagte Estate & Gold, New Primrose Gold, New State Areas, New Unified Main Reef, Randfontein Central, Van Ryn Deep, and Witwatersrand Gold, all gold producers save the New State, which is developing.

KNIGHTS DEEP, LTD. TRANSVAAL

Head office: Consolidated Gold Fields of S. A., Ltd., Box 1167, Johannesburg, Transvaal. **London office:** 8 Old Jewry, E. C. 2, England.

D. Christopherson, chairman of board of directors; G. A. Chalkley, mine mgr., Box 192 Germiston, Transvaal.

Inc. Sept. 14, 1895, in the Transvaal. **Cap.,** £743,526; £1 par; all issued.

The year ended July 31, 1918, showed a working profit of £21,019; the net balance carried to appropriation account being £3,211. **Dividends:** total declared to December, 1918, 252½%; nothing in 1918.

Property: 506 claims situated partly on the farm Elandsfontein No. 11 and partly on the farm Driefontein No. 12, Witwatersrand.

Development: ore reserves estimated in 1918 at 1,671,000 tons that average 4.43 dwt., exclusive of 83,000 mine tons of partly developed ore carrying 5.03 dwt. gold per ton. Recent development indicates that certain blocks, including above reserves cannot be profitably worked under 1920 conditions.

Equipment: 400 stamps, 11 tube-mills, and cyanide plants.

Production: year ended July 31, 1918, 1,140,700 tons of ore yielding gold to the value of £842,442, compared with £886,295 from 1,196,500 tons in 1917.

LANGLAAGTE ESTATE & GOLD MNG. CO., LTD. TRANSVAAL

Office: 10 Austin Friars, London, E. C. 2, England.

S. B. Joel, chairman of board of directors; J. Munro, V. c.; W. A. Crige, mgr.; W. L. White, cons. eng.

Inc. Jan. 13, 1888, in the Transvaal. **Cap.,** £950,000; £1 par; 886,500 issued.

Revenue in 1918 was £647,999, of which £139,083 was profit. After paying dividends of £110,813, etc., balance forward was £70,898. **Profit for** 1st quarter of 1919 was £54,785.

Dividends: total 571½% since 1889; 12½% for 1918; 7½% on Decem-er 31, 1919.

Property: covers a large area on the Rand. Block B mine contains 060,594 tons of 6.9 dwt. ore, which is worked by an incline shaft 2,983' eep. New work in 1918 totaled 8291'. The Langlaagte mine is worked it.

Equipment: complete with 200-stamp mill containing 5 tube-mills and anide plant.

Production: in 1918 was 152,282 oz. of gold from 533,690 tons of ore, th a total cost of 19/ ($4.56) per ton. Output for last quarter of 1919 was 1,790 tons of 24/6 ($5.88) ore, with total costs of 23/6 ($5.64) per ton.

ESSINA (TRANSVAAL) DEV. CO., LTD. TRANSVAAL

Head office: 1 London Wall Bldgs., London, E. C. 2, England. **Mine** ice: Messina, Zoutpansberg, Transvaal, South Africa.

Officers: C. F. H. Leslie, chairman of board of directors; A. B. Emery, gen. mgr.

Inc. Jan. 30, 1905, in England. **Cap.,** £250,000; shares 5s. par; 727,154 issued. Capital increased from £110,000 to £200,000 in 1908, and to present amount in 1911. **Bonds:** £250,000 issued April, 1912, at 95%, redeemable at 105% by drawing or purchase in open market at or under that price; £171,000 outstanding. Interest guaranteed to Jan. 1, 1917, by Camp Bird, Ltd. (of Colorado).

In 1918 the income was £399,096, of which £25,175 was profit. Balance at end of previous year £156,687, was reduced to £133,770.

The year ended June 30, 1919, resulted in a loss of £39,373, after allowing £55,600 for depreciation and railway guarantee.

Dividends: in 1915-16 were equal to 40%; 20% in 1916-'17; nil in 1917-'19.

Property: about 22,432 acres of copper-bearing lands, including the Messina and Vogelsang mines; also coal and lime claims in the Zoutpansberg district of the Transvaal. Ore contains chalcocite, bornite, and some chalcopyrite occurring in veins in granite.

Development: by the 1,033' Messina and 1,742' Vogelsang shafts, and extensive workings.

Ore reserves: in 1916 were estimated at 208,061 tons of 4.75% copper ore to No. 16 level; 273,447 tons of 3.59% in 1917; and 297,803 tons of 3.45% in 1918. The Vogelsang is likely to become a large producer. In 1919, reserves were 415,000 tons of 3.25% ore; also 325,000 tons of 1.4% jig tailings.

Equipment: adequate for all present needs, includes a 250-ton mill and 2 reverberatory furnaces.

Production, years ending June 30:

Year	Ore treated, tons	Copper, %	Copper, long tons
1918	120,899	3.47	3,537
1917	142,588	3.98	5,111
1916	112,043	5.43	5,732
1915	91,033	....	5,331
1914	64,304	....	4,007
1913	24,847	....	1,473

MODDERFONTEIN B GOLD MINES, LTD. TRANSVAAL

Office: A. Moir & Co., 1 London Wall Bldgs., London, E. C. 2, England.

Sir L. A. Wallers, chairman of board; C. L. Butlin, mgr.; H. S. Martin, cons. eng.

Inc. Nov. 18, 1908, in the Transvaal. **Cap.,** £700,000; £1 par; all issued.

In 1918 the profit was £658,587; dividends, £577,500, and balance forward to 1919, £198,045; compared with £709,601, £595,000 and £246,570 respectively.

Dividends: from 1912 to 1918, inclusive, total 442½% (£3,027,500); 82½% for 1918.

Property: 1,467 claims in the Far East Rand.

Development: new work in 1918 was 9,894', compared with 9,941' in 1917. Of this, 60% was pay-ore. A deep circular shaft, 20' in diameter, is being sunk. Ore reserves are estimated at 3,378,000 tons, averaging 9.2 dwt. per ton across 62 inches.

Equipment: complete with 80 ordinary and 24 Nissen stamps, 8 tube mills, and cyanide plants of 60,000 tons monthly capacity.

Production, years ending December 31:

Year	Ore treated, tons	Gold Yield	Cost per ton
1918	605,500	£1,253,614	19/8 ($4.80)
1917	517,500	1,193,717	19/5 (4.69)

MODDERFONTEIN DEEP LEVELS, LTD. **TRANSVAAL**

Office: H. Rogers, Pinners Hall, Austin Friars, London, E. C. 2, England.

H. Newhouse, chairman of board of directors.

Inc. April 26, 1899, in the Transvaal. **Cap.,** £500,000; £1 par; all issued.

Profit in 1918 was £593,851. Dividends amounted to £487,500.

Dividends: 35% in 1915; 67½% in 1916; 85% in 1917; and 97½% in 1918.

Property: 377 claims in the Far East Rand, developed by vertical shafts, opening 3,450,000 tons of 8.8 dwt. ore.

Equipment: complete with mill capable of treating 1,500 tons daily, or over 44,000 tons monthly.

Production, years ending June 30:

Year	Ore treated, tons	Gold Yield	Cost per ton
1918.....	505,950	£1,035,472	17/5 ($4.18)
1917.....	494,400	964,343	16/4 (3.88)

NEW KLEINFONTEIN CO., LTD. **TRANSVAAL**

Office: J. H. Clark, 208 Salisbury House, London, E. C. 2, England.

Wm. Dalrymple, chairman of board of directors; E. J. Way, cons. eng.

Inc. April 2, 1894, in the Transvaal. **Cap.,** £1,300,000; £1 par; 1,151,540 issued.

Net profit in 1917 was £196,115, of which £57,577 was distributed; 115,548 was carried forward. In 1918 the profit was £49,828 out of a yield of £860,265.

Dividends: from 1894 to 1917, inclusive, 212%; including 5% in 1917.

Property: 1,805 claims on the Witwatersrand, covering 4.7 miles on the strike of the reef, and developed by 8 shafts. The property, which is divided into 3 sections, is dependent on the future of the apex section. Reserves are estimated (1919) at 2,048,000 tons averaging 5.78 dwt. per ton, compared with 2,943,994 tons in 1916.

Equipment: complete for an output of 77,000 tons of ore per month.

Production, years ending December 31:

Year	Ore treated, tons	Gold Yield	Working Profit
1918.....	674,740	£860,265	£49,828
1917.....	785,090	1,013,300	216,289

Costs are 24/- ($5.76) per ton.

NEW MODDERFONTEIN GOLD MNG. CO., LTD. **TRANSVAAL**

Head office: Rand Mines, Ltd., Corner House, Johannesburg, Transvaal.

London office: A. Moir & Co., 1 London Wall Bldgs., London, E. C. 2, England.

Sir E. A. Wallers, chairman of board of directors; E. M. Sharp, mgr.; S. Martin, cons. engr.

Inc. June 1, 1895, in Transvaal. **Cap.,** £1,400,000; £4 par; all issued and paid up. Shares are to be split into 10 shillings par in 1920.

Accounts for year ended June 30, 1916, show profit of £766,235, of which £455,000 was paid in dividends. In 1918 the profit was £850,878, which £568,750 was distributed. Balance forward was £306,744.

In 1919, dividends absorbed £875,000 and taxes £215,000; the balance forward was £255,867.

Dividends: 70% from 1906 to 1911; 25% in 1911; 30% in 1912; 30% in 1913; 31¼% in 1914; 32½% in 1915; 32½% in 1916; 40% in 1917, and 30% in 1918.

Property: 1,265 claims, 1,808 acres, considered by some authorities one of the greatest gold mines in the world, when production, present profits and future possibilities are considered.

Development: by 13 shafts to 2,258'. Ore reserves estimated at 9,000,000 tons, assaying 8.6 dwt. gold per ton.

Equipment: includes mill with 236 stamps, 15 tube-mills and cyanide

plants, capable of treating 100,000 tons per month. Eight more Nissen stamps are to be added, increasing monthly capacity by 10,000 tons.

Production, years ending June 30:

Year	Ore treated, tons	Yield per ton	Cost per ton
1919	920,500	43/10($10.52)	20/2 ($4.84)
1918	684,100	45/7 (10.87)	21/3 (5.07)
1917	656,700	43/4 (10.36)	19/5 (4.61)
1916	635,000	48/2 (11.54)	17/3 (4.14)

NEW STATE AREAS, LTD. TRANSVAAL

Office: 10 Austin Friars, London, E. C. 2, England.

S. B. Joel, chairman of board of directors; M. J. Turner, mgr.; W. L. White, cons. eng.

Inc. Feb. 20, 1918, in the Transvaal. **Cap.,** £1,500,000; £1 par; all issued, part paid.

At end of 1918 cash amounted to £169,246, and stores £39,096.

Property: 1,176 claims on farm De Springs No. 15, and 874 claims on Geduld No. 24, in the Far East Rand.

Development: to end of 1919, £650,000 had been spent on development and equipment, and by Jan., 1920, one shaft was down 1,065' and another 1,40[illegible]. Both shafts should strike the reef at about 3,600' depth by the year 192[illegible]. They are 27' 9" by 12' 9" inside measurement

Equipment: includes boilers, hoists, 50-drill compressor, electric power, shops and all necessary buildings. Company employs 300 natives underground.

NOURSE MINES, LTD. TRANSVAAL

Office: A. Moir & Co., 1 London Wall Bldgs., London, E. C. 2, England.

H. C. Boyd, chairman of board of directors; S. Beaton, acting mgr., H. S. Martin, cons. eng.

Inc. Sept. 12, 1894, in the Transvaal. **Cap.,** £850,000; £1 par; 827,821 issued. Profit in 1917 was £60,977, and £131,013 was carried forward. Revenue in 1919 was £620,000 of which £15,393 was profit.

Profit in 1917 was £60,977, and £131,013 was carried forward.

Revenue in 1919 was £620,000 of which £15,393 was profit.

Dividends: total 266% from 1898 to 1918, inclusive; 10% in 1918.

Property. 669 claims on the Witwatersrand.

Development: by vertical shafts. Ore reserves total 1,526,100 tons. New work in 1919 amounted to 15,000'.

Equipment: capable of mining and treating 50,000 tons per month.

Production: 471,000 tons of 26/2 ($6.26) ore in 1918; and 495,100 tons of 28/- ($6.72) in 1917. Output in 1919 was 482,000 tons averaging 27/7 ($6.50) at a cost of 26/7 ($6.38).

PREMIER (TRANSVAAL) DIAMOND MIN. CO., LTD. TRANSVAAL

Offices: J. A. Stevens, sec., 6½ Austin Friars, London, E. C. 2, England; T. D. Edington, sec., and W. M. Chalmers, asst. sec., Cullinan Bldg., Johannesburg; M. S. Knowles, mine sec., Elandsfontein, Transvaal; and Credit Lyonnais, 19 Boulevard des Italiens, Paris, France. **Diamond office:** W. Busch, 14 Holborn, Viaduct, London, E. C. 1, England.

Sir T. M. Cullinan, chairman of board of directors; D. McHardy, gen. mgr.; L. J. Howes, mine mgr.

Inc. Dec. 1, 1902, in the Transvaal. **Cap.,** £800,000, in 160,000 5s. preference shares and 320,000 2s. 6d. deferred shares, all issued. Control is held by De Beers Consolidated.,

Profit for year ended Oct. 31, 1918, was £665,272. Of this the Union Government took £400,245, due under the law, and £252,500 was distributed. Net current assets were £468,000.

Income for 1919 was £1,961,259, of which £1,210,980 was profit. The government's share was £726,588. Dividends absorbed £432,500.

Dividends: paid regularly on preference shares, they being entitled to a cumulative dividend of 250% per annum. Deferred shares received a total of 5200% from 1904 to 1918-'19, inclusive, 850% being paid in the last year.

Property: 3,484 diamond-bearing claims in the Pretoria district of the Transvaal, developed by open-cut to depth of 250'. Drilling has shown diamond-bearing ground to depth of 1,000'. Reserves to 360' are estimated at 32,500,000 loads (1,600 lb. each).

Equipment: suitable for handling and treating 50,000 loads daily.

Production:

Year	Ground treated loads	Yield, carats	Value per load	Cost per load
1919.....	4,529,261	815,267	.....	.....
1918.....	4,805,851	851,573	5/— ($1.20)	2/3 ($0.54)
1917.....	4,928,629	906,341	4/10 (1.16)	2/3 (0.54)
1916.....	1,572,252	419,947	6/— (1.44)	2/8 (0.64)
1915.....	Closed on account of war.			
1914.....	7,683,943	1,417,755	3/3 (0.78)	2/6 (0.60)

RANDFONTEIN CENTRAL GOLD MIN. CO., LTD. TRANSVAAL

Office: 10 Austin Friars, London, E. C. 2, England.

S. B. Joel, chairman of board of directors; G. H. Beatty, gen. mgr.; W. L. White, cons. engr.

Inc. March 26, 1907, in the Transvaal. **Cap.**, £4,500,000; £1 par; all issuel. **Debentures:** £3,000,000 6% authorized, of which 2,315,600 are outstanding.

Financial Statement, years ended December 31:

Year	Revenue	Working Profit	Balance forward
1919 (last quarter).....	£486,117	£174,077	.....
1918.....	1,991,839	108,072	£27,669
1917.....	.....	478,063	335,018
1916.....	2,835,892	834,555	418,200

Dividends 17½% from 1912 to 1918; none since 1915.

Property: 2,296 claims, 1½ acres each, on the Rand, Transvaal.

Development: by 12 main shafts along the 7 miles of reef. New openings in 1916 totaled 112,026', including 2,151' of shaft sinking; and 52,210' in 1918, with 4,084' of sinking. Deepest shaft is 3,652'.

Reserves: consist of 4,944,302 tons of $7.80; 3,486,917 tons of $4.60, and 3,268,654 tons of $2.80 ore, a total of 11,699,873 tons. The last mentioned is at present unprofitable. At the end of 1918 the total was 4,254,000 tons of 6.8 dwt. gold ore across width or thickness of 50".

Equipment: extensive and modern, including 1,000-stamp mill, 26 tube-mills, and cyanide plants, capable of treating 185,000 tons per month. Employs 11,600 natives.

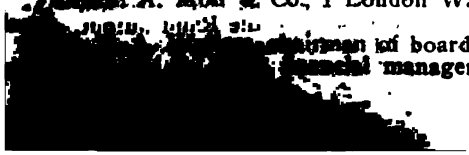
Production, years ending December 31:

Year	Ore treated, tons	Gold Yields	Cost per ton
1919 (last quarter).....	419,200	£486,117	23/8 ($5.68)
1918.....	1,745,000	£1,991,839	21/6 (5.10)
1917.....	2,017,181	2,467,636	.....
1916.....	2,209,622	2,890,000	18/1 (4.34)

The above tables show steadily decreasing returns, which in 1918 was partly due to floods, labor troubles, and epidemic. When the new shafts and pumping stations are completed a larger output and gold production is expected, as development work is satisfactory.

RAND MINES, LTD. TRANSVAAL

Office: A. Moir & Co., 1 London Wall Bldgs., London, E. C. 2, Eng-



...man of board of directors; E. T. Mellor, cons. ...manager.

Inc. Feb. 22, 1893, in the Transvaal. **Cap.**, £550,000; 5s. par; 2,125,995 issued. Listed on London Stock Exchange. On Dec. 29, 1919, 60,000 American shares were listed on the New York Curb, representing 150,000 English shares. These shares were offered the public at $40. Bankers Trust Co., New York, transfer agent, Chase National Bank, New York registrar.

Company is closely affiliated with the Central Mining & Investment Corp., successor to Wernher Beit & Co.

Financial Statement:

Year	Revenue	Dividends Paid	Carried Forward	Reserve Fund	Value of Investments
1918.....	£458,690	£451,773	£361,074	£2,805,628	£3,166,003
1917.....	727,070	770,673	348,898	2,877,878	3,142,418

Dividends: 3020% since 1898; 85% being paid in 1918; and 100% in 1919.

Property: the company owns a substantial though not a controlling interest in the producing mining companies named in the following table, and also 1,252 claims owned outright. Its shareholdings are so extensive that it practically dominates many of the companies and its income is derived almost entirely from the dividends paid by them.

Mines	Int. held by Rand mines, %	Tons	Gold yield, per ton	Profit*	Ore Reserves tons
Bantjes Cons.....	14.00	.....	....	£13,640	95,000
Brakpan	0.22	617,000	35/4	£355,798	2,718,000
City Deep.....	15.80	670,000	41/-	452,777	3,342,000
Consolidated Main Reef.	0.38	539,760	28/2	151,879	1,425,870
Crown Mines.....	46.00	1,861,000	27/2	410,704	8,298,000
Durban Roodeport Deep.	28.80	300,450	30/-	30,068	1,078,500
East Rand Proprietary..	1.67	1,372,300	23/3	52,916	2,268,000
Ferreira Deep.....	39.30	508,200	31/9	211,716	932,400
Geduld Proprietary.....	0.55	513,200	29/-	220,086	2,510,000
Geldenhuis Deep.....	48.20	591,000	23/2	1,332	1,549,600
Jupiter	11.74	266,500	24/-	7,611	787,000
Modderfontein B.....	7.81	605,500	41/-	658,587	3,378,000
Modder Deep.....	1.70	506,100	40/-	519,701	3,450,000
New Modderfontein.....	7.14	684,100	45/7	833,260	9,000,000
Nourse	46.90	471,000	26/2	58,180	1,513,000
Robinson Deep.....	.....	529,300	27/-	3,121	1,725,000
Robinson Gold.....	5.30	493,700	21/8	63,785	943,000
Rose Deep.....	38.40	616,900	23/-	139,813	2,909,500
Village Deep.....	10.80	562,300	28/-	66,256	1,874,000
Village Main Reef.....	9.60	265,900	29/2	89,290	628,150
Wolhuter Gold.....	1.60	382,950	24/-	78,875	856,870

*Operating profit, not including sundry revenues, for 1918.

Thirteen mines in the near Eastern and Central Rand produced 8,421,670 tons of ore in 1918; three in the West Rand gave 1,127,050 tons, and two in the Far East Rand gave 1,397,000 tons. Total profits were £3,336,663 against £4,748,353 in 1917.

The Modder and Spring companies in the Far East Rand are believed to have a long assured life with continuance of dividends and the Rhodesia Broken Hill should soon reach the dividend stage. The holdings are so varied that depletion at one property is offset by development in another mine.

Disbursements to company shareholders for the 11 years ended December 31, 1919, total £10,600,000 or 188% per annum on the shares issued. As this company is interested in mines producing 40% of the Rand output, and the Rand produces 40% of the world's gold, it dominates 16% of the gold output of the entire world.

ROBINSON DEEP, LTD. **TRANSVAAL**

Offices: J. T. Bedborough, 8 Old Jewry, London, E. C. 2, England; and Consolidated Gold Fields Bldgs., Johannesburg, Transvaal. D. Christopherson, chairman of board of directors.

Inc. Dec. 31, 1915, in the Transvaal to acquire assets of Robinson Deep Gold Mining Co., Ltd. **Cap.,** £925,000, in 500,000 cumulative preference A shares of 1s. each and 900,000 shares of £1 each. All A shares and 781,807 B shares are issued credited as fully paid.

Dividends: 8s. on A shares in 1916; 4s. in 1917; 2s. in 1918.

Property: 557 claims, 835 acres, on the Rand, Transvaal.

Development: by 3 shafts, one a new 7-compartment shaft 4,500' deep. Reserves are given as 1,717,000 tons, assaying 6.9 dwt. per ton, and 131,000 tons partly developed, assaying 6.5 dwt. per ton.

Equipment: includes 300 stamps, 10 tube-mills, and cyanide plants.

Production, years ending December 31:

Year	Ore treated, tons	Gold Yield	Profit
1918	529,300	£713,442	£34,225
1917	561,400	772,619	142,691
1916	632,000	934,522	306,688

Costs are about 26/- ($6.24) per ton.

ROOIBERG MINERALS DEVELOPMENT CO., LTD. TRANSVAAL

London Agency: John H. Clark, sec., 208 Salisbury House, London, E. C.

Wm. Dalrymple, chairman of board of directors; J. C. Wilson, act. mgr.; E. R. Schoch, sup't'g eng.

Inc. May 19, 1908, in the Transvaal. **Cap.,** £180,000; £1 par; all issued. Statement for year ended June 30, 1918, shows revenue of £85,334 and profit of £8,265. For same period in 1919 the revenue was £54,687, and expenditures £70,178.

Dividends: has paid 102½% since 1910; 5% in 1916-'17; none since.

Property: tin claims in the Waterburg district of the Transvaal.

Development: by 619' main shaft with 5,164' of new work in 1918; this work costing $9.30 per ton of ore mined. Surface prospecting is done by hydraulicking, as at Nipissing, Cobalt, Ontario.

Equipment: 10 stamps, tube-mill and concentrators.

Production: Year	Ore Treated, Tons	Tin, Per Cent. Metal	Extraction, Per Cent.	Metal Produced, Tons	Cost per Ton
1918-'19	14,948	1.60	.....	350*	.....
1917-'18	18,702	1.89	82.01	320	.....
1916-'17	38,557	2.85	79.80	646	.....
1915-'16	36,460	3.02	77.95	707	$12.10
1914-'15	37,263	2.82	78.27	731	10.24
1913-'14	40,643	3.18	78.81	887	11.46
1912-'13	35,917	3.56	72.85	832	12.92

*Black tin; includes that from slime.

This is one of the few base-metal producers of the Transvaal.

SIMMER DEEP, LTD. **TRANSVAAL**

Offices: J. T. Bedborough, 8 Old Jewry, London, E. C. 2, England; and Consolidated Gold Fields of South Africa, Johannesburg, Transvaal.

D. Christopherson, chairman of board of directors; C. D. Leslie, cons. engr.; H. S. MacGregor, mine mgr.; O. P. Powell, supt. engr.

Inc. Nov. 30, 1906, in the Transvaal. **Cap.,** £1,750,000; £1 par; 1,650,000 issued. **Debentures:** £755,000 5½% first mortgage, of which £689,400 are outstanding.

Accounts for 1915 showed a loss of £2,356 after paying £45,952 debenture interest and £9,848 sundries. Total reserve given as £493,622. In 1917 there was a loss of £13,483, with reserve of £519,985. In 1918 there was a loss of £27,871.

Financial position on July 31, 1918, showed £451,040 cash; £25,836 equipment, and £5,938 general expenditure to that date.

Property: a Government lease of mineral rights on 2,236 claims on Farm De Rietfontein No. 14, Far East Rand, Transvaal, immediately west of the Springs Mines, Ltd., with which arrangements were made for development and purchase of West Springs shares. A share of profits is payable to the Union Government.

Development: two shafts are being sunk, and the reef was expected to be cut at 3,800'.

This is one of the new companies operating in what is considered to be an important section of the Witwatersrand.

ZAAIPLAATS TIN MINING CO., LTD. **TRANSVAAL**

Office: E. G. Crake, Pinners Hall, Austin Friars, London, E. C. 2, England. A. Gilbertson, mgr.; W. J. Gau, cons. eng.

Inc. Aug. 18, 1908, in the Transvaal. **Cap.,** £63,750, in 255,000 shares of 5s. par, all issued.

Profit for year ended July 31, 1918, was £52,186. Dividends absorbed £19,125 and £17,425 were carried forward. Reserve was £10,000.

Dividends: from 1908 to February, 1919, inclusive, 625%; 30% in 1918-19.

Property: 234 tin claims, 23 miles W. of Potgietersrust, Transvaal, equipped with 15 stamps, 4 tube-mills, and concentrator; there is also a smelter.

Production: 355 tons of 70% metal concentrate from 28,132 tons of ore in 1916-17, and 521 tons from 17,078 tons in 1917-18. Costs are around 60/- ($14.40) per ton.

WEST AFRICA

GOLD COAST COLONY

ABBONTIAKOON MINES, LTD.

Office: E. Price, sec., 19 St. Swithin's Lane, London, E. C. 2, England. E. Davis, chairman of board of directors; S. H. Ford, supt. engr.; Consolidated Gold Fields of South Africa, cons. engrs.

Inc. Feb. 24, 1909, in England. **Cap.,** £800,000; 10s. par; 1,273,601 issued.

Profit in 1918 was £16,842 against £6,087 in 1917, and £51,490 in 1915. Balance forward to 1918 was £59,072. The year 1919 resulted in a loss of £6,332.

Dividends: in 1914, 20%; in 1915, 5%; nothing since.

Property: 918 claims, 1½ acres each, near Tarkwa, Wassau, Gold Coast Colony, West Africa, on the Government railroad.

Development: by 3,264' shaft. Reserves are given as 285,250 tons of 33/6 ($8.05) ore.

Equipment: mill with 25 stamps, 2 tube-mills, and cyanide plant of 15,000-ton monthly capacity.

Production:

Year	Ore treated, tons	Value	Cost per ton
1918	106,481	£208,435	38/- ($9.12)
1917	116,688	221,408	36/- ($8.64)
1916	117,885	231,000	27/- (6.50)

ABOSSO GOLD MINING CO., LTD. **GOLD COAST**

Office: 461 Salisbury House, London, E. C. 2, England.

T. F. Dalglish, chairman of board of directors; C. E. Jobling, gen. mgr.; D. A. Thompson, relieving; and G. W. Campion, supt.

Inc. June 18, 1901, in England. **Cap.,** £400,000; £1 par; all issued.

Profit for year ended June 30, 1916, was £25,024; in 1918 there was a loss of £1,795. The balance of £46,062 from 1917 was reduced to £24,267.

Dividends: since 1905 total 65%, 5% being paid in 1916; nothing since.

Property: in the Wassau district, Gold Coast Colony, West Africa. **Development:** by 1,880′ shaft. Ore reserves were estimated at 237,280 tons, worth $7.80 per ton in 1916, and 280,330 tons of $7.98 ore in 1918. The stoping width is 64″.

Equipment: complete for mining, steam power, also 50 stamps, tube-mill, grinding pans, and cyanide plant, of 15,000 tons monthly capacity.

Production, years ending June 30:

Year	Ore treated, tons	Yield	Cost per ton
1919	80,075	£132,027	32/6 ($7.80)
1918	102,256	152,320	29/- (6.96)
1917	112,460	167,270	26/1 (6.25)
1916	113,300	179,459	25/7 (6.14)

ASHANTI GOLDFIELDS CORPORATION, LTD. GOLD COAST

Office: H. Morgan, sec., 6 Southhampton St., Holborn, London, W. C. 1, England.

Earl of Bessborough, chairman of board of directors. J. S. Watkins, mgr.; W. R. Feldtmann, cons. engr.

Inc. May 25, 1897, in England. **Cap.,** £250,000; 4s. par; 1,103,057 issued. Profit for 1919 was £152,396, compared with £159,621 in 1918 and £173,281 in 1916. Dividends absorbed £154,428. Balance forward to 1919 was £105,471. Reserves total £117,375. Of the total profit in 21 years, 94.3% has been distributed to shareholders.

Dividends: since 1900 total 947%, 70% being paid in 1918, and 75% in 1919.

Property: 100 sq. miles at Obuasi, in Gold Coast Colony, West Africa, 124 miles from the coast. Mine is the largest producer in the region.

Geology: the Obuasi shoot occurs in disturbed ground, close to the intersection of two fissure planes. The normal fissure filling or vein formation is a brecciated graphitic schist, in places very friable. The main vein is a solid quartz body 1,000′ long on some levels, and from 3 to 40′ wide. The ore, owing to parallel streaks of graphite, has a banded structure. Some gold is free, the remainder being in pyrite and other sulphides. The Ayeinm shoot, in the same main fissure, is pear-shaped in horizontal section, being 700′ long and from 4 to 60′ wide. Gold content in both shoots is erratic.

Development: by shafts to 2,000′ depth. Mining is rendered difficult by the weakness of the rock, the irregular and great thickness of the quartz, the flat pitch of the shoot and the graphitic selvage on the footwall.

Reserves have varied as follows:

Year	Tons	Dwt. per ton	Gross Value
1919	529,500	27.2	.....
1918	526,200	28.5	£2,735,000
1917	534,100	24.5	2,772,000
1916	436,600	24.9	.....

Ore extraction costs are 12/- ($2.88) and development 7/ ($1.74) per ton. Methods are described by Johnston in "The Mining Magazine" of September, 1917.

Equipment: complete for mining, with mill containing 50 stamps, 7 ball-mills, Edwards' roasting furnaces, fine grinding and cyanide plant of 15,000 tons monthly capacity. The power plant will be enlarged during 1920.

Production: years ended June 30:

Year	Ore treated, tons	Yield	Cost per ton
1919	85,566	£429,271	59/- ($14.24)
1918	105,452	464,102	54/- (12.96)
1917	116,883	483,911	49/3 (11.79)
1916	136,994	475,958	44/7 (10.70)

Total production to end of 1918 has yielded £5,523,749. This is one of the world's biggest gold mines, operated under peculiar difficulties.

Yukon Gold Co.—Operating profit in 1919 was $511,158, less $175,828 for interest, etc., and $1,444,015 for depletion, depreciation, and stock investments, the year resulting in a deficit of $1,108,684. There are now 3 dredges in the Yukon; 4 in California, and 1 in Idaho; while 3 have been sent to Malaya to dredge tin-bearing ground. Company is exploiting silver-lead claims in the Mayo district, 200 miles S. E. of Dawson, Yukon Territory.

Alaska

Alaska Gold Mines.—Year 1919 resulted in total operating loss of $273,397. Gold recovered averaged 66 cents per ton, which is 22 cents lower than in 1918. In 5 years the output was $7,503,740. Operations can be continued only as long as advantage is taken of extracting ore broken in stopes or prepared for mining, on which costs have already been paid, according to the president of company.

Alaska Sulphur Company.—Development and equipment under way to produce 100 tons of sulphur daily for paper mills of Northwest. Deposit is at Lost Harbor, Akun Island, S. W. Alaska. T. H. Landswick of Seattle, secretary.

Bon Alaska Mining Co.—Inc. 1916, in Washington, with capital of $1,000,000; shares $1 par, listed on New York Curb in February, 1920. Company owns 28 claims in the Wrangell district, S. E. Alaska. Ores carry silver, lead, zinc, and gold. Samples of shipping ore are said to average 31.4 oz. silver and 48.9% lead. Property considered to lie in same belt of rocks as prevail in the Portland Canal district, where the Big Missouri and Premier mines lie, over 100 miles away. Development consists of 1,500 ft. tunnels, etc. When shipping 20 tons of $100 ore daily, a profit of $1,100 is expected by management.

Gold Bullion Mine.—Reported sold in February, 1920, to Hugh Dober and L. C. Thompson of Montreal, Quebec, for $500,000. Equipment to be enlarged.

Kennecott Copper Corporation.—Dividend of 50c. paid March 31, 1920.

Arizona

Arizona Commercial Mining Co.—On No. 6 level the orebody is 40' wide carrying 6% copper, for over 100', up to April, 1920. First quarter of year yielded 1,900,000 lb. copper. Net quick assets approximate $550,000.

Arizona Copper Co., Ltd.—Production for first quarter of 1919 was 9,000,000 lb. Rumored that control of company may pass to American interests.

Calumet & Arizona Mining Co.—Operating profit for 1919 was $1,906,364, less $1,381,948 for depletion, etc., leaving $524,416 net. The surplus at end of year was $13,229,770. Production was 44,991,107 lb. copper; 995,366 oz. silver, and 28,530 oz. gold. At the Gadsden mine at Jerome, 5,619 ft. of work was done, but operations were suspended in March, 1920. Option was taken on the Cornell mine in British Columbia. First quarter of 1920 yielded 10,300,000 lb. copper. A dividend of $1 per share paid March 22, 1920.

Central Copper Co.—J. N. McCauley, pres., 71 Broadway, New York. Inc. in Arizona. Cap. $10,000,000; 50c. par. Property: 31 claims in Texas and Dos Cabezos districts, Cochise county, Arizona. Veins carry copper. Prospectus very optimistic.

Consolidated Arizona Smelting Co.—About 900,000 lb. of copper bullion shipped monthly to refiners. Operating profit in 1919 was $96,294. Surplus at end of year was $172,076.

Helvetia Copper Co.—Seven oil wells in Texas are yielding an average of 9 barrels each daily.

Inspiration Consolidated Copper Co.—Receipts from sales of copper during 1919 were $11,045,222, and expenses, $6,747,658. After allowing for depreciation, etc., net balance was $4,186,628. Surplus was reduced to $9,879,259. Ore reserves are given as 77,477,000 tons. The mill worked at 55% capacity, and gave a better recovery. Tests in leaching oxide ore are

satisfactory and are being continued. Dividend of $1.50 per share paid April 26, 1920. First quarter produced 20,900,000 lb. copper.

Iron Cap Copper Co.—Operating profit in 1919 was $249,032. Copper sold was 5,823,008 lb. Current assets are $909,251. and liabilities $323,227. Dividend of 25c. per share paid March 18, 1920. Good progress being made on new mill.

Jerome Grande Copper Co.—Selling treasury shares in March, 1920, to pay for further exploration and installation of electric plant.

Miami Copper Co.—Dividend of 50c. paid May 15, 1920. Production for first quarter was 13,500,000 lb.

Mile-Wide Copper Co.—Application made in February, 1920, to place property in hands of receiver.

New Cornelia Copper Co.—Operating profit in 1919 was $1,601,198, less $1,583,952 for depletion and depreciation, leaving $17,246 net. Sales of copper were 29,972,106 lb. The works operated satisfactorily. Production for first quarter of 1920 was 10,400,000 lb. Dividend of 25 cents a share payable May 24, 1920.

New King of Arizona Mining Co.—Formely King of Arizona, now being developed.

Old Dominion Co.—Operating profit for 1919 was $73,685, against $1,147,079 in 1918. Production was 28,166,396 lb. copper, 5,755 oz. gold, and 137,071 oz. silver. Ore reserves were increased by 440,000 tons. First quarter of 1920 yielded 6,900,000 lb.

Ray Consolidated Copper Co.—Production in 1919 was 46,746,893 lb., which sold at an average of 17.90c. Costs were 15.62c. After dividends of $2 per share, there was a deficit of $1,410,917. On March 31, 1920, a dividend of 25c. was paid. First quarter of 1920 yielded 11,600,000 lb.

Shannon Copper Co.—Net quick assets in March, 1920, were $453,598. Company may enter the oil business.

Shattuck-Arizona Copper Co.—The year 1919 resulted in a loss of $21,893. Revenue was $1,069,698. Dividends amounted to $262,500. Surplus was reduced to $1,732,365. First quarter of 1920 yielded 1,000,000 lb. copper, 1,930,000 lb. lead, 41,000 oz. silver, and 460 oz. gold.

Shea Copper Co.—Information on page 382 from reliable source, but not guaranteed.

Silver King of Arizona.—Par value of shares increased to $5, and issue of $500,000, 7%, 10-year convertible bonds sanctioned.

Superior & Boston Copper Co.—Year ending September 30, 1919, showed loss of $14,863, reducing profit and loss credit to $16,401. Surplus account was $455,101. By January 1, 1920, neither the Old Dominion nor North veins had been cut on 1,000′ level. On 1,200′ level the Eastern vein is 48′ wide, but carries only 0.4% copper. The footwall vein on 400′ level maintains its richness and width. Seventeen cars of ore yielded $38,303 from the smelter.

United Arizona Extension Mining Corporation.—Inc. March, 1920, with capital of $1,500,000, shares $1 par, to develop 13 claims near Cordes station, close to the Arizona Binghampton.

United Eastern Mining Co.—Gold production in 1919 was $2,031,594, from 97,325 tons of ore. Ore reserves are valued at $6,000,820. Dividend of 5c. paid for first quarter of 1920.

United Verde Copper Co.—Dividend of $1.50 per share paid in March, 1920.

United Verde Extension Mining Co.—The 20,000,000 lb. of copper on hand at beginning of March, 1920, was reduced to 7,000,000 lb. by end of month. Output for first quarter was 10,600,000. Gross revenue in 1919 was $3,464,924, of which $3,340,900 was operating profit. Reserves for depletion and depreciation totaled $2,359,180. The net loss was $235,156. Surplus was reduced to $5,904,068.

Arkansas.

Boston & Arkansas Mining Co.—The old Davis zinc-lead-copper mine in Sevier county is being reopened. It is fully equipped, and is in charge of C. L. Larson.

California

Argonaut Mining Co.—On account of fire in the adjoining Kennedy mine, operations were suspended in March, 1920.

Blue Ledge Mine.—This promising property almost on the Oregon boundary, in Siskiyou county, is shipping copper ore regularly to the Tacoma smelter.

Carson Hill Gold Mining Co.—In March, 1920, work on the 1,100′ level had exposed 10′ of ore averaging $56 per ton, from which daily shipments were 30 tons. The mill is being enlarged.

Central Eureka Mining Co.—The 3,500 and 3,700′ levels are opening well. Dividend of 5c. paid January 12, 1920. Reserve fund being built up.

Feather River Copper Co.—The 2,500′ tunnel is in over 500′. Electrically-driven machinery installed. Interests in the Kay Copper Co. of Arizona are behind this venture.

Gruss Mining Co.—A 1,000′ tunnel is being driven to develop a copper vein. Mill is to be remodeled.

Kennedy M. & M. Co.—On account of fire, operations were suspended in March, 1920.

Natomas Company of California.—Income from all sources in 1919 was $2,934,470, of which $167,548 was operating profit. Against this must be placed $651,674, non-operating expense. Indebtedness was reduced to $431,123, and mortgage and bonded debt to $10,751,785. Current assets at end of year were $1,036,335, and liabilities $196,123. Gold production was $1,775,124, of which $461,484 was profit.

Nevada Pacific Exploration Co.—Gold ore blocked out in this mine near Forest Hill, estimated as worth $400,000, and 50-ton mill ready. Nevada interests behind this venture.

New Idria Quicksilver Co.—Output in 1919 was 7,400 flasks. Net profit was $1,050. Better ore and market now prevailing.

North Star Mines Co.—Gold production in 1919 was $1,181,346, of which $102,856 was profit. One dividend of 4%, $100,000, was paid in June. Little development was done at the North Star, while results at the Champion promise little for the future. Costs were $18.04 per oz. of gold, compared with $9.51 in 1913.

Colorado

American Smelting & Refining Co.—The Leadville District mill was taken over on a long lease in March, 1920. It is to be remodeled to dress low grade complex ores from the Yak tunnel and other mines.

Colorado Fuel & Iron Co.—Iron mines yielded 715,145 tons of ore in 1919. Net operating profit was $4,165,366 from all sources.

Cresson Consolidated Gold M. & M. Co.—10 cents per share paid March 10, 1920, making $8,491,163 to date. Production in 1919 was $1,039,500 from 94,920 tons of ore.

Golden Cycle Mining & Reduction Co.—Dividend rate reduced from 3 to 2c. monthly in April, 1920.

Leadville Leasing Corporation.—Organized in February, 1920, by A. J. Bailey to operate four mines on Breece, Carbonate, and Idaho Park hills, Leadville. Ores carry high silver content.

Little Jonny Mine.—Gold ore from this Leadville mine is being treated at the Golden Cycle mill at Colorado Springs.

Portland Gold Mining Co.—Dividends of 2c. per quarter reduced to 1½c. in 1920. New orebody on 2,300′ level shows 4 to 5′ of 1 oz. ore.

San Juan Silver Syndicate.—Organized to develop claims near Ouray. Considered by promoters to be a "double-barrelled opportunity."

Sunnyside M. & M. Co.—Surface equipment burned in April, 1919, rebuilt, and in April, 1920, the mill was dressing 500 tons of ore daily, employing 350 men. The gold-silver-lead-copper-zinc-iron ore is concentrated by flotation.

Tonopah Placers Co.—Three dredges moved 3,122,571 cu. yd. in 1919, averaging 9.8 cents per yard. The profit was $16,284, plus $6,788 from miscellaneous items.

Vindicator Consolidated Gold Mining Co.—First quarterly dividend in 1920 passed.

Idaho

Bunker Hill & Sullivan Mng. and Conc. Co.—Dividends in 1919 were 1,144,500, and $490,500 in first quarter of 1920, making $23,659,470 to date.

Callahan Zinc-Lead Co.—New name for Consolidated Interstate- Callahan M. Co. First quarter of 1920 yielded 23,780,000 lbs. of zinc concentrate, 020,000 lb. lead concentrate, and 82,090 oz. silver.

Federal Mining & Smelting Co.—Four mines were operated during 919, two in Idaho and two in Oklahoma. Reserves in the Morning mine t Mullan are 1,088,600 tons, and in the Independence at Hailey, are 53,000 ons. These mines produced 172,330 and 13,380 tons, respectively. Receipts om all sources were $2,474,864, and expenses $1,756,718. Dividends absorbed 49,479. Quick assets at end of year were $1,708,531 in excess of liabilities. rospects for 1920 are considered bright, on account of the lead, silver, and ic markets.

ERRATA: Hecla Mining Co.—On page 701, in the table, the column der 1919 should read.

Ore sales, etc	$1,692,771
Operating charges	1,066,232
Net profit	626,539
Dividends	600,000
Current assets	1,822,226
Current liabilities	63,318

On Hecla's 2,000' level, 3' of high-grade lead-silver ore was cut in February, 1920. Dividend of 20c. a share payable June 28, 1920.

Hercules Mining Co.—Shipping ore to Bunker Hill smelter in February, 0. instead of to Northport, Wash.

Nabob Consolidated Mining Co.—Milling resumed in March, 1920. ares to be listed on New York Curb.

National Copper Mining Co.—Operations finally stopped early in April, 0, and equipment to be sold.

Yukon Gold Co.—Dredge during 1919 dug 1,519,035 cu. yd. averaging 9c., at cost of 9.05c. per yard.

Michigan

Ahmeek Mining Co.—Dividend of 50c. a share paid March 31, 1920. earnings in 1919 were $640,424. Production was 17,223,111 lb. copper, hich 12,167,613 lb. was delivered at average of 18.81c. Costs were 14.02c.

Allouez Mining Co.—The year 1919 resulted in a loss of $73,738, equal 98c. per lb. on the 3,020,067 lb. delivered.

Arcadian Consolidated Mining Co.—Work resumed in April, 1920. ipany is financed for 2 years' exploration.

Calumet & Hecla Mining Co.—First 3 months of 1920 yielded 16,600,000 opper. Large shipments of metal being made. Copper delivered in realized $5,263,076, but expenses on same were $5,666,726. Total operloss was $652,286. The year ended with a surplus of $241,659.

Franklin Mining Co.—The year 1919 resulted in a deficit of $192,930. uction was suspended in May. The output was 1,062,879 lb. On No. id 19 levels 200,000 tons of good ore reported awaiting extraction.

Hancock Consolidated Mining Co.—Initial shipment in February, 1920, 700 tons of ore to mill yielded 15 lb. (0.75%) copper per ton. Results o. 44 level reported encouraging.

Indiana Mining Co.—Deficit for 1919 was $10,020. Property has been idle since May, 1918. It is well equipped.

Isle Royale Copper Co.—Operating at 60% capacity, production being at rate of 13,000,000 lb. per annum. Quick assets in February, 1920, were about $1,800,000 net. No dividend paid in first quarter. Net earnings in 1919, before deducting taxes, etc., were $416,491. Production was 13,007,66[illegible] lb. of which 8,834,380 lb. was sold at 18.6c. per lb. Costs were 15.8 cents.

Keweenaw Copper Co.—No exploration was done in 1919. Investments amount to $1,724,201.

Mass Consolidated Mining Co.—Mine still closed. Copper on hand in February, 1920, was 1,000,000 lb. Timber and surface rights on 600 acres sold for $25,000.

Mayflower-Old Colony Copper Co.—Assessments and interest during 1919 totaled $109,993. Exploration cost $99,386. Balance on January 1, 1920, was $14,823. Assessments in 1920, to March 17, realized $128,000. Driving on 1,709' level said to be encouraging.

Mohawk Mining Co.—Good ore first opened on 22nd level of No. 4 shaft north persists to 25th. Copper output averaging 1,000,000 lb. monthly. Operating costs in 1919 totaled 9c. a pound. Financial position is strong. Dividend of $1.50 paid on May 1, 1920.

Naumkeag Copper Co.—Assessment of 50c. a share on November 1, 1919, realized $35,186. Results of work on the Pewabic lode at 1,000' depth were so discouraging in January, 1920, that work was stopped there, and started at the adit level to crosscut the whole Pewabic series.

Osceola Consolidated Mining Co.—Production in 1919 was 10,824,[illegible] lb., of which 7,766,460 lb. was delivered at 18.65c. Costs were 18.08c. Net profit after allowing for depreciation was $112,559.

Quincy Mining Co.—A dividend of $1 per share paid March 29, 1920.

St. Mary's Mineral Land Co.—The sale of 6,302 acres of timber land realized $216,875. Dividends received from the Champion mine were $[illegible] per share. Cash at end of 1919 amounted to $95,953, against $206,16[illegible] a year ago.

Seneca Copper Corporation.—Second mill test of 715 tons in February, 1920, averaged 57 lb. (2.85%) copper per ton of ore. Shipments to Baltic mill to be resumed in May. Report by R. A. Parker of Denver, says that the Kearsarge lode has been opened on 3 levels as rich and wide as in adjoining mines, and within 2 years the mine should be on a good paying basis.

South Lake Mining Co.—Production was not resumed during 1919. Physical condition of mine is reported good. Current liabilities exceeded assets by $150,316 at end of year. $2 per share of the unpaid subscription to capital stock payable March 22, 1920.

Superior Copper Co.—Year 1919 resulted in loss of $92,938. Production was 563,935 lb. Metal sold realized 18.67c., and costs were 31.57c. per lb. Net current assets are $539,444, mostly cash or equivalent.

Victoria Copper Mining Co.—Production in 1919 was 1,245,590 lb. copper from 89,206 tons of ore, equal to a 0.69% yield. The year resulted in a loss of $35,808. Current assets are $395,096, and liabilities $262,385. Development was considered satisfactory.

Winona Copper Co.—Work was suspended in February, 1919, and the yield was only 561,238 lb. Revenue was $113,390, and expenditure $200,[illegible]. First two months of 1920 yielded 339,000 lb. copper. In March there were 300,000 lb. unsold.

Wolverine Copper Mining Co.—Regular dividend for March, 1920, passed. Output for first 2 months was 510,000 lb.

Missouri

American Zinc, Lead & Smelting Co.—New zinc-lead deposits discovered 10 miles S. of Joplin, and extensive drilling under way.

Eagle-Picher Lead Co.—Drilling new zinc-lead deposits 10 miles S. of Joplin.

St. Joseph Lead Co.—Owing to great demand for lead, company's works are at full capacity.

Underwriters Land Co.—Drilling new zinc-lead deposits 10 miles S. of Joplin.

United Zinc Smelting Corporation.—Capacity of works at Moundsville, W. Va., being doubled.

Montana

Anaconda Copper Mining Co.—A dividend of $1 per share, payable May 24, 1920, making $2 for current year. Production for first quarter was 55,000,000 lb. The Emma mine is producing 15% zinc and 8 oz. silver ore, also 150 tons daily of manganese ore, to be increased three times. The ferro-manganese plant at Great Falls is in operation, where also superphosphate is being made, and the copper rod mill working to capacity.

Barnes-King Development Co.—Gold production in February, 1920, was $42,377. Directors decided in March to buy 17,500 shares, at $1 each, of the Kansas-Montana Oil & Gas Co., which is drilling a well for oil in Fergus county, Montana. Oil is expected at depth of 2,400 feet.

Boston & Montana Development Co.—Recent developments are reported as encouraging. Regular shipments of ore being made. Foundations for mill complete.

Butte & Superior Mining Co.—Net profit in 1919 was $864,989, after allowance for depreciation and depletion ($916,272). Monthly production running 13,000,000 lb. zinc and 210,000 oz. silver. Earnings in January and February, 1920, at rate of $9 per share per annum. Net quick assets approximate $3,000,000. Settlement over flotation patents not expected for several months.

Butte Copper & Zinc Co.—Regular shipments of manganese and zinc ore being made from the Emma mine under the 50-50 working agreement with the Anaconda company.

Davis-Daly Copper Co.—Daily output in April, 1920, was 400 tons of 2% copper ore. Good developments reported on 2,700′ level. Net profit January was $27,000. Dividend of 25c. paid March 30. Financial position good.

East Butte Copper Mining Co.—Production in 1919 was 146,542 tons ore, yielding 19,987,733 lb. copper, 698,146 oz. silver, and 1,013 oz. gold. Gross income was $4,342,390. Net profit was $524,189. Costs were 16.58c. pound. An interest has been taken in property near Tonopah, Nevada; the Mule Creek oil field of Wyoming; also in Kansas and Oklahoma.

Elm Orlu Mining Co.—In apex dispute with Anaconda over part of the Pilot Butte copper vein, ground being examined and compromise probable.

North Butte Mining Co.—Monthly production in 1920 at rate of 1,800,000 Development at 3,200′ depth on Edith May vein is good. The East Side properties are producing ore. Net cash assets approximate $1,700,000.

Nevada

Arizona Silver Mining Co. and associated companies.—Certain Boston brokers who were very active in an advertising campaign in these shares were arrested under the Massachusetts law in March, 1920, and fined up to $200 each on April 21.

Bluestone M. & S. Co.—Sales of metals during 1919 realized $494,913. There was a net loss of $248,601.

Gold Zone Divide Mining Co.—Report of February 2, 1920, states that 36′ of new work was done on the 500′ level. Drift on what is supposed to be the Divide fissure cut a vein 40′ wide assaying $6 per ton across full width. N. E. and S. W. drifts, and a 100′ winze are being driven to determine pitch of the vein. Property is well equipped.

Jim Butler Tonopah Mining Co.—Net profit for 1919 was $28,563. Ore production was only 5,711 tons, averaging $23.48 per ton. Total costs were $15.08. Results were not encouraging, and only small profits may be expected for 1920.

Nevada Consolidated Copper Co.—Dividend of 25c. paid March 31, 1920. First quarter of year produced about 12,000,000 lb. copper. Net profit for 1919 was $1,225,357, Total surplus was reduced to $8,160,533.

Red Hill Florence Mining Co.—Assessment No. 5, of 1½c. per share, payable February 10, 1920. Receipts in 1919 were $28,214, including $24,7[illegible] from assessments. Mine development cost $20,090. Cash on January 1, 1920, was $6,888. Physical condition of the mine is considered encouraging.

Rochester Nevada Silver Mines Co.—Name changed to Rochester Silver Corporation. Capital, $2,000,000; shares $1 par. The relative equities of the 3 companies consolidated remain unaltered from original scheme. At beginning of 1920, net current assets were $142,383. Last quarter of 1919 yielded a profit of $71,722 from 13,923 tons of $14.30 ore. Costs are $9.14 per ton, but are expected to be reduced to $7.25. Ore reserves are equal to 200 tons a day for one year.

Simon Silver-Lead Mines Co.—Capital increased in April, 1920, from $1,500,000 to $2,000,000; shares $1 par.

Tonopah Belmont Development Co.—Net profit in 1919 was $569,80[illegible] Ore reserves are larger than in previous year. Price received for silver was 10 cents per ounce higher than in 1918, but costs were 15 cents more.

Tonopah Divide Mining Co.—Former directors re-elected in April, 192[illegible] Report for full year 1919, dated April 10, 1920, shows that 1,012,800 shares are outstanding. Cash assets exceed liabilities by about $31,000. Ore shipments amounted to 9,612 tons, averaging $29.35 per ton. Costs were $19.[illegible] per ton. New work covered 4,605', making 7,578' to date. The shaft was sunk 217', and is 585' deep, where leaching and oxidation continue unchanged. The lower levels have failed to open the high-grade ore opened above. Reserves are estimated at 52,000 tons averaging 20 oz. silver and 0.08 oz. gold, and 16,000 tons carrying 5.12 oz. silver and 0.125 oz. gold. The total value is about $1,500,000.

Tonopah Extension Mining Co.—Dividend of 5 cents a share paid April 1, 1920. Development continues satisfactory, and in the Victor section, [illegible] veins—8, 6, and 13' wide, respectively, have been opened to the 1,760' level.

Tonopah Mining Co.—Net earnings and income during 1919 were $402,207. Dividends totaled $300,000. Net value of investments, cash, supplies, loans to subsidiaries, etc., totals $5,381,247. Output was 41,298 tons of $18.74 ore. Costs totaled $6.37 per ton. Ore reserves are undeterminable, but should supply the mill with 150 tons daily for about one year.

New Mexico

Chino Copper Co.—Output in 1919 was 40,488,706 lb., and net operating profit on $1,038,908. After paying dividends, there was a deficit of $1,501,44[illegible] Surplus of quick assets reduced to $4,444,384 at end of 1919. First quarter of 1920 yielded 11,300,000 lb.

South Dakota

Homestake Mining Co.—Operations gradually returning to normal after the fire and flooding of mine. No dividends paid so far in current year.

National Tin Corporation.—Work resumed in February, 1920, and ore sent to mill.

Trojan Mining Co.—Mill working at full capacity.

Tennessee

Tennessee Copper & Chemical Corp.—Three contracts for three years each have been made for sale of sulphuric acid at about $10 per ton.

Report for 1919 states that 413,877 tons of ore yielded 10,407,228 lb. copper at cost of 18.715c. per lb. After allowing for operating expenses and interest there was a loss of $325,379. Current assets are $6,255,097, and liabilities, $1,022,399. Ore reserves total 3,273,645 tons. Acid production was 266,627 tons.

Utah

Bingham Mines Co.—Net income from all sources in 1919 was $80,306. Dividends totaled $112,000. Previous surplus of $365,877 was reduced to 261,231. The mines are responding to the intensive development campaign.

Daly West Mining Co.—Metals sold in 1919 realized $179,910. Surplus was reduced by $21,647. Cash balance on January 1, 1920, was $141,979. After lapse of 7 years, a dividend of 15 cents paid April 1. The new development campaign has been most satisfactory.

Eagle & Blue Bell Mining Co.—Dividend of 10c. a share paid April 10, 1920.

Judge Mining & Smelting Co.—Receipts from metals, etc., were $724,898 during 1919, and expenses $588,692. At end of year the cash balance was 148,385, plus $135,000 for unsold zinc. Dividend No. 36, of 12½c. per share, was paid April 1, 1920. Physical condition of mine is good for large output, and a continuous run is assured for the remodeled zinc plant.

Moscow M. & M. Co.—Property consolidated with that of Red Warrior and Beaver Combination companies, and new company organized under name of Moscow Silver Mines Co.

Silver King Consolidated Mining Co.—Net value of ore mined in 1919 was $275,970. Dividends amounted to $70,000.

Utah Consolidated Mining Co.—Exploration covered 17,407'. Reserves are 848,000 tons of copper ore and 38,400 tons of lead ore. Production was 710,346 lb. copper, 13,072,177 lb. lead, 10,548 oz. gold, and 373,180 oz. silver. Profit for 1919 was $181,966. Current assets at end of year were $2,135,907, and liabilities $204,220.

Utah Copper Co.—Monthly production in 1920 at rate of over 9,000,000 pounds.

Wyoming

Quin "B" Mining Co.—Office: Equitable Bldg., Baltimore, Md. Incorporated in Arizona in 1916, with capital of $500,000; $1 par; and owns 5 claims Carbon county, Wyoming. A 275' tunnel is said to have opened half a million tons of 3% copper ore.

Canada

British Columbia

Granby Consolidated Mining, Smelting & Power Co.—New issue of 7-year 8% convertible debentures on market, April, 1920. Copper production at rate of 2,000,000 lb. monthly, all from the Anyox property. Proposed to concentrate the remaining ore at Phoenix.

Manitoba

Mandy Mining Co.—Gross value of 8,482 tons of copper ore sent to Trail, B. C., during 1919 was $629,666. Net income was $217,452. Surplus at end of year was $168,318. Production for 1920 will be about 9,000 tons of ore. Equipment sold in March, 1920, to syndicate developing the Flin Flon property.

Nova Scotia

Bradford Mines, Ltd.—Office: Halifax, N. S. Inc. in Nova Scotia, with capital of $1,000,000, shares $1 par, 430,000 issued. To develop 264 acres of mineral ground in the Tangier district, 40 miles by water from Halifax. Ore is gold bearing, and is free milling. There are said to be a large number

of veins, estimated to contain 750,000 tons of $15 ore. Deepest workings are at 600'. Property is fully equipped, including electric power and mill. Estimated net earnings are $141,823 per annum, plus revenue from sale of power.

Ontario

Beaver Consolidated Mines.—Profit in 1919 was $158,216, and balance at credit of profit and loss account was increased to $1,049,081. Holdings in Kirkland Lake Gold M. Co. are placed at $362,262. Production was 301,781 oz. silver. Broken ore in mine is valued at $231,264. Development was satisfactory.

Gifford-Cobalt Mine.—Work probably to be resumed in summer of 192

Keeley Silver Mines, Ltd.—Subsidiary of Associated Gold Fields of Western Australia was organized in March, 1920, to develop the Keeley mine in the South Lorrain area near Cobalt.

Kerr Lake Mines.—Report of March 16, 1920, states that on Febru 29, cash and securities were valued at $2,415,027, equal to $4 per sha Production for first 2 months of year was 213,234 oz. silver. A fu equipped silver mine, in Utah, with 87,000 tons of 18 oz. ore, also a gra property in New Zealand, with an estimated profit of $3,436,000, now be equipped with a dredge, have been acquired.

King Kirkland Gold Mines, Ltd.—Incorporated, April 1920, to ope in Kirkland Lake district.

Kirkland Lake Gold Mining Co.—Operations in 1919 were hampere by a strike. Reserves are sufficient for the new 150-ton mill for 2 years.

La Rose Mines.—Profit for 1919 was $51,736. Surplus was $514,424.

Ontario Smelters & Refiners.—Company operates plant of Standard & R. Co. at Chippewa, Ontario; also owns land in the Temiskaming distri Capital is $750,000, of which $500,000 is outstanding. In March, 1920, $250,0 of 7% first-mortgage bonds were offered. Annual turnover is estimated $440,000.

Silver Islet Mine.—The Nepigan Mining & Lands Co., owner of t mine, on an island in Lake Superior, near Port Arthur, first worked in 18 has granted an option to American interests. Considerable ore is said be available for mining.

Thompson-Krist Gold Mining Co.—Being consolidated with the Por pine-Crown company in April, 1920.

Mexico

Sonora.

Canario Copper Co.—Capital increased from $2,000,000 to $20,000,00 December, 1919, and par value of shares from $1 to $10.

El Fuerte M. & S. Co.—Acquired smelter of Choix Consolidated M. C and obtained lease on part of latter's mines in 1920.

Greene Cananea Copper Co.—Production in first quarter of 1920, 10,100,000 lb. copper and 405,000 oz. silver.

South America

Chile

Chile Copper Co.—Year 1919 resulted in an operating profit of $1,26 but after paying interest, etc., there was a deficit of $1,720,165. Produc in January, 1920, was 7,500,000 lb.

Peru

Cerro De Pasco Mining Co.—Monthly production in 1920 averag 4,600,000 lb. copper. Total income in 1919 was $23,917,308, of which $2,28 was profit, after deducting operating charges, depletion, depreciation, in est, and taxes. Dividends amounted to $3,592,909. Surplus is $10,273

[redacted]

Egypt

Barramia Mining & Exploration—[redacted] £6,132. Operations resulted in a [redacted] and loss is £10,996. [redacted] being wound up.

[redacted]

Philippine Islands

Benguet Consolidated Mining Co.—[redacted] hat 23,719 tons of [redacted] of P400,311. Dividends amounted [redacted] and liabilities P4[redacted]

[redacted]

[redacted]

Mount Bischoff Tin Mining Co.—[redacted] 919, 127 tons of metallic tin were raised [redacted] fter distributing £7,500 in dividends and [redacted] et credit was £72[redacted] The [redacted] m. Cyril W. Gudgeon is the new [redacted]

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